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INVITED LECTURES

Role of sleep in the pathogenesis of gastroesophageal reflux disease and its complications

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Gastroesophageal reflux (GER) is a common event, occurring primarily post-prandially, and usually associated with symptoms of heartburn or regurgitation. Numerous epidemiologic studies have recently noted that approximately 5% of the American population has heartburn nearly everyday[1]. Episodic heartburn is usually treated with over-the-counter medications such as antacids, and a recent survey has documented that about 13% of the American population takes antacids at least twice a week[2]. Although GER with heartburn has been noted to be relatively common, the long-term consequences and complications of this physiologic event have not been generally well recognized or appreciated by the practicing physician. The severity of GER is determined by its combined frequency and duration, or total acid contact time (ACT). Although ACT can accumulate via numerous short episodes of GER, or fewer longer episodes, there are data suggesting that the accumulation of ACT during sleep related episodes may be more damaging to the esophageal mucosa[3,4]. The advent of 24-h ambulatory esophageal pH monitoring has allowed an accurate correlation of the pattern of GER during daytime and nocturnal periods.

THE PATTERN OF GER

Considerable attention has been focused on the differences in the pattern of GER during the daytime and during sleep in a study published by Johnson and Demeester [3]. By utilizing 24-h esophageal pH monitoring these investigators identified three different groups of patients with reflux esophagitis, and they noted that the more severe forms of esophagitis were associated with an increase in supine or nocturnal GER. On the basis of these results, the authors suggested that reflux events occurring during the nocturnal interval were more likely to be associated with the development of complications of GER. Additional data from our laboratory provides support for this hypothesis is that we have shown that the single most effective marker in discriminating patients with and without erosive esophagitis was the number of sleep related reflux episodes lasting more than 5 min [5]. These data support work by Johnson and DeMeester which have identified different patterns of GER associated with daytime (predominantly upright position) and nighttime (predominantly supine position) esophageal pH monitoring[3]. In the upright position, episodes of GER tend to be more numerous, particularly post-prandially, but they are rapidly neutralized to a pH of 4 or above. In the supine position, predominantly during sleep, episodes of reflux are fewer, but acid clearance is more prolonged.

PARAMETERS OF ACID CLEARANCE DURING SLEEP

Prolonged acid clearance during sleep has been identified as a risk factor in the development of esophagitis as noted above. We have identified a number of parameters concerning acid clearance during sleep which further delineate the mechanisms by which infused acid into the esophagus during sleep is cleared an subsequently neutralized to a pH of 4.0. For example, in normal volunteers our work has shown that the clearance of infused acid from the distal esophagus is specifically correlated with the percent of waking time during the acid clearance interval. That is, if individuals spend most of the acid clearing interval asleep as defined by polysomnography, the ACT is more prolonged than if the individual spends most of the acid clearing duration awake[6]. These data were also analyzed in terms of evaluating the swallowing rate subsequent to water infusion compared to acid infusion. The swallowing rate for the 10 min interval subsequent to the infustion of acid or water was compared to the swallowing rate in the 10 min interval preceding the infusion. The data revealed a marked and highly statistically significant increase in the swallowing rate associated with acid infusion. This identifies the fact that in this group of normal volunteers, they are quite differentially sensitive to acid when infused during sleep. All of these individuals had a negative acid perfusion test in the daytime which proved that they were unresponsive to acid infusion during the waking state. Obviously, the esophagus appears to be responding quite differently to the acid stimulus as a function of the state of consciousness (*i.e.* waking *vs* sleep).

In other studies we have documented differential effects of both volume and pH stimulation of the distal esophagus during waking and sleep. We have shown that infusing different volumes into the esophagus will produce quite differential arousal and swallowing

responses which are volume dependent. That is, larger volumes, which are presumably more likely to show longer acid clearance and greater proximal migration in the esophagus, reveal a shorter arousal latency[7]. In addition, the latency to the first swallow was compared in both the waking state and during sleep. This analysis revealed that in the waking state, different volumes did not produce any effect on the latency to the first swallow, while during sleep there was a clear decrease in the latency to the first swallow with increasing volume. This would suggest that in the sleeping state, where individuals are more vulnerable to the pulmonary aspiration of refluxed gastric contents, a protective response is in place in the form of enhanced responsiveness to larger volumes of acid.

In a similar study comparing different pH levels of the infused acid, lower pH levels have also shown shorter arousal latencies and first swallow latencies[8]. These data combine to suggest that both volume and the pH of reflux gastric contents can markedly affect that arousal latency, swallowing responses which suggest that intrinsic communication exists between the brain and the esophagus to provide protective mechanisms against the possibility of pulmonary aspiration.

CONCLUSION

From the research conducted in our laboratory and others it would appear that prolonged esophageal acid contact time is associated with a greater risk to develop erosive esophagitis. In addition, sleep is a time of increased risk of not only esophageal acid contact, but also proximal migration and aspiration of refluxed gastric contents. Our research suggests that there are afferent mechanisms producing higher cortical responses in the form of arousals from sleep and subsequent swallowing behaviors which serve to protect the organism against prolonged acid contact time and possible pulmonary aspiration.

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INVITED LECTURES

Effect of psycho-emotional stress on gastrointestinal motility

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Psycho-emotional stress often induces various kinds of gastrointestinal symptoms, suggesting alteration in gastrointestinal motility, particularly in patients with functional bowel disorders such as non-ulcer dyspepsia (NUD) and irritable bowel syndrome (IBS). However, the precise mechanism involved in the alteration in the motility. We have evaluated gastrointestinal motility under psycho-emotional stress and simulated stressed condition with corticotropin releasing hormone (CRH).

EFFECT OF MENTAL ARITHMETIC STRESS ON GASTROINTESTINAL MOTILITY

Mental arithmetic (MA) stress is one of the simple and effective stress test. Gastrointestinal motility in normal control subjects and patients with functional bowel disorders were monitored to see the effect of MA stress, using microtransducer manometric system (Synectics, Sweden). Esophagus: With MA stress, esophageal peristaltic contraction amplitude decreases insignificantly. In patients with diffuse esophageal spasm or nut cracker esophagus, contraction amplitude increases after mental arithmetic stress[1]. Stomach: Antral contractility decreases during MA stress both in normal control subjects and in patients with NUD or IBS[2,3]. Duodenum: MA prolonged the duration of phase Ⅱ with MA stress, both in normal control subjects and in IBS patients. This effect is more prominent in IBS patients. Also, MA stress induces discrete clustered contractions in the duodenum. MA decreases amplitude of duodenal contraction during MA stress, which is more prominent in patients with NUD or IBS[2,3]. Colon: MA stress slightly increases colonic motility indices (CMI) in normal control subjects, while it increases significantly in IBS patients[2].

COMPARISON BETWEEN NORMAL CONTROL SUBJECTS AND PATIENTS WITH FUNCTIONAL BOWEL DISORDERS

Esophagus: Esophageal motility in patients with nut-cracker esophagus and in patients with diffuse esophageal spasm is obviously different from normal control subjects because of the definition of the disorders[3,4].

Stomach: Antral contractility is weaker in NUD patients. Similar findings were suggested from the EGG study and gastric emptying study[5].

Duodenum: Prolonged duration of phase Ⅱ and the appearance of discrete clustered contractions were observed in some patients with NUD or IBS[3,4].

Colon: Colonic motility index in patients with IBS is higher than normal control subjects, and more exaggerated response to MA stress are observed.

EFFECT OF CORTICOTROPIN RELEASING HORMONE (CRH) INJECTION

As the hypothalamo-Pituitary-Adrenal (HPA) axis is highly suspected to be responsible for the physical response to stress, CRH which plays an critical role in HPA axis response to stress was administered to normal volunteers and IBS patients exogenously to simulate stress response.

Duodenum: Duodenal motility was suppressed with CRH after transient minor increase of motility index. IBS patients showed transient, but significant increase of motility index of the duodenum[6].

Colon: Colonic motility increased after CRH injection in normal volunteers, and more prominent response was observed in IBS patients[6].

SUMMARY

MA stress induces alterations in gastrointestinal motility, which is partly reproduced by CRH injection. Similar changes in gastrointestinal motility was also found in patients with functional disorders of the GI tract such as NUD or IBS. Patients with functional disorders of the GI tract have exaggerated response to MA stress or CRH injection. These data suggest that mental stress, which can be simulated by CRH injection, alters gastrointestinal motility. Such alterations of GI motility is frequently observed in patients with NUD or IBS, and exaggerated responses to MA stress or CRH injection.

CONCLUSION

From the data above listed, we conclude that the mental stress induces GI dysmotility which can be seen in patients with NUD or IBS, probably via CRH secretion.

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INVITED LECTURES

Clinical significance of gastric dysrhythmias

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GASTRIC DYSRHYTHMIAS

Physiologic role of the gastric slow wave[1,2]

As in the heart, the stomach possesses pacemaker tissue in the gastric body which generates an oscillation of the gastric membrane potential known as the pacesetter potential or slow wave. In man, the gastric slow wave oscillated at 3 cycles per minute (cpm).

The slow wave occurs with nearly constant frequency and is present continuously regardless of the contractile state of the stomach. In the noncontracting state, the slow wave amplitude is not of sufficient magnitude to reach the threshold depolarization necessary to induce contraction. If the stomach receives a neural or humoral stimulus, the plateau potential is enhanced and/or action potential s are generated which increase the level of depolarization about the mechanical threshold and the gastric smooth muscle contracts. Because the critical level of depolarization is reached only during the plateau phase of each slow wave, the maximal number of gastric contractions is determined by the slow wave frequency.

Patterns of gastric dysrhythmias[3]

Human tachygastria is defined as the presence of a slow wave frequency greater than 4.5 cpm for more than 60 s. Tachygastria is associated with decreased contractile activity; This is because tachygastric signals are of such low amplitude that neurohumoral input cannot provide the depolarization necessary to reach the contractile threshold.

Most tachygastrias originated in the antrum, assume the role of the dominant pacemaker, and entrain the rest of the antrum and body to the higher frequency. Thus tachygastric slow waves often propagate in a retrograde direction.

Spontaneous episodes of abnormally slow electrical oscillations, termed bradygastria, have been noted infrequently in healthy humans. Bradygastria, defined as the presence of a slow wave frequency less than 2 cpm for at least 1 min, usually originated in the body of the stomach and propagates in the normal antegrade direction. Because of the reduced frequency of slow wave activity, bradygastria results in a diminution of gastric contractile activity.

A third rhythm disturbance, termed mixed gastric arrhythmia, consists of bursts of alternating slow and rapid slow wave activity in a manner analogous to the sick sinus syndrome of the heart. Mixed arrhythmias have features of both tachygastria and bradygastria.

Abnormalities of the gastric slow wave frequency (tachygastria, bradygastria, mixed arrhythmia) may spontaneously occur which are associated with disturbances in normal gastric contractile activity.

Mechanisms of formation of gastric dysrhythmias[4-6]

The mechanisms responsible for generation of gastric dysrhythmias are unknown but may involve neural factors and local condition within the gastric smooth muscle wall. The causes of gastric dysrhythmias are probably different from cardiac arrhythmias as most cardiac antiarrhythmic drugs do not prevent gastric slow wave disturbances.

Tachygastria can be induced by activation of neural pathways. The best model for this is circular vection, in which a subject placed within a revolving drum experiences a sensation of selfrotation and motion sickness. This experimental motion sickness is associated with release of catecholamine and β-endorphin and is blocked by atropine suggesting the involvement of adrenergic, opiate, and cholinergic neural pathways.

Several hormones can modify the slow wave frequency in canine and human models. Intravenous metenkephalin and β-endorphin induce tachygastria, bradygastria, and mixed arrhythmias in dogs. Similarly gastric dysrhythmic capabilities have been demonstrated for insulin, secretin, cholecystokinin, pentagastrin, glucagon, and somatostatin. Dysrhythmias resulting from these hormones exhibit characteristics very similar to spontaneous slow wave disturbances suggesting possible roles as physiologic mediators.

Prostaglandin E_2 induces both tachygastria and bradygastria in dogs. In isolated gastric muscle, prostaglandin E_2 increases the spontaneous electrical frequency, with shortening and reduction of the amplitude of the plateau potential, whereas the prostaglandin synthesis inhibitor, indomethacin, decreases the slow wave frequency with plateau potential enhancement, suggesting that endogenous prostaglandins act as physiologic accelerants of the gastric slow wave.

Indomethacin prevents dysrhythmias induced by met-enkephalin in dogs. In gastric smooth muscle tissue from a patient who underwent antrectomy for gastroparesis, indomethacin reduced the electrical cycling rate from 9 cpm to 3 cpm, which was associated with prolongation of the plateau potential and increased contractile

Table 1 Effects of medications on gastric emptying

Delays Gastric Emptying
Alcohol (high concentration)
Aluminum hydroxid antacids
Atropine
Beta agonist
Calcitonin
Calcium channel blockers
Dexfenfluramine
Diphenhydramine
Glucagon
Interleukin-1
L-dopa
Lithium
Omeprazole
Ondansetron
Opiates
Phenothiazine
Propantheline bromide
Sucralfate
Tetrahydrocannabinol
Tobacco
Tricyclic antidepressants
Accelerates gastric emptying
Beta blockers
Cisapride
Diazepam
Domperidone
Histamine H_2 antagonist
Metoclopramide
Naloxone
Prostaglandin E_2

Table 2 Drugs with prokinetic properties on the stomach

Medication	Mechanism(s) of Action	Dosing
Metoclopramide	Dopamine receptor antagonism Stimulate acetylcholine release from enteric nerves 5HT$_3$ receptor antagonism	5-20 qid
Cisapride	Stimulate acetylcholine release from enteric nerves Direct stimulant of smooth muscle contraction receptor 5HT$_3$ antagonist	5-20 mg tid to qid
Erythromycin	Motilin receptor agonist	50-200 mg qid
Domperidone	Peripheral dopamine receptor antagonist (Does not cross blood brain barrier)	10-30 mg qid
Bethanechol	Muscarinic receptor agonist	25 mg qid

activity. These studies suggest a role for endogenous prostaglandins in both pharmacologically-induced and spontaneous gastric dysrhythmias.

Clinical conditions associated with gastric dysrhythmias[7-9]

In healthy individuals, the incidence of tachygastria, bradygastria, or mixed arrhythmia is extremely low, however several clinical syndromes have been shown to be associated with an increased frequency of gastric dysrhythmias.

The presence of gastric dysrhythmias with these syndromes is associated with nausea and vomiting and, in many instances, with delays in gastric emptying as demonstrated by radionuclide gastric emptying scans.

In diabetic gastroparesis, 9 of 10 patients in one study had tachygastria whereas a second study of 6 patients reported 1 with tachygastria, 2 with bradygastria, and 3 with a flatline EGG pattern. Other investigatorshave documented normal slow wave frequencies in diabetics with gastroparesis; However in these patients the normal increase in EGG signal amplitude after meal ingestion was not seen. Thus several different slow wave disturbances may be found in diabetes. The slow wave disturbances found in diabetic gastroparesis may be mimicked by induction of acute hyperglycemia in

Table 3 Clinical conditions associated with the development of gastric slow wave dysrhythmias

Diabetic gastroparesis
Idiopathic gastroparesis
Nonulcer dyspepsia
Unexplained nausea and vomiting
Nausea of the first trimester of pregnancy
Motion sickness Anorexia nervosa
Gastric ischemia
Gastroparesis associated with abdominal malignancy

healthy volunteers suggesting that elevated plasma glucose by itself may be disruptive to slow wave rhythmicity.

The other major groups of individuals to be evaluated with EGG are those with unexplained nausea and vomiting and those with idiopathic gastroparesis. Nine of 14 patients with unexplained nausea in one study had runs of tachygastria or mixed arrhythmia. A larger study compared EGG findings in 48 patients with idiopathic nausea with 52 healthy volunteers. Twenty-three of the 48 patients had either mixed arrhythmias, tachygastria, or loss of the physiologic increase in signal amplitude after a meal whereas none of the healthy volunteers exhibits abnormalities. The loss of the signal amplitude increase after a meal correlate d with delays in gastric emptying in these patients.

The source of the abnormality causing slow wave disturbances in idiopathic gastroparesis is unknown. A microscopic analysis of the gastric wall from a 5 mo old child with unexplained gastric retention revealed no abnormalities in the smooth muscle or myenteric plexus, but electrophysiologic studies showed reduction of plateau potential duration and amplitude.

Other clinical conditions associated with gastric dysrhythmia include the nausea of the first trimester of pregnancy, anorexia nervosa, motion sickness, and is chemic gastroparesis. The gastric dysrhythmias noted during pregnancy may be reproduced by administration of progesterone with or without estradiol suggesting a hormonal etiology of the slow wave disturbances.

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Functional dyspepsia: Pathogenesis and management

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Dyspepsia is a common digestive complaint which is defined as persistent or recurret abdominal pain or discomfort, localized in the epigastric region. In Western world, the problem is reported to occur in up to 20%-40% of the population in varying degrees of severity. One half to two thirds of investigated patients with dyspepsia have a normal upper gastrointestinal endoscopy and thus no obvious cause of their symptoms. Dyspepsia is not a narrowly defined entity caused by a single disease process, but a collection of symptoms due to multiple etiologies involving diverse mechanisms. The symptoms are assumed to arise from the upper gastrointestinal tract and may include heartburn and regurgitation, nausea and vomiting, early satiety or prolonged digestion, of anorexia and weight loss. In clinical practice, it is critical to differentiate organic causes of dyspepsia from those that are functional because the decision is important in determining the choice of diagnostic tests, a variety of therapeutic regimens, and the outcome of treatment[1,2].

The organic disorders must be considered and appropriately evaluated by careful history, physical examination, and appropriate laboratory tests or in some cases, treated empirically. Heartburn and acid regurgitation are highly reliable symproms of gastroesophageal reflux disease, and if these are the predominant symptoms, therapy may be initiated without testing. Certain historical features are highly predicitive of organic disease and require further testing, including: (1) age over 45, (2) dysphagia, (3) recurrent vomiting, (4) evidence of gastrointestinal bleeding, and (5) jaundice or significant weight loss. Testing which may be considered to evaluate dyspepsia includes GI endoscopy or contrast radiography, abdominal ultrasound or computerized tomography, ambulatory pH monitoring, small bowel radiography or manometry, and ERCP with or without manometry[3,4].

Functional dyspepsia is the symptom complex described above in which no organic or structural reason can be found to explain the complaints. Some have employed the terms reflux-like, ulcer-like, motility-like, or non-specific to describe dyspepsia, but this classification has no scientific basis, it has not been established as defining the underlying pathogenic mechanisms, nor has it been helpful in predicting the response to specific therapies. The exception is reflux-like dyspepsia which accurately describes the underlying excessive esophageal acid exposure and the response to prokinetic or antisecretory drugs in up to 90% of cases[5]. Furthermore, if vomiting is the predominant complaint, it is essential to exclude outlet obstruction of the stomach or gastroparesis[6].

The underlying mechanisms for functional dyspepsia are unlikely to be related to gastric hypersecretion, gastritis (although the issue with respect to *Helicobacter pylori* gastritis is still unresolved), prepyloric erosions, or alterations in the humoral mileau. Dietary and psychological factors play some modulatory role in some situations, but they are not likely to be primary factors in most. The two leading hypotheses to explain the underlying pathogenic mechanisms are upper gastrointestinal dysmotility and enhanced visceral sensation[4].

A wide spectrum of myoelectrical and motor abnormalities have been described in patients with functional dyspepsia[7]: (1) delayed gastric emptying, (2) antral hypomotility[2], (3) gastric dysrhythmias, (4) chemical gastritis (indirect histologic evidence of duodenogastric reflux or gastroduodenal incoordination, (5) abnormal small bowel transit, and (6) intestinal dysmotility. These abnormalities occursingly or in a variety of combinations in about 50% of cases.

Some patients with functional dyspepsia have a lowered pain threshold to gastric distension or various chemical stimuli including fat and acid. The reason for this finding is unknown, but it may explain the observation that these patients often experience pain or discomfort following a meal. Visceral hypersensitivity may be due to an altered threshold of enteric mechanicoreceptors, altered afferent sensory signal processing, or a lowered pain threshold centrally[4]. These patients do not have lowered peripheral somatic pain thresholds, nor do they have altered gut compliance (pressure-volume relationships). Heightened visceral nociception or "visceral hyperalgesia" is a promising area of research, but more studies are required in order to apply sensory testing in rourine clinical practice[1]. The ability to modify visceral sensation pharmacologically is also very limited and we are in great need of new therapeutic agents[4].

The issue of *Helicobacter pylori*-induced gastritis and other types of gastritis continues to be controversial. The prevalence of *H. pylori* is not different than in the general population. Unfortunately the published trials some inadequacies in experimental design, but there is no convincing evidence that the treatment of *H. pylori* reliably relieves symptoms of dyspepsia better than placebo.

The therapy of functional dyspepsia remains difficult and somewhat empiric[7]. In the published literature, the definition of function-

al dyspepsia has been variable, different categories of patients have been included in the studies and the response to placebo has been high (30%-60%). However, an effective therapeutic program can frequantly be designed. Dietary management plays a limitied role, but patients may obtain some benefit if they avoid fatty foods and gastric irritants such as school, highly spiced foods, and aggravating drugs such as non-steroidal anti-inflammatory agents. Therapy of *H. pylori* is not reliable in relieving symptoms and is not recommended as a first step unless peptic ulcer is or has been demonstrated. Anti-secretory drugs, such as the H_2-receptor antagonists or the proton pump inhibitors, are often tried first, but their utility is questionable. Overall, the therapeutic gain over placebo is about 20% and drugs which reduce gastric secretion should probably not be the first choice in functional dyspepsia.

In many series, the use of prokinetic drugs, especially cisapride has been effective in 60%-90% of patients[5]. Cisapride acts through the local release of acetylcholine through the action of $5HT_4$ receptors[5]. The drug enhances lower esophageal sphincter pressure, accelerates gastric emptying, improves gastroduodenal coordination, and shortens small bowel transit. Fortunately, it has few side effects, but several drug interactions are worth noting. Drugs with anticholinergic effects such as atropine, antihistamines, and tricyclic antidepressants appear to block the action of the drug almost completed, and should be avoided. In addition, the concurrent use of azole antifungal drugs such as ketoconazole or itraconazole should be avoided because of prolongation of the Q-T interval and the induction of serious ventricular arrhythmias. Cisapride is preferred over metoclopramide because of the latter's problems with central nervous system toxicity manifest by psychological and extra-pyramidal side effects.

Newer, but less well-established agents to treat functional dyspepsia have been explored including erythromycin for gastroparesis and $5HT_3$-receptor antagonists (ondansetron or granisetron), somatostatin analogs (octreotide), and a kappa-type opioid agonist (fedotozine) to modify sensory thresholds[6,7]. At this time, the only drugs which are accepted to modify visceral hypersensitivity are the tricyclic antidepressants (nortriptyline, amitriptyline, *etc*.). These are often quite effective, but new approaches are badly needed.

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Spectral analysis of electrogastrogram and its clinical significance

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In comparison with gastric manometry, the measurement of the electrogastrogram (EGG) is easier and more straightforward. Its analysis is, however, much more complicated than that of gastric manometry. Since the EGG is measured by cutaneous electrodes, it contains noise and electrical interferences from other parts of the body. Appropriate signal processing techniques have to be applied to extract useful information from the EGG. Spectral analysis is widely used for both qualitative and quantitative analysis of the EGG. The most important advantage of spectral analysis is its ability to separate the gastric signal from interferences or noise. In time domain (tracing), the interferences are superimposed on the gastric signal, hindering accurate analysis of the EGG. In frequency domain (spectrum), however, the signal and interferences are separated if their frequencies are different. The necessity of spectral analysis is raised by the fact that the EGG often contains gastric dysrhythmias and that gastric dysrhythmias are associated with gastric motor disorders. Accordingly, most investigators use EGG parameters exclusively derived from spectral analysis[1]. The most commonly used spectral parameters of the EGG are described as follows.

DOMINANT FREQUENCY

Although the EGG is a combination of the gastric signal and noise, its main component is the gastric signal. The frequency, which is believed to be of gastric origin and at which the power in the power spectrum has a peak value, is called the dominant frequency. Numerous studies have shown that the dominant frequency of the EGG accurately reflects the frequency of the gastric slow wave[2-4]. Figure 1 illustrates the definition of the dominant frequency and power of the EGG. The dominant frequency and power of the EGG can be computed from the power spectral density, which is defined as the squared magnitude of the Fourier transform of the infinite data sequence with appropriate statistical averaging. The power spectrum density is directly calculated from EGG data sequence. Table 1 summarizes the frequency components of the gastric slow waves which may be recorded in the EGG and their clinical implications. The dominant frequency of the EGG in asymptomatic, normal subjects is between 2.4 to 3.7 cycles per minute (cpm)[5]. The EGG with a dominant frequency of lower than 2.4 cpm is called bradygastria. The EGG with a dominant frequency of higher than 3.8 but lower than 9.0 cpm is called tachygastria. If there is no dominant peak in the spectrum, the EGG is called arrhythmia.

EGG DOMINANT POWER

The power in the power spectrum at the dominant frequency is called the EGG dominant power. The EGG dominant power is proportional to the regularity and amplitude of the gastric slow wave. It increases when the gastric slow wave becomes more regular or when there is an increase in the amplitude of the gastric slow wave. The absolute value of the EGG dominant power, however, may not be very meaningful. This is because it is associated with many factors, such as the position of the electrodes, the preparation of the skin, and the thickness of the abdominal wall. All these factors are difficult to control in an EGG study.

One of the most commonly used EGG parameters associated with EGG dominant power is the power ratio. The power ratio of the EGG is defined as the ratio of the dominant EGG power before and after a test meal or an intervention. In normal subjects, there is always an increase in EGG dominant power after a test meal. Different explanations have been given on the meaning of the postprandial power increase. This increase may be attributed to the increased gastric contractility and/or gastric distention. The postprandial increase of EGG dominant power seems to be a normal response of the EGG, but it is not necessarily an indicator of normal postprandial gastric motility. However, it is believed that a decrease of the EGG dominant power after a solid test meal has rarely been reported in normal subjects but frequently observed in patients with gastroparesis and patients with symptoms of nausea and vomiting. it is believed that a decrease of EGG dominant power after a normal test meal may be an indicator of postprandial gastric motility disorders. However, one should be fully aware of the consistency of the test meal, which may lead to different responses of the EGG.

PERCENTAGE OF NORMAL SLOW WAVES

The percentage of normal slow waves is a quantative assessment of the regularity of the gastric slow wave measured from the EGG. It is defined as the percentage of time during which gastric normal slow waves are observed in the EGG. The percentage of normal

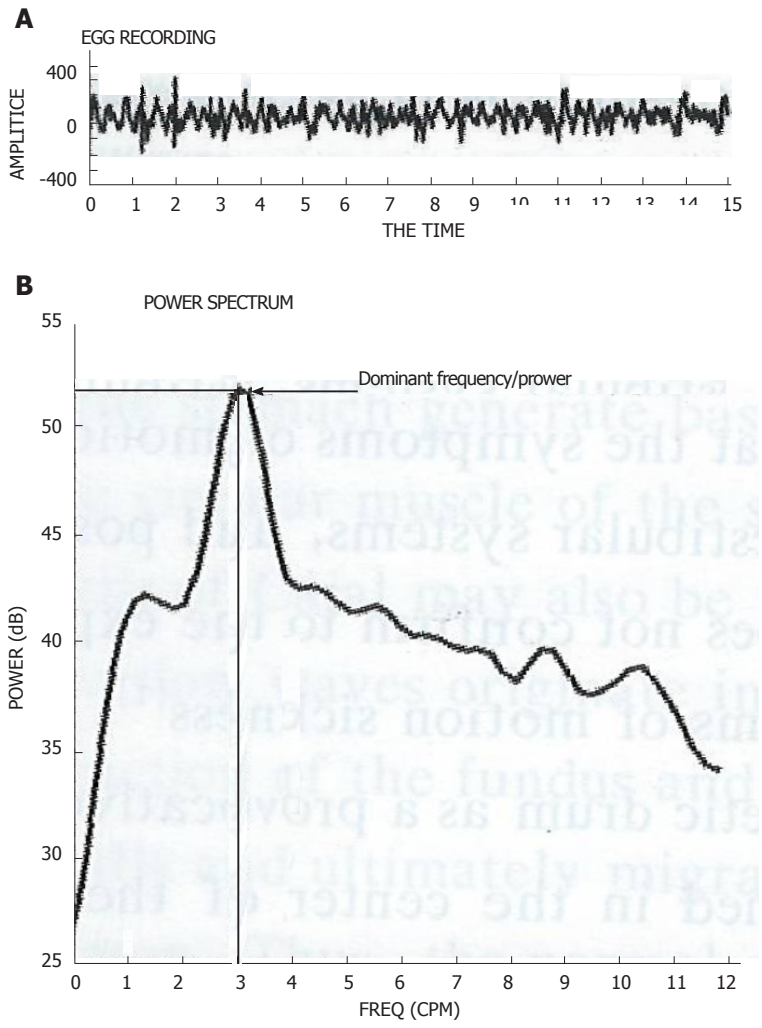

Figure 1 Computation of EGG dominant frequency and power. A: A 15-min EGG recording from a normal subject. B: The power spectrum of the 15-min EGG recording computed by the spectral analysis method.

Table 1 Composition of the electrogastrogram recording

Components		Freq (cpm)
Signal	Gastric Slow Waves	0.5-9.0
Noise	Respiration	12-24
	Small Bowel	9-12
	EKG	60-80
	Motion Artifacts	Whole Range

gastric slow waves can be computed using one of the running spectral analysis methods, such as short time Fourier analysis or adaptive spectral analysis method[5]. One power spectrum is generated for every one or a few minutes of EGG data. The spectral peak in each spectrum is then examined visually. A spectrum is defined as normal if it has a clear peak in the 2.4 to 3.7 cpm range and abnormal if it does not show a clear peak in the 2. 4 to 3.7 cpm range. The percentage of normal slow waves is determined by computing the ratio between the number of normal spectra and the number of total spectra. Figure 2 presents an example for the computation of the percentage of normal slow waves. It is running power spectra of a 26-min EGG recording computed by the adaptive spectral analysis methos[6]. Each line in the figure from the bottom to the top stands for the power spectra of 2-min EGG data. It is seen that 10 of the 13 spectra have peaks in the range of 2.4 to 3.7 cpm. Accordingly, the percentage of normal slow waves is equal to 77%.

PERCENTAGE OF DYSRHYTHMIAS

The percentage of gastric dysrhythmia is defined as the percentage of time during which gastric dysrhythmia is observed in the EGG. It can be computed in the same way as that for the percentage of normal gastric slow waves. If necessary, it can be further classified into the percentage of bradygrastria, the percentage of tachygastria, and the percentage of arrhythmia. For the EGG presented in Figure 2, there are three spectra which have peaks outside the normal gastric slow wave range. The percentage of gastric dysrhythmia is then equal to 23%.

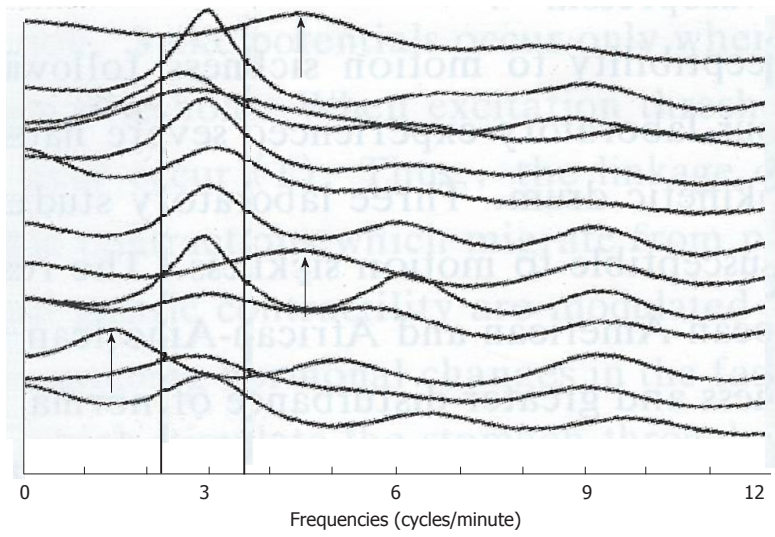

Figure 2 Running power spectra illustrating the computation of the percentage of normal gastric slow waves and the percentage of dysrhythmias.

Table 2 Dominant frequencies and their corresponding powers of a 10-min electrogastrogram recording computed by the adaptive spectral analysis method

Time (min)	Frequency (cpm)	Power (dB)
0-1	3.25	40.5
1-2	3.28	42.3
2-3	3.02	43.6
3-4	3.22	50.7
4-5	3.25	49.5
5-6	3.34	45.8
6-7	3.02	42.5
7-8	3.12	50.0
8-9	3.05	48.3
9-10	3.06	45.6
Mean (SD)	3.16 (0.12)	45.9 (3.6)

Gastric dysrhythmias have been observed in a variety of clinical settings and are believed to be associated with gastric motor disorders. Thus, accurate detection of gastric dysrhythmias from the EGG is of great clinical significance. Tachygastria is associated with gastric hypomotility. The range of tachygastria frequently observed is between 2.8 and 9.0 cpm. Cautions should be made in distinguishing between tachygastria and harmonics of the fundamental frequency of the gastric slow wave. Sometimes, a review of both the running spectra and the original EGG tracing is necessary to determine whether a frequency peak at the double of the fundamental frequency if indicative of a tachygastral event.

The correlation between bradygastria and gastric motility is not yet as clear. Some investigators reported that bradygastria may be correlated with strong antral contractions, while others found it to be associated with gastric motor disorders. Some prokinetic agents such as erythromycin may decrease the frequency of the gastric slow wave to a level close to 2.0 cpm, but it may induce strong coordinated contractions in the stomach.

INSTABILITY COEFFICIENTS

The instability coefficients were introduced to specify the stability of the dominant frequency and power of the EGG. It is computed based on the running power spectrum. Table 2 explains how they are defined and computed. For a 10-min EGG recording, running power spectra are computed using the adaptive spectral analysis method. The dominant frequency and power of the EGG during each 1-min period are presented in the Table. The means and the standard deviation of the dominant frequency and power during the 10-min period can be computed respectively. The instability coefficient (IC) is defined as the ratio between the standard deviation (SD) and the mean (M). IC = SD/M × 100%. In Table 2, the IC for the dominant frequency is 38%, and the IC for the dominant power is 7.8%.

While the percentage of normal gastric slow wave specifies

the regularity of the gastric slow wave, the instability coefficients reflect subtle changes of the gastric slow wave. A 100% normal EGG means that the frequency of the gastric slow wave is within the 2.4 to 3.7 cpm range during the whole recording period. However, it does not show any subtle variations of the dominant frequency within that specified range. The frequency instability coefficient is an dominant power within the recording period.

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INVITED LECTURES

EGG as a physiological marker of motion sickness in Asian and non Asian subjects

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We use the EGG to study gastric dysrhythmias associated with the experience of nausea. We use motion sickness as a model to study nausea. That is, we study motion sickness, a specific cause of nausea, in a controlled laboratory situation where we can provoke symptoms in healthy subjects in 5-10 min, and have them return to their prior healthy state within 30 min. We believe that the symptoms of motion sickness are the result of conflicting sensory inputs, usually from the visual and vestibular systems, and possibly from the proprioceptive system. When one or more of these sensory imputs does not confirm to the expected pattern there will be a sensory mismatch and in susceptible subjects, symptoms of motion sickness[1].

To study motion sickness in the laboratory we use a rotating optokinetic drum as a provocative stimulus. Subjects are seated inside the stationary drum with their heads positioned in the center of the drum and aligned with the vertical axis. The drum is rotated clockwise about its vertical axis at 10 rotations per minute, resulting in circular vection, *i.e.* illusory self-motion. Within a few seconds, all subjects experience vection, but feedback from their vestibular and proprioceptive systems indicates, rightly, that they are sitting still. In previous studies with mostly European-American subjects, we have shown that exposure to a rotating optokinetic drum provokes not only symptoms of motion sickness in susceptible subjects, but also an increase in sympathetic nervous system activity, a decrease in parasympathetic activity, an increase in gastric tachyarrhythmia, and an increase in the anti-diuretic hormone vasopressin[2].

We began to investigate a possible genetic factor in susceptibility to motion sickness following the serendipitous finding that most Chinese subjects who came to our laboratory experienced severe nausea and other symptoms of motion sickness when exposed rotating optokinetic drum. Three laboratory studies were conducted to test the hypothesis that Asian subjects are hyper-susceptible to motion sickness. The results of the first study[3] showed that Chinese women compared to European-American and African-American women experienced significantly more severe symptoms of motion sickness and greater disturbance of normal gastric myoelectric activity. A second study[4] yielded similar results using American-born children of Asian parents. The results of a third study[5] using Chinese men and women were similar and also showed a significant increase in vasopressin during rotation. Possible genetic mechanisms that may account for these results will be discussed.

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Clinical applications of electrogastrography

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BASIC MYOELECTRICAL ACTIVITIES OF THE STOMACH

Slow waves

The stomach is a neuromuscular organ which has intrinsic electrical activities that are modulated by the parasympathetic, sympathetic and enteric nervous systems and gastrointestinal hormones. Neuromuscular activities of the stomach generate basic electrical phenomena termed "electrical control activity"[1]. The outer layer of the circular muscle of the stomach wall is considered a source of these electrical oscillations; The interstitial cells of Cajal may also be the source of the gastric slow wave.

Gastric slow waves originate in a "pacemaker region" located on the greater curvature of the stomach near the junction of the fundus and proximal gastric corpus. The slow waves are propagated distally and circumferentially and ultimately migrate towards the pylorus at a rate of one propagated wave front every 20 s in man. Thus, the normal gastric slow wave frequency occurs at 3 cycles per minute[2]. As the gastric slow wave approaches the distal antrum and pylorus, a new slow wave develops in the pacemaker region.

The slow wave controls the timing and propagation of gastric peristalses, which are produced by the contraction of the circular muscle layer. Contractions of the circular muscle layer may not occlude the lumen, to strong lumen-obliterating contractions which are seen in the fasting state.

Spike potentials

Spike potentials or electrical response activity are the electrical events which occur during circular muscle contraction. Spike potentials occur only when slow wave depolarization has brought the circular muscle to its excitation threshold. When excitation threshold is reached, spike potentials and contraction of the circular muscle layer occur[1]. Thus, the linkage of the slow wave with spike potential activity underlies gastric peristaltic contractions which migrate from proximal stomach to pylorus at a rate of 3 per minute. Spike activity and gastric contractility are modulated by a host of factors including parasympathetic and sympathetic activity, ongoing hormonal changes in the fasting or postprandial state, a wide range of physical and nutrient factors which stimulate the stomach through intragastric or extragastric mechanisms, and a variety of emotional or stress-related stimuli.

ELECTROGASTROGRAPHY-A NON-INVASIVE METHOD TO RECORD GASTRIC MYOELECTRICAL ACTIVITY

Alvarez recorded sinusoidal 3 cycle per minute (cpm) waves with electrodes place d over the upper abdomen in 1922[3]. He called these recordings electrogastrograms (EGG), and predicted that abnormalities of the gastric myoelectrical rhythm may be related to upper gastrointestinal symptoms and gastric dysfunction. The normal gastric frequency range is between 2.4-3.6 cpm[4]. Other frequency ranges of interest are 3.6-9.9 cpm, an abnormally rapid frequency range termed tachygastria[4]. The EGG frequencies from 1-2.4 cpm are slower than normal, and may be abnormal if they dominate the recording[4]. These very slow EGG rhythms are termed bradygastrias. Finally, the 10-15 cpm range encompasses the known duodenal frequencies in man, which are from 10-13 cpm. In addition to frequency analysis and the percentage of power in the various frequency bands, the power in these bands can be compared before and after a stimulus such as a meal or drug.

ABNORMAL MYOELECTRICAL ACTIVITY OF THE STOMACH GASTRIC DYSRHYTHMIAS

Alvarez predicted that electrical abnormalities of the stomach may be related to abnormal digestive symptoms and abnormal gastric function. In 1980, You *et al*[5] described a series of patients with unexplained nausea and vomiting and dysrhythmias. The rhythms ranged from regular 6-7 cpm tachygastrias to very chaotic, fast rhythms termed tachyarrhythmias. Abell *et al*[6] showed that glucagon infusions evoked gastric dysrhythmias and nausea in healthy volunteers. The gastric dysrhythmias recorded with mucosal electrodes correlated with cutaneous signals which showed the same gastric dysrhythmias. Recent studies confirmed the excellent correlation between normal 3 cpm rhythm and arrhythmias recorded from surface EGG electrodes and serosal electrical recordings[7,8]. Stern and Koch showed that the shift from the normal 3 cpm electrical rhythm to tachyarrhythmias was associated with onset of nausea

during motion sickness[9].

CLINICAL APPLICATIONS OF ELECTROGASTROGRAPHY

Evaluation of patients with nausea and vomitig

Gastric tachyarrhythmias and bradygastrias have been recorded in diabetics with gastroparesis and in patients with idiopathic gastroparesis[10-12]. Abnormal EGGs reflect gastric dysrhythmias and are predictive of delayed gastric emptying. Over 90% of the patients with the gastric dysrhythmias had delayed gastric emptying[12].

Gastric dysrhythmias have also been recorded in patients with bulimia nervosa, anorexia nervosa, and in patients with functional dyspepsia and normal gastric emptying rates. Gastric dysrhythmias have been recorded in patients with nausea of pregnancy[13].

Normal 3 cpm EGG patterns were recorded in patients with documented gastroparesis and mechanical obstructions of the upper gastrointestinal tract[14]. Normal 3 cpm EGG rhythms and gastroparesis has also been recorded in patients with diabetes mellitus; These patients have very few upper gastrointestinal tract symptoms. Domperidone restored the normal 3 cpm EGG rhythm and reduced symptoms, but gastroparesis was unchanged, suggesting gastric electromechanical dissociation[10].

Finally, normal 3 cpm EGG rhythm and normal gastric emptying suggests that the patient's nausea and vomiting may not be related to gastric electrical or mechanical dysfunction. In these instances, the EGG pattern is helpful in that it suggests that non-gastric causes of nausea and vomiting should be sought. Patients with occult reflux esophagitis, chronic cholecystitis, and patients with psychogenic nausea have this normal pattern.

Evaluation of GI motility disorders in children

Electrography is an excellent technique for the study of gastric myoelectrical activity in children because it is non-invasive and safe. Studies of EGG activity in premature infants and newborns have been successfully accomplished[15]. EGG recordings in children with gastrointestinal pseudo-obstruction revealed patterns of myogenic and neurogenic dysfunction[16]. Children with n on-ulcer dyspepsia have a variety of gastric dysrhythmias which are eradicated with cisapride treatment[17].

Evaluation of motion sickness

Gastric dysrhythmias occur several minutes before subjects report the nausea of motion sickness[9,18]. Gastric dysrhythmias have been recorded during vection-induced nausea, rotating chair stimuli and during KC-135 "Vomit Comet" studies. EGG techniques also lend themselves for the study of gastric physiology in space. The effects of various drugs and foods on gastric dysrhythmias m ay be studied using EGG technology.

Evaluation of nauseogenic drugs and anti-nauseate drugs

gastric dysrhythmias and nausea occur after the infusion of glucagon, epinephrine, progesterone, and morphine. Gastroprokinetic drugs such as domperidone and cisapride correct gastric dysrhythmias and improve symptoms of nausea. Ondansetron, a-HT_3 antagonist, given during established morphine-induced nausea, eradicates gastric dysrhythmias and restores normal 3 cpm EGG activity.

SUMMARY

Gastric dysrhythmias are recorded in a variety of clinical syndromes and experimental conditions in which gastric motility disorders and symptoms of nausea are present. The eradication of the dysrhythmia and the restoration of the norm al 3 cpm gastric electrical activity are associated with improvement in symptoms, particularly nausea. Gastric dysrhythmias also interferes with the normal mixing and emptying of a meal. The clinical importance of gastric myoelectrical abnormalities continues to emerge. Much additional work is necessary to determine the mechanisms whereby gastric dysrhythmias occur and to investigate therapies designed to eradicate these abnormal gastric myoelectrical events.

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INVITED LECTURES

Electrogastrography in childhood

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Current understanding of the pathophysiology of gastrointestinal motility in the human infant and child is far from complete. This is largely due to the fact that invasive and unpleasant investigations are usually required to study contractile activity and transit through the gut. In fact, such invasive investigations are less acceptable and on average poorly tolerated by both infants and children, and therefore systematic studies are severely limited. The constraints imposed by such poor acceptability of extensive motility studies in childhood are the main reasons why pediatric gastroenterologists have become increasingly interested in non-invasive means of assessing gastrointestinal motility and transit. Such techniques include ultrasonography, breath test and electrical impedance tomography for the study of gastric emptying, and the recording of electrical activity of the gastric antrum by surface electrodes, *i.e.* electrogastrography or EGG.

From a historic point of view, EGG is not new in pediatrics. Back in 1926, in fact, four years after the first description of a human EGG by Walter Alvarez, I. Harrison Tumpeer, a pediatrician, published an article on the "registration of peristalsis by the Einthoven galvanometer"[1], and a few years later Tumpeer and Phillips reported the successful recording of an EGG from a 5 wk old infant with pyloric stenosis[2], who 'was so thin that gastric peris talsis was evident by simply watching the skin over his abdomen. It is noteworthy that this tracing (obtained by using standard ECG limb leads) was described by the Authors as looking like an ECG with a slowly changing baseline. The changes in the baseline clearly occurred at approximately 0.05 Hz and closely matched the frequency of gastric contractions that could be observed visually. Therefore Tumpeer and Phillips suggested that such ECG baseline changes, that had often been reported (but not explained) by cardiologist, were in fact due to gastric peristalsis. Since then, there were no further EGG studies in pediatric patients until 1978, when Telander *et al*[3] published a report describing a small infant with severe intractable vomiting and a marked impairment of gastric emptying. These abnormalities were related to a severe dysfunction of gastric smooth muscle, which in turn was due to a derangement of the frequency of gastric electrical control activity from the customary 3 cpm to a "tachygastria" of 4.7 cpm, and to an orad propagation of the electrical activity recorded in the gastric antrum. A similar patient with tachygastria underlying an intractable vomiting and the inability to assume oral feeds was described a few years later by Cucchiara *et al*[4]. In both these patients, antrectomy was curative of vomiting and gastroparesis, and allowed the children to resume oral feeds.

With time, the technique of recording and evaluation of the gastric electrical activity from surface electrodes has been considerably improved. The use of bipolar electrodes, adequate amplifiers and band-pass filters allows the recording of a much clearer signal. The digital conversion of the raw analogue signal at frequencies of 1-5 Hz provides a mathematical representation of the signal which is suitable for subsequent computerized analysis. The technique of running spectral analysis[5] (by Fast Fourier Transform, autoregressive modelling, or exponential distribution)[6]allows the frequency and power of the signal to be assessed in a more objective fashion than the simple visual inspection. Also, recent developments such as the wavelet analysis[7] can be used to remove artifacts and improve the interpretation of the re cording, especially in infants and young children. Such techniques are now customary in modern EGG, and were used in a number of pediatric EGG studies that have appeared in the literature over the last few years. Essentially, these studies were aimed at either defining the ontogenesis and development of gastric electrical control activity, or at investigating the role of gastric antral dysrhythmias in a number of pediatric disorders characterized by nausea, vomiting and feeding problems.

Koch *et al*[8] found a considerable degree of instability in the postprandial gastric electrical activity of both pre-term (28-32 wk) and term babies, with normal 2.5-3.6 cpm frequency occurring only for 9 to 34% of the time, and being often overwhelmed by frequencies within the bradygastria or tachygastria range. On the other hand, premature babies did not exhibit any increase in EGG power after gavage feeding of a standard low birth weight formula. These findings may reflect an immature response of the gastric neuromusculature (and also of the humoral control system) to formula feeds. Zacchi *et al*[10] described cyclic frequency and amplitude of the EGG signal in as many as 51% of infants. This is a common experience for pediatricians involved with gastrointestinal motility testing, and should be taken into account in order to avoid an overestimation of gastric dysrhythmias. By carrying out consecutive measurements of the EGG (at one week and two months), Liang *et al*[11] were able to describe a developmental pattern of gastric electrical activity in preterm infants, which was characterized by a significant increase in the percentage of 2-4 cpm activity and a reduction or normalization of tachygastria. Furthermore, by the age of 4.5 mo, fullterm infants

showed a significantly higher (70%) percentage of regular 3 cpm gastric slow waves in comparison with premature babies.

A number of EGG studies have been carried out in recent years in children with different disorders affecting all the control levels of gastrointestinal motor activity: Myogenic, neurogenic (intrinsic and extrinsic) and humoral. Devane *et al*[12] clearly showed that children with pseudo-obstruction related to a primary neuropathic disease had a persistent tachygastria. Several factors may account for the unstable electrical activity found in patients with myopathy: The inability to maintain a constant frequency or a poor summation of the electrical signal, due to a patchy involvement of smooth muscle cells in the disease process, or a marked reduction in signal amplitude and thus in signal-to-noise ratio. On the other hand, the most likely explanation for the tachygastria found in children with enteric neuropathy is a lack of intrinsic inhibitory innervation. Using techniques of chaos analysis, Bisset *et al*[13] were able to demonstrate the presence of complex high dimension interactions in the EGG of children with myopathic pseudo- obstruction, suggesting that gastric myocytes behave like other excitable cells, interacting in a chaotic manner that is increased by disease.

Severe recurrent vomiting, often complicated by aspiration and failure to thrive, is common in children with disorders of the central nervous system (CNS) such as cerebral palsy and psychomotor retardation. Vomiting is usually ascribed to gastroesophageal reflux, which indeed can be found in about 75% of these patients. In a group of 50 vomiting children with cerebral palsy and neurodevelopmental delay, 29 of whom had gastroesophageal reflux. Ravelli *et al*[14] showed that gastric dysrhythmias of different sorts (tachyarrhythmia, bradyarrhythmia, mixed dysrhythmia or unstable electrical activity) were as common as gastroesophageal reflux, occurring in 31 (62%) of the patients, and were associated with reflux in 1/3 of them. Furthermore, Ravelli *et al*[15] found that gastric dysrhythmias were present in most children with disorders of the CNS who had persistent r*et*ching and postprandial discomfort following Nissen fundoplication, and were already present before the procedure was carried out. Thus it appears that children with CNS disease who suffer from recurrent vomiting often have a widespread disorder of foregut motility, where gastric dysrhythmias(possibly due to persistent activation of the emetic reflex) are as common as and may contribute to gastroesophageal reflux. In these children gastric dysrhythmias are probably due to abnormal modulation of the enteric nervous system by the CNS, although in some cases an involvement of the enteric nervous system by a process similar to that affecting the brain cannot be excluded. Since gastric dysrhythmias may be unmasked by Nissen fundoplication, EGG can be useful in detecting which patients are more likely to have r*et*ching problems following this operation, so that in these patients alternative therapeutic interventions may be considered.

Gastric dysrhythmias have been described in adults with anorexia nervosa. In children with early onset anorexia nervosa, on the contrary, Ravelli *et al*[16] showed that the frequency of fasting and postprandial electrical activity and the fasting/postprandial amplitude ratio did not significantly differ from that of controls, although patients with longer established disease had a smaller increase in amplitude. It is therefore possible that gastric motility disturbances detected in adult patients with anorexia nervosa are related to a longer duration of the disease and are a consequence, rather than a cause, of malnutrition in these patients.

Different gastric dysrhythmias and delayed gastric emptying of a mixed solid-liquid meal were reported by Cucchiara *et al*[18] in a high proportion of children with non-ulcer dyspepsia[17]. In a few patients these alterations, together with the clinical symptoms, were successfully treated by the prokinetic drug cisapride. It is interesting to note that in adult patients with nonulcer dyspepsia, no significant correlation was found between gastric dysrhythmias detected by prolonged ambulatory EGG and the patients' symptom score.

A number of neuroamines (*e.g.* noradrenaline or dopamine) and polypeptide hormones (*e.g.* gastrin, glucagon, cholecystokinin) have the potential to induce gastric dysrhythmia, delayed gastric emptying, nausea and vomiting in humans. The effects of an altered humoral environment on gastrointestinal motility were investigated by Ravelli *et al*[19] in children with chronic renal failure. In a pilot study, children with chronic renal failure suffering from anorexia, nausea and vomiting were found to have dysmotility of the foregut in the form of gastroesophageal reflux, gastric dysrhythmia and/or altered gastric emptying. In most of them, serum levels of gastrin were increased above the upper normal limit. In subsequent studies, vomiting or anorectic children with chronic renal failure had significantly higher fasting and postprandial serum levels of gastrin, cholecystokin and neurotensin compared to asymptomatic uremic children and children who had undergone renal transplantation[20]. Gastric dysrhythmias, usually associated with delayed gastric emptying, were pre sent in 75% of symptomatic children with chronic renal failure, many of whom had gastroesophageal reflux on prolonged intraesophageal pH monitoring[20,21]. On the other hand, motility tests were normal in asymptomatic children with renal failure. Following renal transplantation, the gastric dysrhythmias disappeared in all patients in whom renal function and polypeptide hormone levels had normalized[20,21]. Thus it appears that gastric dysrhythmias (and gastroesophageal dysmotility in general) in chronic renal failure are related to an altered humoral environmrnt generated by the impaired renal degradation of these polypeptide hormones.

In summary, EGG can be safely and effectively used in pediatric patients, from premature babies to children and adolescents, to investigate the ontogenesis of gastric electrical activity and the pathophysiology of gastric dysrhythmias in a wide variety of disorders. In analogy to other aspects of gastrointestinal motility such as lower esophageal sphincter pressure and small intestinal motility, gastric antral electrical activity appears to develop from the prenatal period through the first few months of life. In normal healthy children, gastric electrical activity is similar to that in adults in terms of both frequency and response to a meal. Relevant abnormalities (gastric dysrhythmias) have been detected and characterized in several conditions where the different control levels of gastric motor activity are affected. Future developments such as electrical pacing, prolonged ambulatory EGG monitoring, chaos analysis and spatial mapping of gastric frequencies should render the EGG more and more meaningful for the study of gastrointestinal pathophysiology and the assessment of gastrointestinal disease.

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INVITED LECTURES

Hormonal control of gastrointestinal motility

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Many hormones or peptides found in the gastrointestinal tract and endocrine pancreas are known to influence the motor function of gastrointestinal tract including the esophagus, stomach, small and large intestines, gallbladder and sphincter of Oddi. The peptides released from these organs that are shown to influence the motility include secretin, gastrin, cholecystokinin, somatostatin, glucagon, gut glucagon-like peptide-1 (GLP-1), motilin, neurotensin, peptide YY, pancreatic polypeptide, and several neuropeptides including vasoactive intestinal polypeptide (VIP), opioids, substance P, galanine, calcitonin gene related peptide and bombesin or gastrin releasing peptide. Only a handful of these peptides are shown to exert their actions in physiological conditions.

To be qualified as a hormone, a given peptide must meet the following criteria: (1) In response to a physiological stimulant such as a meal, it must increase in the circulation. (2) Parenteral administration of a peptide in an amount that mimicks the circulating peptide level can produce a predictable biological response, and (3) The biologic action by an endogenous peptide on a target organ or tissue is completely or profoundly suppressed by either a specific receptor antagonist or immunoneutralization of the circulating peptide or hormone with specific antibody. If the action of a peptide is mediated via either paracrine or neurocrine pathway, a circulatory hormone or peptide concentration may be too low to be detected by radioimmunoassay, wheras its local tissue concentration is very high. Similarly, a specific polyclonal or monoclonal antibody or receptor antagonist blocks predicted biologic action.

The peptides that meet these 3 criteria are: Cholecystokinin, secretin, PYY, motilin, and possibly, somatostatin, neurotensin and gut glucagon peptide-1.

CHOLECYSTOKININ (CCK)

Four physiologic actins have been identified: (1) Contraction of the gallbladder mediated via local release of acetylcholine, (2) Relaxation of the sphincter of Oddi mediated by CCK-induced release of VIP, (3) Inhibition of gastric emptying mediated *via* capsaicin-sensitive sensory vagal afferent pathway, to induce local release of VIP in the fundus and contraction of pyloric sphincter, and (4) Increased contraction of the distal colon probably mediated via local release of acetylcholine.

SECRETIN

This hormone inhibits gastric emptying which appears to be mediated by capsaicin-sensitive sensory vagal afferent pathway. Although it has been shown to inhibit the motility of duodenum and the remaining small intestine when given intravenously, it has not been proven whether its action is physiological. Peptide YY (PYY): Although PYY containing endocrine cells (L-cells) are found throughout the entire intestinal and colonic mucosa, they are found in high density in the distal ileum and colon. The peptide released mainly by fat digests, inhibits gastric emptying and prolong transit time of small intestine and colon. PYY is probably the major hormone participating in ileal brake mechanism. In additon, if given intravenously, it prolongs duration of cycle of interdigestive migrating motor complex of the stomach and duodenum.

MOTILIN

It has been convincingly shown that motilin triggers phase 3 activities of gastric antrum and upper small intestine in interdigestive period. Although it stimulates gastric and upper intestinal motility to enhance gastric emptying, it is yet to be decisively determined whether or not its action is physiological.

CANDIDATE HORMONES

Although somatostatin, neurotensin and glucagon-like peptide-1 influence the motility of gastrointestinal tract, these peptides have not fulfilled the criterias for their hormonal status. Somatostatin was shown to inhibit and inhibit ileal motility. In addition, it modulates human interdigestive motility of small intestine by shortening the interdigestive motility cycle when it is given intra venously in a physiological dose. It also stimulates esophageal body contraction, and decreases lower esophageal sphincter pressure (LESP). Neurotensin decreases LESP and delays gastric emptying and intestinal transit time, but it stimulates colonic motility. Glucagon-like Peptide-1 released by fatty acid from the distal ileum and colon, delays gastric emptying. Thus it appears to participate in the ileal brake mecha-

nism to inhibit small intestinal motility.

PHYSIOLOGICAL SIGNIFICANCE

In response to ingestion of a meal, classic gut hormones such as gastrin, secret in, CCK, PYY are released into the circulation as acid gastric chyme enters the duodenal lumen. The latter 3 hormones play important roles on the control of gastrointestinal motility and transit. It is apparent that duodenal brake for control of gastric motility and emptying is induced mainly by secretin and CCK, and ileal brake mechanism for gastric emptying and intestinal transit is controlled by PYY and probably by GLP-1. Based on recent observations that the action of both CCK and secretion on gastric emptying is mediated via capsaicin sensitive vagal afferent pathway, the hormonal actin on the stomach motility requires interaction with both peripheral and central nervous system, "gut-brain interaction". Thus the gut hormones released in physiological conditions can not exert their actions without the neuronal participation.

It is also apparent that the "enterogastronal" proposed by Kosaka and Lim in Beijing, China in 1930, basing on their historical experiment carried out in dogs, turns out to be those peptides released by fat digests from the intestine that regulates gastrointestinal motility. Secretin, CCK and PYY are some of those peptides.

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Regulation of GI motor function: Role of brain peptides

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Regulation of gastrointestinal function depends largely on the integration of three systems: Central, autonomic and enteric[2,11]. A major component of the central control of gastrointestinal (GI) motor and secretory functions depends on vagal parasympathetic innervation, via modulation of circuits within the enteric nervous system, and largely through vago-vagal reflexes[2]. Retrograde and anterograde tracing techniques have established the morphological link between the GI tract and afferent and efferent vagal pathways[1]. Moreover, electrophysiological and functional approaches have shown that a number of brain peptides modulate vagal circuits at a central level, affecting GI motor functions[2].

In terms of stimulation or inhibition of GI motility or transit, only thyrotropin-releasing hormone (TRH) has been shown to act in the brain to stimulate both gastric and intestinal transit. Other brain neuropeptides have mainly an inhibitory action in gastric motility and emptying, while having varible effects on small intestine and colonic motility suggesting the involvement of multiple pathways and/or brain structures in these actions[2]. TRH nerve terminal s and fibers are located in the dorsal vagal complex and make synaptic contact with vagal preganglionic motorneurons that innervate the stomach[9]. Central TRH (after intracisternal or intracerebroventricular injection or microinjection into specific brain nuclei) stimulates gastric emptying and motility, duodenal motility and accelerates intestinal transit. The important role of the vagus as the efferent component of central TRH-induced changes in GI motor function is supported by the observations that intracisternal TRH increases efferent activity in the gastric branch of the vagus and that the motility effects of central TRH are abolished by vagotomy or atropine[14]. Microinjection techniques have determined that the dorsal motor nucleus of the vagus (DMN) is the most responsive nuclei to TRH-mediated stimulatory actions on gastric motor function[14]. TRH-containing cell bodies are localized mainly in medullary raphe nuclei (nucleus raphe magnus and obscurus) and TRH immunoreactivity in the dorsal vagal complex originates exclusively from these raphe cell bodies[5]. Functional studies also indicate that raphe nuclei play a role in the vagal dependent regulation of gastric motility through the releases of TRH and serotonin in the dorsal vagal complex[5]. The TRH stimulatory effect in the dorsal motor nucleus of the vagus is modulated by several transmitters. In particular, serotonin (5-HT), which co-exists with TRH in the same nuclei and shares a similar receptor distribution in the DMN, potentiates central TRH-induced stimulation of gastric motility[6]. Neuroanatomical and functional methods of approach have recently showed that medullary TRH plays a physiological role in the central vagal stimulation of gastric motility induced by cold exposure and 2-deoxy-D-glucose[8,16].

Another brain neuropeptide known to affect GI motor function through modulation of vagal activity is corticotropin-releasing factor (CRF). CRF plays a physiological role in integrating the central response to stress, including changes in GI motor function[12]. CRF injected into the brain ventricles or delivered into specific nuclei inhibits gastric motor activity and emptying, slows small intestine transit and stimulates colonic motility and fecal output in rats[12]. Gastric and small intestine actions depend on vagal integrity, and are abolished by vagotomy, while colonic changes seem to be mediated by modulation of sacral parasympathetic outflow[12]. Moreover, electrophysiological data show that centrally injected CRF induces a potent and long lasting decrease of single and multi-unit efferent activity of the gastric branch of the vagus, and inhibits cold exposure-induced neuronal activity in the dorsal motor nucleus of the vagus[4].

During recent years, it has been shown that the immune system plays an important role regulating GI functions through the interaction with the intrinsic and extrinsic innervation of the GI tract and through the release of CRF in the brain. Cytokines produced during immune challenges in the periphery can reach the central nervous system and those produced directly in the brain, seem to have the capacity to modulate efferent vagal activity of the GI tract. The effectiveness of centrally administered IL-1β in inhibiting vagally stimulated gastric acid secretion and lesion formation suggest that cytokines may act on the dorsal vagal complex to regulate vagal outflow to the stomach[13]. Functional data suggest that Il-1β actions are mediated through prostaglandin-and CRF-dependent mechanisms[1 0]. Moreover, microinjection into the DMN of IL-1β inhibits vagally stimulated gastric motility in anesthetized rats[7]. Similarly, tumor necrosis factor alpha (TNF-α), another cytokine, inhibits vagally stimulated gastric contractility when microinjected into the DMN[3].

These observations suggest that a number of neuropeptides (TRH, CRF) or cytokines (IL-1β, TNF-α) released at a central level

during exposure to specific environmental, metabolic or immunologic stressors have the ability to modulate vagal circuits affecting GI motor activity through direct modulation of efferent activity at a central level.

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Enteric nervous system in pathogenesis of gastrointestinal motility disorders

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INTRODUCTION

The concept of the little brain in the gut is basic to neurogastroenterology and understanding of gastrointestinal motility disorders. It refers to the presence in the gastrointestinal tract of a nervous system with functional properties similar to those of the brain and spinal cord, as well as the independent integrative systems responsible for behavior in simpler animals such as arthropods and mollusks[1]. The conceptual model (Figure 1) for the enteric nervous systems is the same as for other integrative nervous systems[2]. It is comprised of sensory neurons, interneurons and motor neurons with the directionality of information flow in this respective order.

Sensory neurons function to provide informatin in the state of the intestine. This consists of parameters such as contractile tension, mechanical brushing of the mucosal surface, osmolarity, pH, and glucose concentration. The information generated by sensory neurons is processed in microcircuits comprised of interneurons. Synaptic connections among the interneurons form the interneurons processing circuits.

Motor neurons innervate the gastrointestinal effector systems. The primary effector systems are the musculature, secretory epithelium and the blood vascular system. Motor neurons are the final common pathways from the interneuronal microcircuits. They transmit the commands to the effector systems that initiate or suppress activity of the effector systems. Outflow in motor neurons to the different effectors is coordinated by the interneuronal microcircuits to determine the overall behavior of a particular region of the gut consistent with the digestive state at any moment in time.

This overview will start with the neurophysiology of enteric motor neurons and relations of normal function to pathophysiology. This will be followed by review of the synaptic properties of the interneuronal microcircuits. References to current concepts of enteric neuroimmune communication and the implications of this for understanding gastrointestinal disorders will conclude the overview.

METHODS: OF ENTERIC NEUROPHYSIOLOGY

Basic knowledge of enteric neurophysiology has been obtained from standard methods of recording the electrical and synaptic behavior of enteric neurons in the various specialized regions of the digestive tract[3]. These are the same electrophysiological methods used productively for investigation of neuronal behavior in the brain and spinal cord. The methodology involves impalement of individual neurons with fine tipped glass micropipette electrodes. With appropriate amplifiers and accessory electronic devices, the electrodes record resting membrane potentials, action potential discharge and synaptic potentials in single neurons representative of the transmission and processing of signals within the microcircuits.

Synaptic events are recorded by the microelectrodes after impalement of the neuron. Synaptic potentials may be recorded as spontaneously occurring events or be evoked experimentally by electrical stimulation of the presynaptic axon that forms the synapse with the postsynaptic neuron. Synaptic potentials are evoked experimentally by electrical shocks from fine stimulating electrodes manipulated onto either the fiber tracts connect enteric ganglia or onto the surface of a ganglion.

Segments of the enteric nervous system are obtained for study by microdissection of the gastrointestinal wall and placement of the preparations into recording chambers for microscopic observation. The preparations are bathed by physiologic al solutions circulated by pumps providing continuous superfusion. The neurons are exposed to neurotransmitters, modulators and pharmacological agents of experimental interest by addition of the agent to the superfusion solution or by micropressure ejection from fine-tipped pipettes brought into close proximity to the neuron under study.

ENTERIC MOTOR NEURONS

Enteric motor neurons are the final common pathways from the enteric microcircuits to the effector systems consisting of the musculature, the mucosa and the intramural blood vascular system. There are two populations of motor neurons, one of which is excitatory and the other inhibitory. One population of motor neurons to the musculature releases inhibitory transmitters that suppress contraction and relax tension in the muscle, whereas a second population releases excitatory neurotransmitters to evoke contraction. The intestinal crypts are innervated by a population of excitatory secretomotor neurons that, when active, evoke secretion of water,

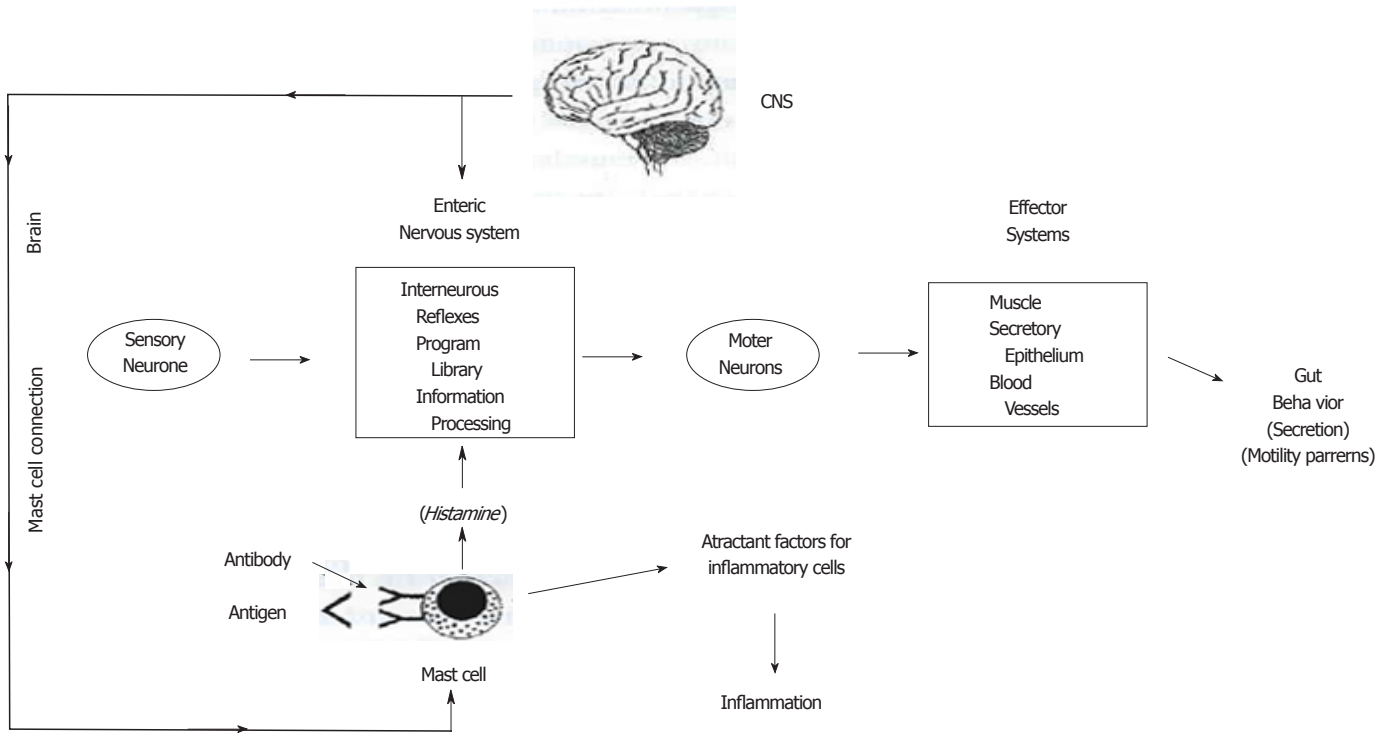

Figure 1 Neurogastroenterology is the subspeciality of gastroenterology that studies the brain, the enteric nervous system, neuro-immune communication and behavior of the digestive effector systems. The heuristic model for the enteric nervous system is an independent integrative nervous system. It processes information derived from sensory neurons and immune (mast) cells. The interneuronal processing circuits contain reflex micro circuits and a library of gut behavioral programs. Interneuronal circuits determine the outflow of information in motor neurons to the intestinal effector systems. Coordinated activity of the effectors determines moment-to-moment behavior of the gut. Mast cells detect threatening antigens and alert the enteric nervous system to their presence. Mast cells signal the enteric nervous system by releasing paracrine mediators. The central nervous system signals the enteric nervous system through a brain to mast cell connection as well as direct neural pathways.

electrolytes and mucin from the crypts. Enteric vasomotor neurons release neurotransmitters that act to dilate the submucosal vasculature and thereby increase mucosal blood flow in support of secretory behavior.

Inhibitory Motor Neurons to the Musculature

Inhibitory motor neurons to the musculature have Dogiel Type I morphology as revealed by intraneuronal dye injection from recording electrodes and neuronal tracing methods. These are neurons with many short dendrites around the perimeter of relatively flat cell bodies with one long axon projecting from the cell bod y to the effector system. Most evidence suggests that the neurotransmitters released from inhibitory motor neurons are vasoactive intestinal peptide and nitric oxide.

The functional significance of inhibitory motor neurons is appropriately timed relaxation of tension in the musculature. During peristaltic propulsion, timed activation of inhibitory motor neurons relaxes the intestinal circular muscle ahead of the advancing bolus. In sphincteric regions, such as the lower esophageal sphincter or internal anal sphincter, the inhibitory motor neurons are silent and turned-on by the microcircuits with appropriate timing to relax the sphincter and allow passage of the intraluminal contents. In both the sphincteric smooth muscle and the circular musculature of the body of the small and large intestine, activation of the motor neurons and release of inhibitory neurotransmitter results in hyperpolarization of the membrane potential of the muscle cells to produce electrical potentials called inhibitory junction potentials.

Some of the inhibitory motor neurons in the body of the intestine are spontaneously active. Ongoing action potential discharge releases inhibitory neurotransmitters to maintain the autogenic musculature in a continuous state of inhibition. Evidence of the ongoing inhibition is found in experimental situations *in vitro*. For example, segments of cat small intestine, after equlibration in the organ bath, show electrical slow waves, but no action potentials or circular muscle contractions. Blockade of the ongoing activity of the inhibitory motor neurons by tetrodotoxin releases the inhibition resulting in the appearance of action potentials with each slow wave and the occurrence of large amplitude contractions at the frequency of the slow waves.

The behavior of enteric inhibitory motor neurons differs between sphincters and non-sphincteric regions of the gut. In the microcircuits of the sphincters, the inhibitory motor neurons are normally silent and turned-on transiently with appropriate timing for relaxation of the myogenic tone in the sphincter. On the other hand, some of the inhibitory motor neurons in the non-sphincteric intestinal regions are continuously active to maintain the autogenic musculature in a state of ongoing suppression. This accounts in part for the state of physiological ileus seen, for example, during the interdigestive state between the arrival of migrating motor complexes. Contractile responses of the muscle during normal behavior of the intestine require swithing-off the discharge of the inhibitory neurons. When the inhibitory neurons are off triggering of contractions by the electrical slow waves can occur.

Disinhibitory motor disease

The neurophysiology of inhibitory motor neurons suggests that any condition with ablation of the neurons will result in achalasia and discoordinated motor behavior. Hirschsprung's disease is a classic example where congenital absence of inhibitory motor neurons, as well as other circuit elements, results in uncoordinated autogenic contractions of the musculature and failure of relaxation of the internal anal sphincter. Achalasia of the lower esophageal sphincter is associated with degenerative loss of the neurons in this region of the gut. Likewise, some forms of biliary dyskinesia are undoubtedly related to loss of the inhibitory innervation and achalasia in the sphincter of Oddi. In paraneoplastic syndrome, similarity of antigenic components of the small cell carcinomas in the lung and enteric neurons results in inflammatory ablation of the neurons. This eliminates inhibitory neural control of the musculature accounting for spasticity and non-propulsive contractile behavior with symptoms of intestinal pseudo-obstruction. A similar situation occurs in Chagas disease where similarity of surface antigens between the blood parasite Trypanosoma cruzi and the enteric neurons leads to inflammatory ablation of the integrative circuits of the intestinal minibrain[4]. Loss of enteric neurons in cases of intestinal pseudo-obstruction of unknown etiology suggest idiopathic degenerative disease of the enteric nervous system as a poorly understood factor in gastrointestinal motility disorders.

Intestinal secretomotor neurons

Like the motor neurons to the musculature, the secretomotor neurons to the intestinal crypts have Dogiel type I morphology. The

neurotransmitters released from the neurons to evoke secretion include vasoactive intestinal peptide and acetyl choline. Acetylcholine acts at muscarinic receptors on the epithelial cells to initiate the cholinergic component of the secretory response.

Axons of the secretomotor neurons in guinea-pig small intestine give off collaterals that innervate blood vessels in the submucosa. When the secretomotor neurons fire, they evoke both secretion from the crypts and vasodilation which supports the secretory response with increased blood flow. The axon collaterals to the arterioles release acetylcholine that in turn activates release of nitric oxide from the vasculature endothelium to relax the vascular smooth muscle.

One kind of synaptic input to the secretomotor neurons consists of inhibitory inputs. When these inputs are activated, they result in hyperpolarization and suppression of action potential discharge by the neuron. The overall effect is to shut-off the secretomotor neurons and thereby prevent neurally evoked secretion from the crypts. Inhibitory synaptic inputs to the secretomotor neurons are provided by both the sympathetic innervation of the intestine and the intrinsic microcircuits. When active, the input from the sympathetic nervous system suppresses secretion by releasing norepinephrine to act at alpha-2 adrenoceptors on the secretomotor neurons. The inhibitory neurotransmitter released from intrinsic neural elements to suppress the secretomotor neurons appears to be somatostatin.

Secretomotor pathophysiology

Disruption of normal function of intestinal secretomotor neurons leads to predictable states of secretory disease, particularly in the colon. Hyperactivity of the secretomotor neurons is associated with diarrheal states. This includes immune responses in which foreign antigens (*e.g.*, parasites and food antigens) degran-ulate mast cells to release mediators that activate the secretomotor neurons. Cholera toxin which is taken up by submucosal neurons converts the neuronal behavior to an hyperexcitable state.

Hypoactivity of the secretomotor neurons is associated with constipation. Opiate abuse is a classical situation of constipation related to suppression of activity of intestinal secretomotor neurons. Opiates and opioid peptides when aplied to enteric neurons *in vitro* studies hyperpolarize the neurons and thereby suppress spike discharge. In animals addicted to morphine, application of naloxone dramatically increases the firing rate of the neurons.

The action of effective antidiarrheal drugs are explained by their inhibitory actions on secretomotor neurons. Clonidine, octreotide and loperamide all act to hyperpolarize and suppress spike discharge in secretomotor neurons. Clonidine acts at alpha-2 adrenoceptors to produce this effect, whereas octreotide is a somatostatin analog and loperamide an opioid.

ENTERIC NEUROIMMUNE COMMUNICATION

Apart from the brain-in-the-gut, the digestive tract is recognized as the largest lymphoid organ in the body together with a unique compliment of mast cells. In its position at one of the dirtiest of interfaces between the body and outside world, the intestinal mucosal immune system continuously encounters dietary antigens, bacteria, viruses and toxins. Physical and chemical barriers at the epithelial interface are insufficient to exclude fully the large antigen load thereby allowing chronic challenges to the mucosal immune system. Observations in antigen sensitized animal models suggest direct communication between the mucosal immune system and the minibrain in the intestine[4]. The communication is meaningful and results in adaptive behavior of the bowel in response to circumstances within the lumen that are threatening to the functionalintegrity of the whole animal. Communication is chemical in nature (paracrine) and incorporates specialized sensing functions of the immune cells for specific antigens together with the capacity of the enteric nervous system for intelligent interpretation of the signals. Immuno-neural integration progresses sequentially beginning with immune detection followed by signal transfer to enteric microcircuits followed by neural interpretation and then selection of a specific neural program of coordinated mucosal secretion and motor propulsion that effectively clears the antigenic threat from the intestinal lumen. Experimental approaches to immuno-neural interaction brings together the disciplines of mucosal immunology and enteric neurophysiology[5-7].

The intestinal tract is colonized from birth by a complement of immune cells that fluctuate with luminal conditions and pathophysiological states[8]. A variety of cell types including polymorphonuclear leukocytes, lymphocytes, macrophages, dendrocytes and mast cells are present in varying numbers. These are often found in close association with the neuronal elements of the enteric nervous system. The histoanatomy as well as immunophysiological observations indicate that elements of the enteric immune system are strategically positioned to establish a first line of defense against foreign invasion at a vulnerable interface between the body and the outside environment[5].

Foreign antigens in the form of foodstuffs, toxins or invading organisms sensitizes the enteric immune system. After sensitization, a second exposure to the same antigen triggers predictable integrated behavior of the intestinal effector systems. Coordinated activity of the muscle, mucosa and blood vasculature results in organized behavior of the whole intestine that rapidly expels the antigenic threat. Recognition of an antigen by the sensitized immuno-neuro apparatus calls forth a specialized propulsive motor program that is coordinated with copious secretion of water, electrolytes and mucus into the intestinal lumen. Detection by the enteric immune system and signaling to the enteric minibrain initiates the adaptive behavior[4].

The neurally organized pattern of muscle behavior in response to an offending antigen in the sensitized intestine is called power propulsion. The specialized form of intestinal motility forcefully and rapidly propels any material in the lumen over long distances and effectively strips the lumen clean. Its occurrence is accompanied by abdominal distress and diarrhea.

Power propulsion is one of the neural programs contained in the library of programs of the enteric minibrain. Output of the program reproduces the same stereotype d motor behavior in response to radiation exposure, mucosal contact with noxious stimulants or antigenic detection by the sensitized enteric immune system. The neural program for power propulsion incorporates connections for coordination of mucosal secretion with the motor behavior. The program is organized to stimulate copious secretion that flushes and lubricates the mucosa in the receiving segment ahead of the powerful propulsive contractions, which in turn, empty the lumen. The overall benefit for the well being of the animal is undoubtedly rapid elimination of material recognized by the immune system as threatening. The side-effects for the individual are lower gastrointestinal distress and diarrhea.

Several kinds of immune cells are potential sources of paracrine signals to the enteric minibrain[4]. Among these are lymphocytes, macrophages, polymorphonuclear leukocytes and mast cells. Most is known about signaling between mast cells and the elements of the local neural networks.

Intestinal mast cells proliferate during exposure to dangerous invaders such as Trichinella spiralis. Following an initial exposure to the nematode, immunoglobulin bound to receptors on the mast cells recognized the sensitizing antigens. Cross-linking of a specific antigen with the bound antibody triggers degranulation of the mast cells. Degranulation releases a variety of paracrine messengers which may include serotonin, histamine, prostaglandins, leukotrienes, platelet-activating factor and cytokines (Figure 1). Among these, histamine is implicated as a significant messenger in communication between the enteric immune system and the enteric nervous system[5,9].

CONCLUSION

Twentieth century progress in understanding the neurophysiological basis of integrative functions of the enteric nervous system supports the conclusion that the system functions like a minibrain. Most of the nervous functions associated with the central nervous system operate in the enteric nervous system. The implications of this are significant for understanding functional disorders of the gastrointestinal tract. Functional disorders of the central nervous system, such

as Parkinson's disease and Huntington's chorea, were impossible to understand prior to the advancement of knowledge of the neurophysiology of the midbrain microcircuits responsible for programming of somatomotor behavior. This analogy holds true for functional bowel disorders where the underlying nervous malfunctions are not yet well understood. Understanding of many gastrointestinal disorders now categorized as functional disorders pivots on continued momentum in the development of knowledge of the neurophysiology of the enteric nervous system. Scientific investigation in this area has spawned the new subdiscipline of neurogastroenterology which is currently one of the exciting frontiers of gastrointestinal research.

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INVITED LECTURES

Diseases of enteric peptidergic neurons

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THE ENTERIC NERVOUS SYSTEM (ENS)

ENS is the part of intrinsic nervous system that is embedded in the walls as myenteric or submucosal ganglia throughout the gastrointestinal tract. It plays an important part in controlling or modulating all the digestive functions, including motility, secretion, absorption, ion transport, blood flow, hormone release, *etc*. Although ENS is modulated by extrinsic autonomic nerves (vagal and sympathetic), it is characteristically able to act autonomously, *i.e.*, independently of CNS, hence the name "minibrain" of the GI tract.

The great majority of enteric neurons are peptidergic, comprising 80% of total myenteric neurons and 85% of total submucosal neurons in the guinea pigs[1]. These peptidergic neurons may contain one or more neuropeptides, which act in concert with classic transmitters (cholinergic or adrenergic) or other transmitters (GABA, amines, ATP, purines). Co-localization of neuropeptides and other transmitters can usually be observed in the same enteric neuron. The peptidergic neurons are the major non-cholinergic, non-adrenergic (NANC) nerve cell populations in the GI tract.

Sphincters of the GI tract play an important role in coordinating GI motility. A number of peptides and peptidergic neurons are involved in the regulation or modulation of sphincter functions, such as vasoactive intestinal peptide (VIP), substance P (SP), opioids, galanin, neuropeptide Y (NPY), and calcitonin gene-related peptide (cGRP). Abnormality in the number of peptidergic neurons or peptide content may result in GI motor diseases[2].

Deficit or dysplasia of enteric neurons may also lead to a variety of gastrointestinal motor diseases.

ACHALASIA

Achalasia is an esophageal disease characterized by incomplete relaxation of lower esophageal sphincter (LES) and incomplete distal esophageal peristalsis, resulting in dysphagia and dilatation of the esophagus. Recent immunohistochemic al studies of human esophagus revealed that the LES receives terminations positive for VIP (in 96%), cGRP (in 80%), and galanin (in 59%), and that 55% myenteric neurons are nitrinergic[3]. VIP and cGRP induce relaxation or decrease the tone of LES, whereas SP and galanin induce contraction or increase the tone of LES. VIP also reduces the increase in LES pressure stimulated by gastrin[4]. In patients with achalasia, VIP and VIP-containing fiber s in LES specimens are markedly decreased or virtually lacking[2], Transcutaneous electrical nerve stimulation decreases LES pressure in achalasia and in the meantime enhances systemic VIP concentration. Regardless of the above findings, the role of VIP in the pathogenesis of achalasia is still being questioned[5].

CONGENITAL ESOPHAGEAL STENOSIS (CES)

CES is a rare disease with narrowed esophageal lumen, aperistalsis and dysphagia since childhood. A marked reduction in myenteric nitrergic nerves was observed without significant quantitative changes in VIP, SP, and galanin neurons[6].

INFANTILE PYLORIC STENOSIS

This is an inborn disorder characterized by lack of relaxation in the pyloris, presented as refractory vomiting soon after birth. Normally, VIP and galanin induce relaxation or decrease the tone of the sphincter of pylorus whereas SP and opioids induce contraction or increase the tone of the sphincter of pylorus. Immunohistochemically, peptidergic ganglia or nerve fibers can be observed in the pylorus. In this disease, however, immunoreactive VIP, SP, NPY, and enkephalin nerve fibers are lost or decreased in the pylorus[2].

HIRSCHSPRUNG'S DISEASE

Hirschsprung's disease (aganglionosis coli) is characterized by segmental aganglionosis and lack of relaxation of diseased colon, with aperistalsis and dilatation of colon proximal to the diseased segment. Clinically, it is presented as refractory constipation. Hypoganglionosis and neuronal dysplasia of colon are related diseases with similar symtoms. Normally, peptidergic as well as nitrinergic neurons are present in human myenteric and submucosal ganglia, in Hirschsprung's disease, normal populations of neural cell bodies were observed only in 20% of patients, and immunohistochemical studies have revealed the absence of NANC inhibitory innervation. Neuropeptide immunoreactive nerve fibers, such as VIP, pituitary adenylate cyclase-activating peptide (PACAP), gastrin-releasing peptide (GRP), cGRP, SP, enkephalins, and galanin, are all reduced in number. In contrast, the cholinergic and adrenergic innervations are increased in the aganglionic segment. Notably, NPY nerve fibers are also increased in number, probably reflecting the adrenergic hyper-

innervation. Nitric oxide synthetase (NOS) is almost absent in the diseased segment[7,8].

CONSTIPATION WITH HYPERGANGLIONOSIS

This is a disease in young children presented as severe constipation and hyperplastic ganglia throughout the large and small intestines. Immunohistochemical study shows lowered expression of cGRP[9].

IDIOPATHIC CHRONIC CONSTIPATION (ICC)

Low total neuron density was observed at the myenteric plexus in patients with ICC. Using anti-VIP and anti-NOS antibodies, it can be found that the density of VIP-positive neurons is low while that of NOS-positive neurons is high in both myenteric and submucosal plexuses. These data support the postulation that in addition to the decrease in VIP neurons, the excessive production of NO may cause the persistent inhibition of intestinal contractions in ICC[10].

DIABETIC ENTERONEUROPATHY

Using the technique of *in situ* hybridization, it was shown that VIP mRNA con tent in myenteric neurons is significantly higher in streptozotocin-induced diabetic rat than in the controls, although the number of cell bodies is lower in diabetic rats compared to controls[11].

CHAGAS DISEASE

Chagas disease is characterized by the ganglionic damage in gastrointestinal smooth muscles and other muscles due to infestation with Trypanosoma cruzi in la tin America. Furthermore, the toxin released by the parasite is believed to be responsible for the damage and ablation of myenteric ganglionic neurons, which eventually lead to motor dysfunction, megaesophagus, and megacolon. VIP and SP neurons are decreased in Chagas disease[12].

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INVITED LECTURES

Normal and disturbed motility of gallbladder and sphincter of Oddi

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Smout AJPM, van Berge-Henegouwen GP, Samsom M. Normal and disturbed motility of gallbladder and sphincter of Oddi. *World J Gastroenterol* 1996; 2(Suppl1): 28-29 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/28.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.28

Two smooth muscle pumps regulate the output of bile into the duodenum: The gallbladder and the sphincter of Oddi (SO)[1]. The human liver produces 500-1000 mL of bile per day. More than half of this volume enters the gallbladder to be concentrated. Gallbladder contraction can occur both during fasting in connection with phase 2 of the interdigestive migrating motor complex (in conjunction with peak activity of serum motilin levels) and during a meal under cholecystokinin (CCK) and cholinergic stimulation[2]. Impaired gallbladder contraction and gallbladder emptying have been linked to a number of clinical conditions with an increased incidence of gallstone disease[3] (Table 1).

The SO is the muscular arrangement surrounding the last part of the common bile duct and pancreatic duct before it ends into the duodenum. The SO is constituted of a choledochal sphincter, a pancreatic sphincter, an ampullary sphincter and so-called intermediate fibers. The sphincteric segments of the common bile duct as well as the pancreatic duct are invariably present and therefore a complete sphincterotomy of the choledochal sphincter segment never results in total abolishment of the pancreatic SO activity[4].

Manometry of the SO is carried out with the same equipment as used in other manometric investigations of the GI tract. This includes side-hole catheters connected to external transducers which are perfused from a pneumohydraulic capillary infusion system and connected to a computer for automatic analysis and data storage. It is improtant to note that the usual premedication for ERCP can not be used with the exception of benzodiazepines, as these have been shown not to interfere with the manometric recordings. Since it can take some time before a stable recording of signals is reached, only readings after stabilization should be included in the analysis.

SO manometry is performed by slowly withdrawing of the pressure recording catheter from the choledochal duct into the duodenum[5-7]. Pressure is recorded using a triple-lumen catheter with recording orifices spaced at 2 mm intervals. A pressure rise can be seen, when entering the SO. In humans the mean pressure in the sphincter is only 4 mmHg greater than that in the common bile duct and about 15 mmHg greater than in the duodenum. Furthermore, phasic contractions can be seen superimposed on the basal pressure. These contraction occur at a rate of about 4 per minute and have an average amplitude of 100-150 mmHg. In the fasting state these phasic contractions of SO show a variable propagation. Some 60% show an antegrade peristaltic propagation, 25% are simultaneous contractions and less than 15% have a retrograde peristaltic movement. Following administration of CCK or a CCK analogue a direct inhibition of SO activity is usually recorded.

SO manometry carries a significant risk of acute pancreatitis[8]. The incidence of acute pancreatitis varies between 6% and 20%, dependent of the criteria used. Because the complication of pancreatitis is probably due to increased pressure in the pancreatic duct caused by the catheter and the water perfusion system, it is important to stay away as much as possible from the pancreatic duct during the procedure. For this reason a special manometry catheter with separate perfusion and aspiration ports was developed. With this manometric device overpressure by water perfusion can be prevented and the complication is recuced.

Because of the fear of complications a number of other methods for patients with suspected SO dysfunction have been employed. These are cholescintigraphy with HIDA and ultrasound examination[6]. Cholescintigraphic studies have shown an satisfactory correlation with manometry if one takes the hepatic hilus-duodenum transit as criterium. However, todate no series have proven these methods to be of value in predicting symptomatic benefit after sphincterotomy (vide infra).

SO dyskinesia or dysfunction, also called "biliary dyskinesia"[9], is a term used to characterize an abnormality of phasic and tonic SO contractility which may be manifested clinically by billiary and or pancreatic disorders without the evidence of gallstones. The clinical syndrome describes typically patients with postcholecystectomy pain without organic substrate and without any evidence of chronic pancreatitis. It is possible that several patients undergoing cholecystectomy for the presence of gallstones rather have SO dysfunction prior to surgery.

According to Hogan and Geenen patients with typical "non-organic" biliary pain can be divided in three subgroups. Group I includes patients with biliary pain, liver enzyme values greater than 2 times the upper limit of normal documented on 2 or more occasions, delayed contrast drainage time from the choledochal duct of more than 45 min and a dilated choledochal bile duct (> 12 mm) as seen during ERCP[10]. Group Ⅱ patients have biliary pain and one or two of the previously mentioned criteria. Group Ⅲ comprises patients with biliary pain only *i.e.* without any of the abnormalities

Table 1 Clinical conditions with increased incidence of gallstones and abnormal gallbladder emptying (stasis)

Cholesterol gallstone disease
Use of sex hormones, pregnancy
Use of octreotide, somatostatinoma
Prolonged fasting
Gastric bypass surgery for obesity
Total parenteral nutrition
Truncal vagotomy
Diabetes mellitus
Spinal cord injury

as mentioned for group Ⅰ or Ⅱ. SO dysmotility occurs in almost all patients in group Ⅰ, in about 50% of group Ⅱ and in 25%-30% of group Ⅲ patients.

Manometric abnormalities of the SO may comprise all measurable parameters The most important being increased baseline pressure, increased phasic contraction amplitude, dyscoordination of phasic contraction propagation, tachy-oddia and a paradoxical response to intravenous CCK administration. Research from many centers has shown that the most improtant and discriminating criterium is an elevated SO basal pressure above 40 mmHg. Other less important criteria for abnormal SO functions are: Amplitude of phasic contractions > 250 mmHg, discoordination and/or absence of inhibition of SO activity after CCK injection[11].

Response to CCK can also be used in the differential diagnosis of biliary-like abdominal pain. Recently an abnormal response to CCK with failure of complete inhibition of phasic contractions was demonstrated in 50% of patients with the irritable bowel syndrome and previous cholecystectomy. These patients might constitute a subset of those with sphincter of Oddi dyskinesia implying that the entity of SO dyskinesia is likely to be a heterogeneous group of disorders, one of which may include the irritable bowel syndrome[11].

With respect to tachy-oddia it is important to differentiate this phenomenon from the normal phase 3 activity during the regular migrating motoric complex of gastrointestinal motility. Tachy-oddia of the SO probably is a physiologic event during the passage of a normal phase 3.

Definitive proof of SO abnormality as the cause of the biliary pain was provided by a randomized study comparing sphincterotomy with a sham procedure. In this study it was shown that sphincterotomy was of clear clinical benefit only in those patients who had an elevated basal SO pressure. Recently this was confirmed in a retrospective survey for the use of the SO manometry in the UK. Therefore, it can be recommended that patients with biliary type pain without organic substrate but with increased SO baseline pressure should undergo sphincterotomy[12].

They are the most likely candidates to have a predictable symptomatic improvement of their biliary pain after this procedure. The practical value of drugs in the treatment of SO dyskinesia is limited. When CCK produces a paradoxical increased basal pressure or increased phasic activity in association with biliary pain, a CCK-antagonist potentially could be of value, but until now no CCK-antagonists have been approved for therapeutic use in humans. Another possibility could be the use of Botulinum toxin, but this has only been used in experimental animals until now.

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Spinal control of anorectal function

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Controlling of defaecation and preservation of continence is mainly achieved by the physiological function of rectum and anus. The seemingly two to tally opposite functions is coordinated by a spinal centre in the lumbosacral region of the spine which is under conscious control of the cortex.

Defaecation is a stereotyped sequence of actions, usually initiated by a conscious mechanism and involves a number of pelvic reflexes that are controlled and coordinated by a centre in the brain stem. The basic control mechanism is present in the newborn and the higher cortical activity develops through "training".

Under resting conditions and during gradual (approximately 10 mL/min) distension of the rectum, continence to rectal mucus and faeces is largely maintained by the tonic contraction of the internal anal sphincter (IAS), which some assistance from the tonic activity of the external anal sphincter (EAS)[1,2]. The tonic contraction of the sphincter is unable to maintain continence when this is threatened by rectal contraction, rapid rectal distension and increases in intra-abdominal pressure. This is because rapid rectal distension and contraction cause a reflex relaxation of the IAS, mediated by intrinsic nerves, while rises in intra-abdominal pressure are usually of sufficient magnitude to overwhelm the resting sphincter pressure and may also induce sphincter relaxation[3]. Continence can only be maintained under these conditions by a compensatory contraction of the EAS. Although the EAS responses are present in paraplegic patients and are therefore spinal reflexes, the response to rectal distension is heavily modulated by conscious mechanisms and is very closely linked with rectal sensation. The activity of the EAS is almost completely absent when the subject is asleep and does not show any increase in response to rectal distension[4].

Despite these evidences, the mechanisms are still poorly understood. The main reason is that there is no good physiological model for studying in human being. We have studied a group of patients who had complete spinal lesions before and after rhizotomy[5-7]. Results derived from those studies were also compared with normal subjects and patients with faecal incontinence or constipation. From those data, we may draw a conclusion that spinal centre plays a coordinative role in controlling anorectal function in man.

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Towards the understanding of the mechanisms of faecal incontinence

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Disorders of anorectal function account for 10% of patients seeking medical care in gastrointestinal clinics. They represent a spectrum of problems that include organic diseases and function disturbances. Owing to inadequate knowledge and lack of appropriate diagnostic methods, until recently, these problems were largely neglected. However, extensive research in the last two decades together with the availability of a wide range of tests has now facilitated a better understanding of these problems[1]. An ideal test should identify the underlying cause(s) and provide guidelines for treatment. Unfortunately, there is no single test[2]. Several techniques are available that could provide comprehensive information regarding defaecation dynamics.

To evaluate anorectal function and its controls comprehensively each component of the continence mechanism should be assessed and it is therefore essential to utilise a number of techniques. While static measurements of anorectal motility can be performed quickly, these may not be representative of anorectal motility under ambulatory conditions or during sleep[3].

Combined measurement of anorectal pressure, sphincter electromyography and rectal sensation reveals many causes of defaecation[1]. In patients with faecal incontinence, anal endosonography may localise the sphincter defect[4] and aid surgical reconstruction. Pudendal nerve latency test may provide pathophysiological basis for a weak anal sphincter. Saline continent test is useful not only for the diagnosis but for followup. Several tests are available, but choosing the appropriate test would depend on the patients' symptoms and physical findings.

Faecal incontinence may result from increased colorectal motility, reduced strength of the internal anal sphincter (IAS) or external anal sphincter (EAS), decreased rectal compliance, impaired rectal sensation, or a combination of these factors[6,7]. In our series of 302 patients with "idiopathic" faecal incontinence, 92% had a weak EAS, 32% had a weak IAS, 27% had an unstable IAS (characterised by prolonged "spontaneous" anal relaxation), 47% had a hypersensitive rectum, and rectal sensation was impaired in 8%[9].

In summary, ideally, the clinician should utilise these tests either to confirm a clinical suspicion or to provide new information that could aid management.

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INVITED LECTURES

Discovery and development of motilin agonists

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The incidental discovery at our laboratory that erythromycin (EM) greatly stimulates gastrointestinal (GI) contractile activity in conscious dogs prompted us to examine the mechanism of action of EM and EM was found to be a non-peptide motilin agonist. In collaboration with Dr. S. Omura, the Kitasato Institute of Tokyo, we examined the structure-activity relationship in more than 300 derivatives of EM, and found that the macrolide compounds which manifest motilin-like activity should be composed of a 14-membered lactone ring with desosamine (aminosugar) and cladinose (neutral sugar) attached at C5 and C3 with a glycoside linkage. A number of desosamine greatly affects motilin-like activity, and 8,9-anhydroerythromycin 6,9-hemiketal propargyl bromide (EM536), was the most potent motilin agonist among the derivatives, the activity of which is about 3000 times more than that of EMA. We have named macrolides with motilin activity motile to mean motilin-like macrolides.

In the study of receptor binding in human gastric tissue, EM574, which is one of the EM derivatives, and has been selected for clinical use, specifically disp laced ^{125}I-motilin bound to smooth muscle homogenates and has a Kd value of 7.8×10^{-9} M, compared with 4.5×10^{-9} M for motilin. Film autoradiograms show that ^{125}I-motilin-binding sites are localized in the muscle layers, and the labeling disappearedin the presence of a 1000 times molar concentration of EM574.

EM574 has now been proved to be effective in improving delayed gastric emptying in various diseases. In dog experiments, accelerating effect of EM523 on gastric emptying of solid-liquid meals has been demonstrated.

In the recent studies on stimulatory mechanism of EM523-induced contractions in postprandial stomach of conscious dogs, it was found that EM523, in doses 1-30 μg/kg-h, induced a dose-dependent increase in fed-type contractions. EM523-induced contractile activity was partially inhibited by at ropine, hexamethonium, dopamine, 5-hydroxytryptamine 3 receptor antagonist, and substance P antagonist but soon recovered. Atropine-resistant and EM523 induced contractions were further inhibited by 5-HT_3 receptor antagonist and substance P antagonists, and the combined use of the two antagonists completely eliminated the atropine- resistant and EM523-induced contractions. EM523-induced contract ions in the fed stomach are quite different from phase Ⅲ contractions in the interdigestive state, and are mediated partially through the cholinergic pathways. The non-cholinergic pathways involve 5-HT_3 and neurokinin 1 receptors.

In addition to the action of motilides in the fed state, EM523 was found to stimulate the endogenous release of pancreatic polypeptide, insulin and glucagon as well as motilin, but not gastrin, CCK, secretin during the interdigestive state. The significant release of these hormones was suppressed by pretreatment with atropine and hexamethonium, and completely eliminated by 5-HT_3 receptor antagonist and truncal vagotomy. These findings suggest that EM523 stimulates the endogenous release of pancreatic polypeptide, insulin and motilin by activating the cholinergic parasympathetic nerve system, finally stimulating the endocrine pancreas through vagally cholinergic muscarinic receptors in the pancreatic islets.

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Pharmacology of prokinetic agents and gimotor disorders

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Hormonal regulation of gastric emptying and its application in the therapy of gastroparesis

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The gastrointestinal system is the largest endocrine organ of the body. More than twenty different types of neuroendocrine cells secrete more than eighty peptides. Despite a prolific literature, the physiologic function and clinical relevance of most of these peptides remains to be identified or is poorly understood. Several of these peptides are able to affect gastrointestinal motor activity in general and gastric emptying in particular. For two of these peptides, motilin and cholecystokinin, the study of their role in the regulation of gastric emptying has led to the development of drugs which may find clinical application even though their physiological role remains uncertain. For this reason this paper will be limited to these two peptides.

Cholecystokinin (CCK) was first described over 60 years ago as a putative regula tor of gallbladder contraction and was shown in 1966 to be identical with pancreozymin, the agent postulated to be released by fats or proteins and causing pancreatic enzyme secretion. Originally isolated as a 33-amino acid peptide, many other molecular forms exist, all however sharing the amidated carb oxy terminal pentapeptide Gly-Trp-Asp-Met-Phe-NH2 which is also present in gastrin and which is responsible for bioactivity. Primarily studied in relation to gallbladder contractility and pancreatic enzyme secretion, the fact that nutrients which stimulate CCK release are potent inhibitors of gastric emptying, has led to the hypothesis that CCK regulates gastric motility.

It has been known for long that infusion of pharmacological doses of CCK in huma ns delayed gastric emptying (Chey *et al*[3] 1970; Debas *et al*[5] 1975). More recently attempts have been made to mimick postprandial rises (which are, compared to the rises seen for other peptides, rather small) (Liddle *et al*[15] 1986; Kleibeuker *et al*[12] 1988).

The effect of CCK is mediated via CCK-receptors carefully characterized in the pancreas. However, CCK-receptors are present on smooth muscle cells throughout the gastrointestinal tract. In general they are distinguished into two types: CCK-A and CCK-B. The nomenclature was intended to indicate a specific localisation in either the alimentary tract (CCK-A) or the brain (CCK-B) and a distinction between peripheral and central preceptors. However this is certainly not absolute. Four classes of antagonists have been developed: Cyclic nucleotide derivatives, amino acid derivatives (example: Loxiglumide, a glutaramic acid derivative), peptide analogs and benzodiazepine derivatives (example: Devazepide formerly called L 364, 718 or MK-329).

Antagonists have been used as a tool to study the role of CCK in gastric emptying. Some animal studies showed a pronounced acceleration of gastric emptying following administration of the CCK-A antagonist L 364, 718 [Green *et al*[9] 1988]. In humans however the data are controversial. In five studies in which loxiglumide was used, three found an acceleration of gastric emptying [Fried *et al*[8] 1991; Meyer *et al*[17] 1989; Konturek *et al*[13] 1994] but the two others failed to find an effect [Corazziari *et al*[4] 1990; Niederau *et al*[19] 1990]. One study which used devazepide was also negative [Liddle *et al*[14] 1989]. These studies will not be discussed in detail, but differences in the type of meal and in the method used to study gastric emptying, may be at the basis of the controversy. It seems that the role of CCK is limited to meals which release CCK, and consequently the application of CCK-antagonists will also be limited to such meals.

Motilin was discovered as part of the studies of Brown and colleagues on the stimulatory effect of an increase in duodenal pH on motor activity in the gastric fundus and antrum. They hypothesised that this was due to the release of an hormonal substance from the duodenal mucosa, and using the motor effect on the gastric fundus as a guideline, they succeeded in isolating a 22-amino peptide from hog duodenal mucosa which they named motilin [Brown *et al*[2] 1972]. Motilin is present in endocrine cells, predominantly in the mucosa of the duodenum and the jejunum. In the fasted state it is periodically released (the stimulus for this release remains unknown) and because this release is associated with the development of phase 3 activity, it has been argued that motilin's physiological role is the initiation of phase 3 activity [Vantrappen *et al*[27] 1986]. The subject is controversial, and one argument against a causal role of motilin has been that not every phase 3 activity is accompanied by a motilin peak. However recent studies have shown that only phase 3 activity which starts in the stomach is associated with plasma motilin peaks [Bormans *et al*[1] Stolk *et al*[26] 1993]. Although motilin is probably not the only factor involved in initiating gastric phase 3 activity, it is certainly a factor which contributes to this event.

Phase 3 of the MMC is considered to be the "intestinal housekeeper" which clears the gastrointestinal lumen of meal remmants,

debris and indigestible solids. Motilin may therefore be seen as a factor contributing to the periodic gastric emptying in the fasted state. The effect of motilin on gastric emptying postprandially has been debated. Certainly, a meal suppresses rather than stimulateds motilin release, and a postprandial role of motilin seems unlikely, except perhaps in the initiation of the first phase 3 activity which marks both the end of the postprandial state and the return of the interdigestive pattern.

In 1984 Itoh *et al*[10]discovered that erythromycin mimicks the effect of motilin and induces phase 3 which starts in the stomach (and the lower esophagea l sphincter) [Itoh *et al*[10] 1984]. Later studies have shown that erythromyc in acts as a motilin agonist because it displaces motilin bound to antral smooth muscle motilin receptors and has the same regional species specificity as motilin *in vitro* [Peeters *et al*[21] 1989]. Additional arguments have further substantiated this hypothesis, which was finally proven without doubt by the discovery that Phe^3, Leu^{13} porcine motilin acts as an antagonist and blocks the contractile effects of erythromycin on the human and rabbit stomach *in vitro* [Petters *et al*[24] 1994; Depoortere *et al*[6] 1995]. Erthromycin derivatives have been developed without antibiotic properties but with enhanced potency to induce contractility. These compounds have been named motilides [Omura *et al*[20] 1987] and several are presently developed as new prokinetic drugs. Two of them EM-574 (Takeda) and ABT-229 (Abbott) appear to be in an advanced stage of development and may soon enter the clinic. All motilides are motilin agonists, and their affinity for the motilin receptor correlates with their potency *in vivo* [Peeters *et al*[23] 1994]. Their ability to accelerate gastric emptying is due to several effects on gastric motility such as: Amplification of the amplitude of antral contractions; Increased proximal gastric tone; Inhibition of pyloric pressure waves; Induction of phase 3-like patterns [Peeters *et al*[22] 1993]. Especially the last effect suggests that motilides may have a nonphysiological effect which is achieved at the expense of the sieving process accomplished by the normal fed motility pattern. In pathological conditions however this may well be the only effective way to relieve conditions of gastroparesis.

Motilides may also reduce postprandial reflex, not only as a consequence of their effect on gastric emptying, but also because there is substantial evidence that they increase LES-pressure. Certainly erythromycin has already shown to be effective in several conditions of gastroparesis such as diabetes [Dull *et al*[7] 1975, Janssens *et al*[11] 1990, Maliakkal *et al*[16] 1991, Mozwecz *et al*[18] 1990] and anorexia nervosa [Stacher *et al*[25] 1993].

For the two peptides under consideration we may therefore conclude that cholecys tokinin plays a role in postprandial emptying, while motilin plays a role in the intermittent clearing of the stomach during fasting. In both cases however these peptides are only one of several control mechanisms. Nevertheless, choosing their receptors as a therapeutic target may prove to be useful, and both CCK-antagonists and motilin agonists may be used as gastrokinetic agents. Although motilides may activate an unphysiological mechanism, they are the most promising group of substances under development at this time.

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ABSTRACT

Neurotransmitters in caudate nucleus substantia nigra and dorsal vagal nucleus involved in inhibitory effect of substance P of caudate nucleus on gastric myoelectric activity and motility

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Abstract

AIM: Our previous study showed that the inhibitory effect of substance P (SP) of caudate nucleus on gastric motility was realized by dopamine (DA) and acetylcholine (Ach) of caudate nucleus, and the effects were mediated by substantia nigra and dorsal vagal nucleus *via* vagus nerve. In present study, the relationship of inhibitory effect of SP of caudate nucleus with DA, Ach as well as gama-aminobutyric acid (GABA) in caudate nucleus, substantia nigra and dorsal vagal nucleus was investigated by immunocytochemical staining technique.

METHODS: Male sprague-Dawley rats (180-220 g/body weight) were used. The inhibitory effect on gastric myoelectric activity and motility were induced after microinjection of SP into caudate nucleus, the immunocytochemical technique was used.

RESULTS: (1) Both tyrosin hydroxylase (TH) immunoreactive fiber s and the number of choline acetyltransferase (ChAT) positive cells were increased in caudate nucleus. It suggested that SP-induced inhibition was realized BY DA, Ach. (2) Meanwhile, the increase of GABA-immunoreactive cells were increased in substantia nigra; But that of SP and TH not. (3) The number of ChAT-immunoreactive cells as reduced in dorsal vagal nucleus; While that of SP and GABA were increased.

CONCLUSION: It suggested that DA, Ach and GABA in caudate nucleus, GABA and Ach in substantia nigra, and SP, GABA in caudate vagal nucleus presumably participate in the inhibitory effects of SP in caudate nucleus on gastric myoelectric activity and motility.

Key words: Neurotransmitters; Caudate nucleus; Substantia nigra; Dorsal vagal nucleus; Substance P; Gastric myoelectric activity; Motility

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ABSTRACT

An investigation of SP, VIP, cGRP levels in gastric antrum of experiment spleen deficiency rats

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Abstract

AIM: Substance P (SP), vasoactive intestinal peptide (VIP) and calcitonin gene related peptide (cGRP) levels in all layers of gastric antrum in experimental spleen deficiency (SD) rats were measured by radioimmunassays (RIA) in order to study the potential role of some gastrointestinal peptides in the gastrointestinal motility disorders presented in SD.

METHODS: 24 adult Wistar rats were used and divided into 4 groups, *i.e.* control group (n = 5), experimental SD group (n = 8), spontaneous recovery group (n = 5) and therapeutic group (n = 5) treated with Chinese herbs (sijunzi tang). A small piece of gastric antrum tissue including all layers was removed and processed for RIA.

RESULTS: The results showed that: The ir-SP, ir-VIP, ir-CGRP levels in gastric antrum of SD rats were significantly lower than that of control. In spontaneous recovery cases, ir-SP level was still less than that of control, $P < 0.05$ while ir-VIP, ir-cGRP levels recovered (*vs* control, $P < 0.05$). ir-VIP, ir-cGRP were improved to the levels of co ntrol group ($P > 0.05$).

CONCLUSION: Our study suggested that there were significantly changes of SP, VIP, cGRP levels in gastric antrum of SD rats. These changes may be closely related to the gastrointestinal motility disorders presented in SD. The Chinese herbs (Sijunzi tang) currently used have partially therapeutic effect. However it still needs to be studied whether this Chinese medicine could completely improve the SD syndrome.

Key words: Substance P; Vasoactive intestinal peptide; calcitonin gene related peptide levels; Gastric antrum; Experiment spleen deficiency

Liu SM, Qu RY, Wang W, Zeng WH, Qu BL, Wang XQ, Zeng XB, Shang HW. An investigation of SP, VIP, cGRP levels in gastric antrum of experiment spleen deficiency rats. *World J Gastroenterol* 1996; 2(Suppl1): 37 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/37.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.37

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ABSTRACT

Action of progesterone, estradiol and oxytocin on contractile activety of isolated gastric strips in rats

Song-Yi Qu, Fang Wang, Tian-Zhen Zheng, Wei Li, Di-Ying He

Song-Yi Qu, Fang Wang, Tian-Zhen Zheng, Wei Li, Di-Ying He, Department of Physiology, Lanzhou Medical College, Lanzhou 730000, Gansu Province, China

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Abstract

AIM: Nausea and vomiting in early pregnancy are extremely common, and the effects of pregnancy and female steroid hormones on the gastrointestinal motility are followed with interest. We studied the effects of progesterone, estradiol and oxytocin on the contractile activity of longitudinal muscle (LM) of fundus, LM and circular muscle (CM) of body and antrum, and CM of pylorus in rats *in vitro*.

METHODS: Each strip was suspended in a tissue chamber containing Krebs solution, constantly warmed by water jacked and supplied with 95% O_2 and 5% CO_2. The contractile response was measured isometrically on the polygraph. After 1 h of equilibration with 1 g tension, drugs were added in the tissue chamber.

RESULTS: (1) Progesterone significantly decreased the resting tension of fundic and body LM, the mean contractile amplitude of body and antral LM and CM, and the motility index of pyloric CM. (2) The progesterone inhibition of the mean contractile amplitude could be partially blocked by phentolamine in CM of body, and by phentolamine or indomethacin in LM of body. Hexamethonium, propranolol and L-NNA (an inhibitor of actin in LM of body). Hexamethonium, propranolol and LNNA (an inhibitor of NO synthase) did not block the action of progesterone. (3) Estradiol significantly decreased the resting tension of fundic LM and body LM and CM, the mean contractile amplitude of body and antral LM and SM, and the motility index of pyloric CM. (4) Phentolamine, indomethacin, hexamethonium, propranolol and L-NNA could not block the action of estradiol. (5) Oxytocin significantly increased the resting tension of LM and CM of body and LM of antrum, the mean contractile amplitude of LM and CM of body antrum, and the motility index of CM of pylorus. (6) Atropine and hexamethonium could not block the action of oxytocin.

CONCLUSION: (1) Progesterone and estradiol inhibited the contractile delaying gastric emptying *in vivo*. (2) Oxytocin stimulated the contractile activity of strips, and it was consistent in prokinetic action *in vivo*. (3) The mechanism of these hormones on stomach muscle strips seems to be a direct one except that the action of progesterone on body was partly mediated *via* prostaglandin and adrenergic α-receptors.

Key words: Progesterone; Estradiol; Oxytocin; Contractil e actively; Isolated gastric stips

Qu SY, Wang F, Zheng TZ, Li W, He DY. Action of progesterone, estradiol and oxytocin on contractile activety of isolated gastric strips in rats. *World J Gastroenterol* 1996; 2(Suppl1): 38 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/38.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.38

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ABSTRACT

Measurement of surface electrical activation small intestine and plasma cholecystokinin concentrations in patients with irritable bowel syndrome

Wan-Dai Zhang, Yu-Sheng Yang, Yu-Gang Song, Dian-Yuan Zhou, Zhen-Shu Zhang, De-Shou Pan, Fu-Cai Feng

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Abstract

AIM: The measurements of the small intestinal electrical activity have been measuned by using serosal or intraluminal electrodes in the small intestine except in one report measured by the surface electrodes in 1993. In this study, we made an attempt that the small intestine electrical activity was measured by surface electrodes and deduced the method to be feasible and scientific. With the method, the surface electrical activity of the small intestine was studied in the patients with irritable bowel syndrome (IBS).

METHODS: One pair of scale electrodes were placed near the umbilicus with a distance of 5 cm. Two bipolar signals derived from the electrodes were amplified by the polygraph system and simultaneously digitized filtered and stored on a personal computer. The power spectrum of 30 min surface recording of each subject was calculated using the periodogram method by which the dominative frequency of the small intestine electrical activity of each subject could be demonstrated, and the rules of the small intestinal electrical activities were to be explored. The study was conducted in two groups of subjects, control group (12 cases) and IBS group (13 cases).

RESULTS: The dominative frequencies of the slow waves of the small intestinal electrical activities ranged from 9-12 cycles perminute (CPM) in both groups with a mean value of 10.67 ± 0.21 cpm in the control group and 11.03 ± 0.24 cpm in the IBS group. The plasma CCK concentration was significant higher in the IBS group than in the control group ($P < 0.005$).

CONCLUSION: This result indicates that the slow waves of the small intestinal electrical activities may not be related to symptoms and the small intestinal motility of patients with IBS. The plasma CCK concentration may be related to the symptoms and the intestinal abnormal motility in the patients with IBS.

Key words: Slow waves; Small intestinal electrical activities; Irritable bowel syndrome; CCK

Zhang WD, Yang YS, Song YG, Zhou DY, Zhang ZS, Pan DS, Feng FC. Measurement of surface electrical activation small intestine and plasma cholecystokinin concentrations in patients with irritable bowel syndrome. *World J Gastroenterol* 1996; 2(Suppl1): 39 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/39.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.39

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ABSTRACT

Effects of emodin on activity of K_{ATP} channel and $[Ca^{2+}]i$ in guinea pig taenia coli cells

Wen-Xiu Yang, Jun-Ying Li, Wen-Wei Hu, Xie-Qun Chen, Wen-Sheng Xu, Zheng-Gen Jin

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Abstract

AIM: Emodin is a component of traditional Chinese drug rhubarb. We had reported that emodin could improve depolarization of cell membrane, shorten the period of membrane potential oscillation and enhance the amplitude index of the spontaneous minute rhythm contraction (MRC) in guinea pig taenia coli (PTC). Now, we have investigated the effects of emodin on activity of K_{ATP} channel and intracellular $[Ca^{2+}]i$ in GPTC muscle cells.

METHODS: Experimental preparations isolated from GPTC were perfused by Krebs solution. The detected parameters of electrical and contractivity activities are: Membrane resting potential (RP); Oscillation period of membrane potential (POP); Frequency of spike potential (SPF); Frequency (1/CP), amplitude (CH) and amplitude index (CHI) of MRC. Using the Fura 2 fluorescence binded intracellular Ca^{2+} to determine $[Ca^{2+}]i$ in dissolved cells suspension.

RESULTS: (1) Emodin enhanced the electrical and contractivity activities in GPTC in dose-dependent manner. When emodin concentration increased, 1/pop increased and CH decreased, the changes of CHI appear to be bell curve. Control CHI value was 1.1 g/min, as emodin concentration was 20 μmol/L, the CHI had maximum value 2.4 g/min. (2) K_{ATP} channel opener cromakalim inhibited the enhancement action of emodin on electrical and contractive activities of cells. When emodin (20 μmol/L) rose CHI from 1.2 to 2.4 g/min, cromakalim (20 μmol/L) reduced CHI to 0.3 g/min. As the electrical and contractive activities were eliminated by cromakalim (20 μmol/L), emodin (20 μmol/L) could recover these activities. (3) When the cells had no contraction, K_{ATP} channel blocker glybenclamide. (20 μmol/L), the MRC resulted in standard pattern. (4) The relationship between emodin concentration and intracellular $[Ca^{2+}]i$: As emodin increased from 10-7 to 10-5 (mol/L), $[Ca^{2+}]i$ increased from 110 to 330 nmol/L, later $[Ca^{2+}]i$ decreased with emodin increased.

CONCLUSION: The basis of membrane potential oscillation and MRC is periodic change of activity of K_{ATP} channel. Action mechanism of emodin may be to inhibit the activity of K_{ATP} channel that cause membrane depolarization, improve Ca^{2+} channel opening and increase Ca^{2+} influx, then induce intracellular Ca^{2+} release and increase $[Ca^{2+}]i$ so that enhance cellular contractive activities.

Key words: Emodin; K_{ATP} channel; $[Ca^{2+}]$; Guinea-pig taenia; Coli cells

Yang WX, Li JY, Hu WW, Chen XQ, Xu WS, Jin ZG. Effects of emodin on activity of K_{ATP} channel and $[Ca^{2+}]i$ in guinea pig taenia coli cells. *World J Gastroenterol* 1996; 2(Suppl1): 40 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/40.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.40

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ABSTRACT

Regulation of small intestine motility disorder by Banxiaxiexin decoction after irradiation and its mechanism

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Abstract

AIM: Patients who have radiation-damage and take radiotherapy often have gastrointestinal symptom, it has relation to disorders of small intestine motility. The study of Chinese traditional medicine shows that many Chinese traditional formulae can improve motility of gastrointestinal tract, they also have an effective treatment for radiation-damage. Finding effective Chinese traditional formulae is very important for treatments for radiation-dam age. Our purpose was to study the regulation of small intestine motility disorder by Banxiaxiexin decoction after irradiation and its mechanism.

METHODS: Our experiments studied the regulation of small intestine motility disorder after irradiation by recording and analyzing the migrating myoelectric complex (MMC) of Wistar rats, and studied the mechanism of its effect with extracorporeal experiment.

RESULTS: Most of the rats' intestinal MMC disappeared from 1 h to 7 d after irradiation, and had diarrhea on the third day (the rate of diarrhea was 90%). After oral application of Banxiaxiexin decoction in most rats, the intestinal MMC appeared after irradiation and the duration of phases was no different from the normal MMC. The fast wave's amplitude of MMC changed after irradiation in control group, but after administration the amplitude tended to be normal. The rate of diarrhea was reduced after administration Banxiaxiexin decoction (45%, $P < 0.01$).

CONCLUSION: Banxiaxiexin decoction can improve the myoelectric activity of small intestine after irradiation, can restore the normal MMC, regulate the disorder of small intestine motility. It has a direct inhibition effect on the smooth muscle contraction of small intestine and antagonistic effects on M-receptor.

Key words: Migrating myoelectric complex; Diarrhea; Irradiation; Banxiaxiexin decoction

Fu D, Chen GZ. Regulation of small intestine motility disorder by Banxiaxiexin decoction after irradiation and its mechanism. *World J Gastroenterol* 1996; 2(Suppl1): 41 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/41.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.41

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ABSTRACT

Role of cystosolic calcium, IP_3 release in contraction of gastric muscle cells induced by CCK-8 and motilin in rats

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Abstract

AIM: It's not clear: (1) whether CCK-8 and motilin had direct effect on rat isolated gastric smooth muscle cells; (2) whether specific receptors exist on gastric smooth muscle cells; and (3) whether cytosolic calcium and IP_3 were involved during contraction of gastric muscle cells caused by CCK-8 and motilin. The purpose of this study was to investigate the action of CCK-8 and motilin on antrum smooth muscle cells, and role of cytosolic free calcium and IP_3 during contraction of antral muscle cells caused by these peptides.

METHODS: Isolated gastric smooth muscle cells were prepared to observe the contracting effect of CCK-8 and motilin on them. Specific antiserum or receptor antagonists were used to investigate their effects on the action of the peptides; Fura-2AM fluro-labelled method was used to measure intracellular calcium concentration changes after CCK-8 and motilin were added to the gastric smooth muscle cells. Protein competitive binding assay was used to measure IP_3 concentration changes after the above peptides were added.

RESULTS: (1) CCK-8 caused contraction of the antrum smooth muscle cells, the percentage of cell contraction was 10.92% ± 2.26%-19.93% ± 4.30% ($P < 0.01$), the contraction was dose-dependent between 2.5×10^{-8}-2×10^{-7} mol/L. CCK-8 antiserum (1:100) and loxiglumide (3×10^{-8} mol/ L) blocked the effects of CCK-8; (2) Motilin caused contraction of the antrum smooth muscle cells, the percentage of cell contraction was 6.38% ± 1.53%-19.88% ± 1.37% ($P < 0.01$), the contraction was dose dependent between 10^{-11}-10^{-10} mol/L. Motilin antiserum blocked the effects of motilin; and (3) CCK-8, motilin, increased intracellular Ca^{2+} and IP_3 concentration in gastric antrum circular smooth muscle cells.

CONCLUSIONS: (1) CCK-8, motilin, exert direct effects on gastric smooth muscle cells *via* specific receptor on cell membrane. (2) Contracting effect of CCK-8 and motilin was induced by Ca^{2+} released from the cytosolic Ca^{2+} storage and [Ca^{2+}] increase, which was dependent on IP_3 concentration.

Key words: Cystosolic calcium; IP_3; CCK-8; Motilin; Rats

Wang WY, Hao W, Zhou L. Role of cystosolic calcium, IP_3 release in contraction of gastric muscle cells induced by CCK-8 and motilin in rats. *World J Gastroenterol* 1996; 2(Suppl1): 42 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/42.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.42

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ABSTRACT

Effect of endogenous nitric oxide on gastrointestinal propulsive motility inhibited by hyperglycemia in rats

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Abstract

AIM: Hyperglycemia inhibited antral motility and gastric emptying. Motilin increased gastric motility. Hyperglycemia also inhibited the release of motilin. And motilin reduced the release of endogenous nitric oxide inhibited gastrointestinal motility. The propose of this study was to investigate the effect of endogenous nitric oxide on gastrointestinal propulsive motility by intravenous high concentration of glucose in rats.

METHODS: 27 rats (154-308 g) were studied. Group 1 (n = 8): First, intravenous injection of NS (0.1 mL/100 g body weight) was done; Second, after 15 min. NS (0.1 mL/100 g body weight) was injected intravenously ; Third after 15 min, the toner (5% toner plus 10% Gum Acacia Power, 1 mL/200 g body weight) was introduced intragastrically; Fourth 30 min. Later, after de capitation, the abdomen was opened and then the distance traveled by toner meal through the gastrointestinal tract (from cardia to the end of rectum), measured in terms of percentage of its total length, was recorded as the index of propulsive motility. Group 2 (n = 7): In second step, 20% glucose (0.1 mL/100 g body weight) was injected intravenously and other steps were the same as group 1. Group 3 (n = 6): In first step, L-nitro-arginine methyl ester (L -NAME, 0.3 mg/100 g body weight) was injected intravenously and the other were the same as group 2. Group 4 (n = 6): Pretreatment with L-arginene (L-ARG, 30 mg/100 g body weight) intravenously 15 min later, then the operation was the same as group 3.

RESULTS: (1) The percentages of distances from group 1 to group 4 were 78.36 ± 10.34, 58.44 ± 3.98, 79.04 ± 13.10, 62.49 ± 3.96. (2) 20% glucose significantly inhibited the gastrointestinal propulsive motility (P < 0.01). (3) L-NAME significantly increased the gastrointestinal propulsive motility against 20% glucose (P < 0.01). (4) The excitatory effect of L-NAM E on gastrointestinal propulsive motility could be reversed by pretreatment with L-ARG (P < 0.05).

CONCLUSION: (1) Hyperglycemia significantly inhibited gastrointestinal propulsive motility in rats. (2) Endogenous nitric oxide, at least partly, mediated this inhibitory effect of hyperglycemia.

Key words: Hyperglycemia; Gastrointestinal motility; Nitric oxide

Ling XN, Jin L, Huang LJ, Li JL, Yang YY. Effect of endogenous nitric oxide on gastrointestinal propulsive motility inhibited by hyperglycemia in rats. *World J Gastroenterol* 1996; 2(Suppl1): 43 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/43.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.43

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ABSTRACT

Effects of TRH microinjection into DVC on motility of the biliary system in rabbits

Chuan-Yong Liu, Jing-Zhang Liu, Han-Ru Wang, Zi-Ying Li

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Abstract

AIM: Thyrotropin-releasing hormone (TRH) is an important brain-gut peptide. In dorsal vagal complex (DVC), TRH, as a transmitter or transmodulator, plays an important role in regulating the secretion and motility of biliary system. This study was performed to investigate the effects of TRH in DVC on motility of the gallbladder (GB) and sphincter of Oddi (SO) in anesthetized rabbits.

RESULTS: (1) Microinjection of TRH (0.8 nmol, 1 μL) into DVC raised GB pressure (GB), increased the frequency of phasic contraction of GB, increased the frequency and amplitude of spike potentials of SO. (2) The injection of several doses of TRH (0.12, 0.25, 0.50, 0.80, 130 μmol, 1 μL) into DVC could excite the motility of GB and SO. As the dose of TRH was increased, the reaction and the duration of the reaction were also increased. (3) The effects of TRH in DVC on motility of the biliary system could be completely abolished by atropine *i.v.* (0.2 mg/kg), propranolol *i.v.* (1.5 mg/kg) or transecting the spinal cord.

CONCLUSION: These results indicated that TRH in DVC could excite motor activity of GB and SO through nerves, not *via* sympathetic nerves. The physiological significance of TRH in DVC may be to maintain the phasic contraction of GB in interdigestive period, thus prevent the formation of gallstones.

Key words: Thyrotropin-releasing hormone microinjection; Dorsal vagal complex; Motility; Biliary system

Liu CY, Liu JZ, Wang HR, Li ZY. Effects of TRH microinjection into DVC on motility of the biliary system in rabbits. *World J Gastroenterol* 1996; 2(Suppl1): 44 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/44.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.44

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ABSTRACT

Effects of NO on minute rhythm contraction and the activity of cellular K_{ATP} in isolated guinea-pig teania coli smooth muscle

Zheng-Gen Jin, Jun-Ying Li, Wen-Wei Hu, Wen-Xiu Yang

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Abstract

AIM: The smooth muscles of guinea-pig taenia coli (GPTC) has myogenic rhythmic contraction (MMC). We observed that emodin could enhance MRC. NO is an inhibitory mediator of nonadrenergic noncholinergic (NANC) nerve. External NO could rapidly hyperpolarize the cellular membrane of gastrointestinal smooth muscle and relax muscle strips. In this paper, we studied the effects of NO on MRC and emodin action in GPTC, as well as the relationship between these effects and cellular K_{ATP} channel.

METHODS: Experimental preparations were isolated from GPTC. They were perfused by Krebs solution. The parameters of spontaneous MRC: Amplitude (CH) period (CP) and amplitude index (CHI) were detected NO was provided by sodium nitroprusside (NaNP).

RESULTS: (1) NaNP rapidly inhibited the MRC in GPTC in a dose dependent manner. Low concentration of NaNP (50 μmol/L) significantly decreased the CH of MRC ($P < 0.05$) and prolonged the CP of MRC ($P > 0.05$). Higher concentration of NaNP more markedly inhibited or eliminated the MRC. (2) Meb, an inhibitor of soluble guanylate cyclase, decreased the inhibitory effect of various concentration of NaNP on MRC. Glibenclamide (Gli, 10 μmol/L), an antagonist of K_{ATP} channel, significantly inhibited the action of NaNP on the MRC. The elimination of MRC induced by high concentration of NaNP could be partly reversed by Gli. (3) Emodin significantly enhanced the MRC in GTPC. Addition of NaNP remarkably inhibited the action of Emolin.

CONCLUSION: NO has significant inhibitory effect on the spontaneous MRC in GPTC. The enhancement of the activity of cellular K_{ATP} channel by NO might be through cGMP and/or other pathways of signal transduction.

Key words: NO; Minute rhythm contraction; Cellular K_{ATP}; Guinea-pig taenia coli

Jin ZG, Li JY, Hu WW, Yang WX. Effects of NO on minute rhythm contraction and the activity of cellular KATP in isolated guinea-pig teania coli smooth muscle. *World J Gastroenterol* 1996; 2(Suppl1): 45 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/45.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.45

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ABSTRACT

Effects of hydrocyactylolide and dihydroflavone B_3 on fluid propulsive behavior of colonic segments from rat and guinea-pig

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Abstract

AIM: To observe the effects of Hydrocyactylolide, Codomopsis Pilosulae (French) Nannf Part 7-2, ethanol extract of Radix et Rhizoma, ether extract of Semen Arecal and Dihydroflavone B_3 (extract of a composite plant) on fluid propulsive behavior of colon segments from rat and guinea pig.

METHODS: The rat ulcerative colitis models were induced by alleviating of 2,4-Dinitrochlorobenzene (DNCB). Isolated colon segments with intact blood vessel and enteric nerves were prepared. The fluid propulsive behavior of these colonic segments were measured using "System for Detect analyzing fluid Propulsion of Isolated Intestinal Segment". The available herb and their effects were observed.

RESULTS: (1) In health guinea-pig, after arterial perfusion of 2.5% ethanol extract of Radix et Rhizoma, the frequency of propulsive complex of colon (PCC) and the fluid output pressure (FOP) decreased. (2) In healthy rats, arterial perfusion of Codonopsis Pilosulae (French) Nannf Part 7-2 (equal to crude drug 12 g/L) tended to decrease the frequency of PCC and aboral FOP of colon; Arterial perfusion of 3% ether extract of Semen Arecal caused strongly contraction, quickly increased the basal lumen pressure and re initiated fluid propulsion of colonic segments from rat fluid propulsion was primarily blocked by adrenaline (10^{-5} mol/L). If tetrodotoxin (10^{-5} mol/L) was added to adrenaline (10^{-5} mol/L)as the arterial perfusion solution, 3% ether extract of Semen Arecal still caused contraction and increased the basal lumen pressure of the colon, but not re initiated the fluid propulsion; The fluid propulsive behavior was significantly abnormal in isolated colon segments from ulcerative colitis model rats; Arterial perfusion of Hystroyatractyllolide (2×10^{-5} mol/L) decreased PCC frequency of ulcerative colitis model rat; While dihydroflavonol B_3 (2×10^{-5} mol/L) tended to increase PCC frequency, increase the oral FOP and aboral FOP.

CONCLUSION: These herbs modulate the abnormal colonic motility from different directions. They had prospects for development.

Key words: Propulsive complex of colon; Fluid output pressure; Herb

Lian ZC, Chen Y, Liang XF, Li J, Wu XB. Effects of hydrocyactylolide and dihydroflavone B_3 on fluid propulsive behavior of colonic segments from rat and guinea-pig. *World J Gastroenterol* 1996; 2(Suppl1): 46 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/46.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.46

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ABSTRACT

Study on nitric oxide and monoamines participated in effects of electroacupuncture on anti stress gastric ulcer in rats

Shun-Li Zhu, Guan-Xun Xu, Quan-Zhu Chen, Zhen-Jiu Wang, Jie Jiao

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Abstract

AIM: This paper analyzed contents of NO, activities of NOS, contents of monoamine transmitters in stress gastric ulcer rats on electroacupuncture Zusanli point (ST 36).

METHODS: The stress gastric ulcer in rats was made by "restraint cold" method. The rats were divided into 4 groups: stress group, electro acupuncture after stress group, stress after electroacupuncture group and control group. The biochemical induced of NO and monoamine transmitters were assayed with 752 model ultraviolet spectrophotometer and MPF-4 model fluorescence spectrophotometer respectively.

RESULTS: (1) The NO and NOS in stress gastric ulcer rats were obviously decreased, compared with control group, $P < 0.01$. The monoamines also changed: 5-HT contents in gastric antral mucosa and serum increased ($P < 0.01$ and $P < 0.05$) respectively. The DA decreased, $P < 0.05$. (2) Compared with stress group, NO and NOS contents of the stress after electro acupuncture group recovered significantly ($P < 0.05$ and $P < 0.01$), respectively. Monoamines (DA, NE, 5-HT and 5-HIAA) content in antrum mucosa changed and showed double direction regulation, *i.e.* the formerly decreased monoamine content increased, while former increased monoamine content decreased. Compared with stress group, 5-HIAA content of the electro-acupuncture after stress group decreased, $P < 0.05$. DA content increased, $P < 0.01$. NE content increased, P = 0-05. (3) Serum 5-HT and DA contents continually increased or decreased after electro acupuncture, compared with stress group, serum NE did not change obviously.

CONCLUSION: The results confirmed that NO was strongly related to monoamine transmitters during the gastric mucosa damage by" restraint cold". It indicated that electro acupuncture had protection effect for gastric mucosa in stress gastric ulcer rats. NO and monoamines involved in effects of electro-acupuncture. It indicated that the protecting effect of electro acupuncture on gastric mucosa was exerted by the double regulation of the monoamines, influencing the DA, NE and 5-HT contents, and NO relaxing blood vessel, regulating mucosa blood flow, thus maintaining mucosa intact, and strengthening the mucosal defensive function.

Key words: Nitric oxide; Monoamines; Electro acupuncture

Zhu SL, Xu GX, Chen QZ, Wang ZJ, Jiao J. Study on nitric oxide and monoamines participated in effects of electroacupuncture on anti stress gastric ulcer in rats. *World J Gastroenterol* 1996; 2(Suppl1): 47 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/47.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.47

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ABSTRACT

Role of cytosolic cAMP in secretin induced relaxation of gastric muscle cells of rat

Wen-Ying Wang, Lu Zhou

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Abstract

AIM: Secretin is a peptide which inhibits gastrointestinal motility. It's not clear: (1) whether secretin had direct effect on rat isolated gastric smooth muscle cells; (2) whether specific receptors exist on gastric smooth muscle cells; (3) whether cytosolic cAMP was involved during relaxation of gastric muscle cells caused by secretin. The purpose of this study was to investigate action of secretin on antrum smooth muscle cells, and the post receptor signal transduction mechanism.

METHODS: Isolated gastric smooth muscle cells were prepared to observe the relaxing effect of secretin on gastric muscle cells, specific antiserum or receptor antagonists were used to investigate their effects on the action of the peptides. Protein competitive binding assay was used to measure cAMP concentration changes after secretin was added.

RESULTS: (1) Secretin caused relaxation of both the body and the antrum. It relaxed the circular muscle cells while had no direct effect on longitudinal muscle cells. (2) Secretin antiserum (1:100) blocked the effect of secretin, adenylate cyclase activator forskolin (10^{-5} mol/L) potentiated while cAMP inhibitor (2×10^{-5} mol/L) antagonized the effect of secretin. (3) Secretin caused cAMP increase in gastric circular smooth muscle cells, Forskolin strengthened while cAMP suppressed intracellular cAMP increase caused by secretin.

CONCLUSION: (1) Secretin exerted direct effect on gastric muscle cells by specific receptors on cell membrane. (2) Relaxation of secretin on gastric circular muscle cells was caused by the increase of the intracellular cAMP after peptides binding to their receptors.

Key words: Cytosolic; cAMP; Secretin; Gastric muscle cells; Rat

Wang WY, Zhou L. Role of cytosolic cAMP in secretin induced relaxation of gastric muscle cells of rat. *World J Gastroenterol* 1996; 2(Suppl1): 48 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/48.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.48

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ABSTRACT

Effect of electrical stimulation of arcuate nucleus on gastric electrical activity in the rats

Guang-Yao Xu, Rong Ma, Xue-Jing Qian, Bao-Tian Su

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Abstract

AIM: Our previous study showed electrical stimulation of arcuate nucleus (ARC) could decrease gastric motility. The aim of this study was to investigate the effect of electrical stimulation of ARC of gastric electrical activity (GES).

METHODS: Wistar rats. The GEA was led by two electrodes implanted under the serosal of the anterior wall of the antrum.

RESULTS: (1) During stimulation, the slow wave of GEA showed inhibition in amplitude (61.9%). (2) After lesion of Locus Coerulus (LC) or dorsal Raphe (dr), the inhibitory effect was abolished ($P < 0.01$, $P < 0.05$, respectively), but the effect was not changed by intraventricular injection of naloxone ($P > 0.05$). (3) The effect was abolished by extirpation of celiac neural plexus ($P < 0.01$) and by propranolol ($P < 0.05$), but not by phentolamine ($P > 0.05$).

CONCLUSION: (1) Electrical stimulation of ARC may result in inhibition of GEA amplitude. (2) LC and DR are involved in the inhibitory effect, but β endorphin neurons rich in ARC may not be involved in such effect. (3) The peripheral neural pathway of the effect may be exclusively transduced by sympathetic nerve mediated through β receptors.

Key words: Electrical stimulation; Arcuate nucleus; Gastric electrical activity; Rats

Xu GY, Ma R, Qian XJ, Su BT. Effect of electrical stimulation of arcuate nucleus on gastric electrical activity in the rats. *World J Gastroenterol* 1996; 2(Suppl1): 49 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/49.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.49

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ABSTRACT

Levels of motilin change in patients with gastric ulcer: Analysis of 32 cases

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Abstract

AIM: The patients with gastric ulcer often have abnormal gastric emptying. Motilin can stimulate the movement of stomach. It is studied that the motilin change before and after treatment in the patients with gastric ulcer.

METHODS: There are 32 cases diagnosed by endoscopy. Plasmic motilin was tested before and two weeks after treatment. 18 cases were tested again 2 mo later. The plasmic motilin was tested by motilin RIA kit.

RESULTS: Compared with controls, there were no significant in plasmic motilin before treatment. But the levels of motilin returned to normal 2 mo later.

CONCLUSION: Motilin release is affected by the volume of stomach, acidity in the duodenum and movement of stomach, recovery of pyloric function and excitation of vagus. These factors also stimulate the release of motilin. After the ulcer is healed, the levels of motilin in patients with gastric ulcer can be used as an objective index to evaluate the effect of treatment.

Key words: Motilin; Gastric ulcer

Wang YM. Levels of motilin change in patients with gastric ulcer: Analysis of 32 cases. *World J Gastroenterol* 1996; 2(Suppl1): 50 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/50.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.50

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ABSTRACT

Experiment of He-Wei-Fang in promoting gastrointestinal motility

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Abstract

AIM: He-Wei-Fang is an effective prokinetic drug of several herbs. In order to develop its usage, the possible pharmacological mechanism was investigated in a model of deceased smooth muscle tension induced by dopamine and a model of gastrointestinal dysmotility induced by L Arginine, which was the precursor of nitric oxide.

METHODS: (1) Male or female rats' smooth muscle strips of gastric fundus were instrumented for the measurement of mean smooth muscle tension in different periods. (2) The gastrointestinal transitional rate of seven groups of mice was recorded after five days of treatment.

RESULTS: (1) Decoction of He-Wei-Fang precipitated with alcohol reverse the deceased tension of smooth muscle induced by dopamine and its effect was not comparable with metoclopramide. The effect of He-Wei-Fang was partially blocked by atropine but not blocked by Hexamethonium. L-Arginine could cause some decrease in tension of smooth muscle but this effect was not significant. In addition, dopamine could cause a complete relaxation when used He-Wei-Fang first. L-Arginine could eliminate the effect of He-Wei-Fang but did not affect the effect in high concentration. (2) He-Wei-Fang promoted the gastrointestinal transitional rate of mice who was treated with L-Arginine. The medium dose of He-Wei-Fang (20 g/kg) had more significant effect than domperidone (10 mg/kg) in increasing the transitional rate.

CONCLUSION: These results suggest that He-Wei-Fang has considerable effect in promoting gastrointestinal motility and the main part of effect is not *via* the cholinergic nervous. Furthermore, He-Wei-Fang is not the blocker of dopamine receptor. The effect of He-Wei-Fang may be realized suppressing the NANC pathway.

Key words: He-Wei-Fang; NANC; Motility

Wu J, Ma C, Shan ZW. Experiment of He-Wei-Fang in promoting gastrointestinal motility. *World J Gastroenterol* 1996; 2(Suppl1): 51 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/51.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.51

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ABSTRACT

Effect and mechanism of Rhizoma Atractylodis Macrocephalae on gastrointestinal motility in animals

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Abstract

AIM: The effect of different doses of Rhizoma Atractylodis Macrocephalae (RAM) on the spontaneous contraction of isolated guinea pig ileum was examined.

METHODS: RAM 0.1 μ slightly inhibited the spontaneous contraction of isolated guinea pig ileum; RAM 0.2 μ or higher concentrations significantly enhanced the spontaneous contraction of isolated guinea pig ileum in dose dependent manner. The distance traveled by charcoal meal through the small intestine in mice measured in terms of propulsive motility.

RESULTS: (1) RAM 0.1 mg/10 g weight markedly increased the propulsive distance of charcoal meal in mice, the effects were abolished by atropin (0.1 mg/10 g weight IP); (2) Regitine (0.03 mg/10 g weight IP) partly blocked the increased gastrointestinal propulsive motility by RAM; (3) No effects were found on the increased gastrointestinal propulsive motility after injection of propranolol (0.07 mg/10 g with IP).

CONCLUSION: The results indicate that RAM has an exciting effect on the propulsive motility of gastrointestinal tract, which may be mediated *via* M receptor and α receptor.

Key words: Rhizoma atractylodis macrocephalae; Isolate guinea pig ileum; Gastrointestinal; Propulsive motility; M receptor α receptor

Ma XS, Xin YS. Effect and mechanism of Rhizoma Atractylodis Macrocephalae on gastrointestinal motility in animals. *World J Gastroenterol* 1996; 2(Suppl1): 52 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/52.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.52

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ABSTRACT

Effect of 91041 on the myoelectric activity of the small intestine in rats

Ji-De Xu, Yuan Liu, Jin-Li, Hong-He, Guo Li

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Abstract

AIM: 91041 is a monomer extracted from 9104. It is unknown whether 91041 has effects on intestinal smooth muscles, we investigated effect of 91041 *i.v.* on intestinal myoelectricity in rats.

METHODS: Two couples of electrodes were implanted under serosal of intestine. MMC was recorded before and after 91041 (10 mg/kg) *i.v.*

RESULTS: The amplitude of spike of duodenum and jejunum in rats was decreased by 50 percent to 90 percent after intravenous administration of 91041. The inhibitory duration ranged 0.6 to 68 min. Furthermore, it reduced the duration of resumed phase 3 (P < 0.01) than that of normal phase 3. These effects were not blocked by naloxone.

CONCLUSION: It suggested that 91041 may become a new inhibitor to small intestinal contraction.

Key words: 91041; MMC; Naloxone

Xu JD, Liu Y, Li J, Ye H, Li G. Effect of 91041 on the myoelectric activity of the small intestine in rats. *World J Gastroenterol* 1996; 2(Suppl1): 53 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/53.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.53

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ABSTRACT

Effects of WS-frequency spectrometer on gastric ulcer healing of rats

Zhen-Shu Zhang, Wan-Dai Zhang, Xue-Qing Chen, Xian-Jin Zhou, Dian-Yuan Zhou

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Abstract

AIM: Peptic ulcer is a chronic disease seen in clinical practice. Chemical drug therapy remains a main choice in treating the ulcer, but the increasing data showed that the drug therapy was not only costly, but also had some sideeffects. Therefore, searching for economic and effective new therapeutic measures have been an important task. It has been reported that WS-frequency spectrometer is of multiple biological effects in the human body, this study attempts to determine whether this device has any healing effects on gastric ulcer model in Wistar rats.

METHODS: Gastric ulcers were successfully developed in 24 rats by acetic acid method. The rats were randomly divided into 3 groups. Rats in group A were treated with WS-frequency spectrometer for 30 min, twice daily for 8 consecutive days. Rats in group B were treated with incandescence lamp in the same manner as group A. Rats in group C serves as control. Gastrointestinal propulsion rate was calculated by IRA.

RESULTS: After 16 time of treatment, the mean area of the ulcer in group A was 12.8 ± 3.8 mm^2 ($P < 0.01$) and in group C (66.5 ± 40.9 mm^2) ($P < 0.01$), there was no significant difference between the latter two groups ($P > 0.05$). The concentration of gastrin in plasma in group A was 125 ± 22 pg/mL, which was significantly higher than in group C ($P < 0.05$), but the gastrointestinal propulsive rate was similar in group A and C.

CONCLUSION: Our findings suggest that WS-frequency spectrometer can promote the ulcer healing, and this effect may be related to the increased gastrin level.

Key words: WS-frequency spectrometer; Ulcer healing; Gastrin

Zhang ZS, Zhang WD, Chen XQ, Zhou XJ, Zhou DY. Effects of WS-frequency spectrometer on gastric ulcer healing of rats. *World J Gastroenterol* 1996; 2(Suppl1): 54 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/54.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.54

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ABSTRACT

Effects of exogenous nitric oxide on antral circular muscle motility of the rat stomach *in vitro*

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Abstract

AIM: Experiments were performed to determine whether exogenous nitric oxide mimics the non adrenergic, non cholinergic inhibitory effect in antral circular muscle of the rat stomach.

METHODS: Rats were anesthetized with urethane by injection intraperitonially. The stomach was removed and the long axis was cut parallel to the circular muscle fibers. Muscle strips were prepared from the circular muscle layer of the antrum. One end of the strip was fixed to the floor of the chamber containing Tyrode solution maintained at 37 ℃. The other end was attached to an isotonic force transducer to record the motility of the strips. Nitric oxide was prepared by chemical reaction between 30%-35% nitric acid and cuprum. The nitric oxide was directly bubbled into the chamber for stimulation.

RESULTS: (1) Nitric oxide could also inhibit acetylcholine induced contraction of the antral circular muscle. (2) Inhibition induced by nitric oxide was not affected by atropine (1 μm/L), phentolamine (1 μm/L) and propranolol (4.2 μm/L).

CONCLUSION: The results suggest exogenous nitric oxide mimics the effect of non adrenergic, non cholinergic inhibitory input and nitric oxide may act as a non adrenergic, non cholinergic inhibitory neurotransmitter in the rat antrum.

Key words: Exogenous nitric oxide; Antral circular muscle motility; *In vitro*

Li Y, Jin NG, Li ZL. Effects of exogenous nitric oxide on antral circular muscle motility of the rat stomach *in vitro*. *World J Gastroenterol* 1996; 2(Suppl1): 55
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ABSTRACT

Effects of motility in gastric mucosal injuries induced by ethanol in rat

Xiao-Hua Hou, Jin-Song Liu, Wei Qian, Cui-Qiong Yi

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Abstract

AIM: The effect of motility in gastric protection was rarely reported. We observed the muscosal injuries induced by ethanol in rats of ligated and non-ligated pylorus after giving cisapride.

METHODS: 2 rat groups: ligated and non-ligated pylorus group. Cisapride was given.

RESULTS: In non-ligated pylorus group, the ulcer index was decreased more remarkablly in high dose of cisapride than that in control, and the degree of damage was decreased in low and high doses of cisapride. In ligated pylorus group, the ulcer index and degree of damages were all larger than the non-ligated pylorus group, and the anti mucous damage function of cisapride disappeared.

CONCLUSION: This suggested normal gastric motor function has an important effect in cytoprotection. The effect of cisapride on gastric protection was *via* its prokinetic action.

Key words: Motility; Gastric mucosal injuries; Ethanol; Rat

Hou XH, Liu JS, Qian W, Yi CQ. Effects of motility in gastric mucosal injuries induced by ethanol in rat. *World J Gastroenterol* 1996; 2(Suppl1): 56 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/56.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.56

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ABSTRACT

Comparative physiology characters of isolated gut segments from 3 different species

Zhi-Cheng Lian, Yong Chen, Xue-Fen Liang, Jian Li, Xiao-Bing Wu

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Abstract

AIM: To observe and compare the motility and propulsive behavior of isolated duodenum, jejunum, ileum and colon segments (15 cm) with intact BVS and ENS from cat, closed colony guinea pig and Sparague Dawley rat were measured using" System for detect analysing fluid propulsion of isolated intestinal segment".

RESULTS: (1) Among 3 intestinal segments of rat, the basal lumen pressures of duodenum (1196 ± 343 Pa) was higher than that of terminal ileum (961 ± 49 Pa), and that of colon (883 ± 147 Pa) was the lowest. (2) Propulsive activities of duodenum and jejunum segments from cat, rat and guinea pig were inactive. Propulsive complexes of ileum segments from 3 animals were obvious and regular. And baggy wall movement and Propulsive complexes of colons were powerful. (3) As to the frequency of the propulsive complex of terminal ileum, the order from the highest to the propulsive complex of terminal ileum, the order from the high to the low was rat, guinea pig and cat. But in colon the order was guinea pig, rat and cat. (4) The output pressures of propulsive complexes of guinea pig jejunum and ileum were higher than those of rat. The output pressure of aboral propulsive complex of guinea pig colon was significantly higher than that of rat.

CONCLUSION: Intestinal toxicity and lumen pressure of rat were aborally gradient from the highest to lowest. The wall movement and propulsive behavior of these 3 animals were characteristically different, which suited to functional needs of the blood digestion, absorption, transfer of food remnants, formation of feces and defecation for animals with different feeding habits.

Key words: Comparative physiology characters; Isolated gut segments

Lian ZC, Chen Y, Liang XF, Li J, Wu XB. Comparative physiology characters of isolated gut segments from 3 different species. *World J Gastroenterol* 1996; 2(Suppl1): 57 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/57.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.57

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ABSTRACT

Effects of nitrergic nerves on development of electrogastric dysrhythmias in rats

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Abstract

AIM: To investigate the effects of nitrergic nerves on occurring of electrogastric dysrhythmia, the rat model of electrogastric dysrhythmia was used.

METHODS: 70 adult Wistar rats were randomly divided into three groups. (1) Control group (20 rats). (2) Test group (40 rats), gastric myoelectric activities were recorded after the rats were fed irregularly for 4 wk; The distribution of nitrergic, cholinergic (SS-IR) and substance P immunoreactive (SP-IP) nerves were shown in antral and proximal duodenal myenteric plexus in the rats with histochemistry or immunohistochemistry technique, then their contents and interrelationships were investigated. (3) Drug group (10 rats), gastric myoelectric activities were recorded followed by injecting intraperitoneally sodium nitroprusside (NaNP), L-NAME, substance P (SP), sandostatin and atropine respectively.

RESULTS: (1) The abnormal rhythm index (38.50%) and the coefficient of variation (cv) of slow wave frequency (23.91%) were significantly increased compared with control ($P < 0.01$), fast waves were also abnormal, *i.e.* their frequencies and amplitudes were significantly decreased compared with control ($P < 0.01$). (2) Compared with control, the contents of nitrergic nerves and SS-IR nerves in myenteric plexus in test group rats were significantly increased ($P < 0.05$), and the contents of SS-IR were significantly correlative with the contents of notrergic nerves ($P < 0.01$); The contents of cholinergic and SP-IR nerves were significantly decreased ($P < 0.05$), and were not significantly correlative with the contents of nitrergic nerves. (3) The electrogastric dysrhythmias were induced by injecting NaNP, atropine or somatostatin analogue sandostatin respectively, while the electrogastric rhythm was not varied significantly by injection of L-NAME might block the effects of sandostatin on electrogastric rhythm, while SP might inhibit the effects of NaNP on electrogastric rhythm.

CONCLUSION: (1) The increase of release of NO or exogenous NO can induce electrogastric dysrhythmias. (2) The effects of peptidergic nerves on gastric myoelectric activities are mediated by nitrergic and/or cholinergic nerves. (3) The abnormal proportion of nitrergic nerves to cholinergic nerves plays the most important role in the occurring of electrogastric dysrhythmias.

Key words: Electrogastrography; Electrogastric dysrhythmia; Nitrergic nerve

Wang ZH, Huang MT. Effects of nitrergic nerves on development of electrogastric dysrhythmias in rats. *World J Gastroenterol* 1996; 2(Suppl1): 58
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ABSTRACT

Nitric oxide participates in protective effect of acupuncture on gastric mucosal damages in rats

Guan-Sun Xu, Zeng-Jiu Wang, Shun-Li Zhu, Quan-Zhu Chen, Dao-Qin Zhang

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Abstract

AIM: The mucosal lesion index, gastric mucosal blood flow (GMBF), gastric electric activity (GEA), activity of nitric oxide synthesis (NOS) in mucosa contents of nitric oxide (NO) in serum were studied and effect of electrical acupuncture (EA) on above indices. On a rat model of restraint cold stress-induced gastric mucosal damages was established. Meanwhile, the protective effect of GMBF and GEA, gastric mucosal level of NOS, serum level of NO and stress-induced gastric mucosal damages in rats were closely related.

RESULTS: EA could effectively protect the gastric mucosal damages and increase previous quota. The mechanism of protective effect of EA on gastric mucosa was discussed.

CONCLUSION: We speculate that EA agitates the synthesis and release of NO in intestinal nerve system, NO mediates the integrity of gastric mucosa, endogenous NO participates in protective effect of EA on gastric mucosal damages.

Key words: Nitric oxide; Electricalacupuncture; Gastric electric activity

Xu GS, Wang ZJ, Zhi SL, Chen QZ, Zhang DQ. Nitric oxide participates in protective effect of acupuncture on gastric mucosal damages in rats. *World J Gastroenterol* 1996; 2(Suppl1): 59 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/59.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.59

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ABSTRACT

Fasted motor function of the small bowel is modified by antigen sensitization with or without strees in rats

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Abstract

AIM: Anaphylaxis has been shown to cause gut motor dysfunction. However it is not clear if antigen sensitization alone causes any change in gut motility. Moreover, the effects of mental stress another cause of motor dysfunction and food intolerance have not been studied at the same time to determine whether they are additive or interactive stimuli. We recorded small bowel motor activity in fasted ovalbumin (OA)-sensitised rats exposed to 'flood stress' to study the effect of antigen sensitization and mental stress on small bowel motility.

METHODS: We recorded the electromyogram (EMG) in the proximal jejunum of 4 groups (n = 8 in each group) of fasted Hooded Lister rats (body wt 200-220 g) 14 d after treatment with OA sensitisation, or sham sensitisation with only adjuvant (Aluminium hydroxide) as vehicle control, or no treatment. In each animal, a bipolar AG/AG C12 electrode qas implanted on the jejunal serosa under general anaesthesia, with the electrode leads exteriorized through the lumen of a coiled spring tube that allowed free movenent after recovery. Seven days after surgery, animals were fasted and placed in an acrylic tank; The EMG was then recorded for 4 h. During the 2nd hour of recording the tank was partly flooded, compelling the animals to stand on a small plinth to avoid immersion. Finally, blood was taken to determine the IgE titre.

RESULTS: In the OA sensitized rats IgE titre was ≥ 64, but was not detectable in unsensitized animals. In the OA sensitized rats median of total spikes in the first hour of recording were 3730 (637-5541)/h, not significantly different from the 3 control groups. When the same data were grouped in one minute time epochs and plotted against time, peaks of spike activity were clearly seen corresponding to phase Ⅲ of the migrating motor complex (MMC). In OA-sensitized rats, the median spike activity in MMC phase Ⅲ was 134 (58-272)/min, which was significantly (P < 0.05) higher than in control groups. In the first hour the median number of MMCs in the OA sensitized group was 6 (4-9)/h, not significantly (P > 0.05) different from the control groups. During and after stress, MMCs were disrupted and replaced by prolonged irregular spike activity. This disturbance in OA sensitized group lasted for 120 (90-180) min, significantly (P < 0.05) longer than those in control groups. Our data show that in fasted rats the effect of antigen sensitization on spike activity is only seen during the peaks of spike activity that occur in phase Ⅲ of MMC, but OA sensitization prolongs the MMC disturbance induced by mental stress. These findings suggest that activated immune cells in gut influence gut motility, and superimposed mental stress exaggerates the effect. The data provede a biological basis for the hypothesis that food intolerance and stress may interact in the pathogenesis of human functional disorders such as the 'irritable bowel syndrome'.

Hu WY, Wingate DL. Fasted motor function of the small bowel is modified by antigen sensitization with or without strees in rats. *World J Gastroenterol* 1996; 2(Suppl1): 60 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/60.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.60

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ABSTRACT

Presence and distribution of motilin and motilin receptors in the brain of the rabbit

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Abstract

AIM: To identify and sequence motilin mRNA from the brain and to study the distribution of motilin and its receptor in the brain. In view of our findings the effect on food intake was explored. The presence of motilin immunoreactivity in the brain has been debated. Recently we reported motilin receptors in the cerebellum.

METHODS: Total RNA was prepared from different regions of the rabbit brain. Single-stranded cDNA was synthesized using superscript Ⅱ RT and PCR was performed with TAQ DNA polymerase and specific primers. Bands of ± 300 bp, ± 500 bp and ± 1000 bp were obtained in all regions examined. Hybridization with a 32P human cDNA probe cofirmed that the 300 bp band was motilin. PCR products were cloned into PCR TMⅡ vector and screened with the 32P probe. The nucleotide sequence obtained from positive clones showed 7 substitutions, resulting in 4 amino acid differences, compared to the rabbit duodenal motilin precursor. The amino acid substitutions were in the signal peptide [-11 (Val→Ala)] and the motilin associated peptide [33 (Asp→Glu), 34 (Ala→Pro), 52 (Met→Thr)]. The concentration of motilin, measured by radioimmunoassay, was significantly higher in extracts from hippocampus (3780 ± 309) and cerebellum (2114 ± 121), than in the medulla (1239 ± 39) (All data in fmol/mg protein). Autoradiographic studies with ^{125}I motilin on rabbit coronal brain sections revealed specific binding in several regions of the brain. Binding studies with homogenates identified two binding sites (pKd, hi = 9.03, pKd, lo = 6.65) in each of these regions but the density of high affinity binding sites (fmol/mg protein) was significantly lower in the hippocampus (1.7 ± 0.66), prefrontal lobe (1.3 ± 0.5), olfactory tract (0.9 ± 0.3) and thalamus (3.5 ± 0.9) than in the cerebellum (8 ± 2). The effect of the *i.v.* administration of motilin (10 μg/kg) on food intake was studied in rabbits deprived from food for 2 d. Motilin significantly stimulated food intake during the first hour with 9.6% ± 0.4% compared to control rabbits, while bombesin (10 μg/kg) decreased food intake with 16% ± 1.3%. The effect persisted after two hours.

CONCLUSION: Motilin is present in the brain, but the motilin gene shows polymorphism. The motilin receptor is present in different regions. Our data suggest motilin is a neuropeptide, with possible central effects.

Depoortere I, Peeters TL, de Clercq P, Svoboda M. Presence and distribution of motilin and motilin receptors in the brain of the rabbit. POSSIBLE ROLE IN THE REGULATION OF APPETITE. *World J Gastroenterol* 1996; 2(Suppl1): 61
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ABSTRACT

Investigation of SP, VIP, cGRP levels in gastric antrum of experimental spleen deficiency rats

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Abstract

AIM: To explore the potential role of gastrointestinal peptides in the digestive disorders presented in Spleen Deficiency (SD), we studied substance P (SP), vasoactive intestinal peptide (VIP) and calcitonin gene related peptide (cGRP) levels in duodenum and jejunum tissues of experimental SD rats by radioimmunoassys (RIA).

METHODS: Twenty four adult wistar rats (110-150 g) were used and divided into 4 groups, *i.e.* control group (n = 6), experimental SD group (n = 8), spontaneous recovery group (n = 5) treated with Chinese herbs (Sijunzi Tang). After all the animals of 4 groups were anesthetized, a small piece of duodenum and jejunum tissues including all layers was removed and processed for RIA.

RESULTS: As compared with control, the ir SP, ir VIP levels in duodenum and jejunum of SD rats were elevated significantly (in duodenum, ir SP 5.63 21 *vs* 2.75 ± 0.81, P < 0.01; Ir VIP 8.44 ± 3.30 *vs* 5.18 ± 1.09, P < 0.05. In jejunum, ir SP 5.76 ± 1.65 *vs* 3.39 ± 1.02, P < 0.05; Ir VIP levels in duodenum and jejunum was found in spontaneous recovery cases. After treated with Sijunzi Tang, the ir SP, ir VIP concentrations in duodenum and jejunum were improved to the levels of control group (P < 0.05). As to ir cGRP levels in small intestine, there were no obvious differences among 4 groups except the ir cGRP level in jejunum of therapeutic group was significantly higher than that of SD group (P < 0.01).

CONCLUSION: The study suggested that changes of SP, VIP, levels in the small intestine of SD rats may be closely related to some disorders (such as gastrointestinal motility disturbance, malabsorption and diarrhea, *etc*.) presented in SD and the Chinese herbs (Sijunzi Tang) are capable of improving this syndrome significantly.

Key words: Gastrointestinal peptides; Spleen deficiency; Rat

Liu SM, Qu RY, Wang W, Zeng WH, Qu BL, Wang XQ, Zeng XB, Shang HW. Investigation of SP, VIP, cGRP levels in gastric antrum of experimental spleen deficiency rats. *World J Gastroenterol* 1996; 2(Suppl1): 62 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/62.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.62

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ABSTRACT

Observation of electrogastrography and gastroduodenojejunal motility after abdominal surgery

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Abstract

AIM: The pathophysiological changes and mechanism of postoperative gastrointestinal dysfunction was not yet clear. The aim of this study was to investigate the effects of abdominal surgery on gastrointestinal activity.

METHODS: Twenty patients, 12 male, 8 female with a mean age of 47.5 ± 10.6 (range 31-66), EGG was done in all patients with abdominal surgery in preoperative day, operative day and the first, second and third postoperative day for at least one hour. Gastrointestinal manometry was done in 8 patients in the preoperative day and 1-3 d after operation. Recording and analysis of EGG and manometry were done by computer system.

RESULTS: Compared with preoperative day, percentage of EGG normal wave in the operative day was obviously lower ($P < 0.001$), but bradygastria and tachygastria was remarkably higher ($P < 0.01$). From the first postoperative day, EGG frequency became normal. The EGG power was low till the third postoperative day. MMC in the upper jejunum was rarely recorded after operation, MMC was most often recorded in the distal part of duodenum. In gastric antrum, duodenum and upper jejunum, the duration of phase Ⅲ MMC ranged 4-7 min. Four days after operation, contractility power and area of phase Ⅲ of MMC in the distal duodenum changed obviously ($P < 0.01$), but those of antrum and proximal duodenum had no changes. In gastric antrum, amplitude of MMC phase Ⅲ was larger than that of other phases.

CONCLUSION: Gastric slow waves were recovered in the first postoperative day, while rapid wave did not recover, therefore, postoperative gastric dysfunction may mainly caused by decrease or absence of fast wave. Gastroduodenojejunal MMC changed greatly after surgery, its number decreased, duration shortened and amplitude decreased, which suggested abnormal MMC was another reason for postoperative gastrointestinal dysfunction. We concluded that EGG and gastric manometry were consistent with each other, they reflected gastrointestinal motility function status, and were non invasive, and easy to operate, these methods should be used widely in clinic and research work.

Key words: Electrogastrography; Gastroduodenojejunal motility; Abdominal surgery

Qi QH, Syn W, Han YH. Observation of electrogastrography and gastroduodenojejunal motility after abdominal surgery. *World J Gastroenterol* 1996; 2(Suppl1): 63 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/63.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.63

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ABSTRACT

Relationship between interdigestive motor complex and electrogastrography in healthy subjects and patients with functional dyspepsia

Chun-Min Yang, Wei Hao, Wen-Jie Xu, Lu Zhou, Bao-Ji Chi, Chuang-Ping Chao, Zhi-Ming Liu, Jian-Rong Wang

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Abstract

AIM: To investigate whether different phases of interdigestive migrating motor complex (MMC) can be recognized *via* cutaneous electrogastrography (EGG) and whether EGG abnormalities exist in patients with functional dyspepsia (FD), who have been found to have gastric emptying delay and abnormalities of interdigestive gastric motility.

METHODS: Thirteen FD patients and 7 healthy subjects, all male, aged 18-30 years, with a mean age of 25 years, entered this study. Simultaneous recordings of antral contractions and EGG were made preprandially for 3 h and postprandially for half an hour. The antral contrations were recorded using an intraluminal pressure tube with one small balloon placed in the antrum. The tube connected pressure transducer and electric bridge amplifier was attached to polygraph system. EGG was measured using WCDF4B electrogastroanalyser (made in Hefei, China), and cutaneous electrodes were placed on the abdoman over the antrum localized by X-ray. The test meal consisted of two boiled eggs, 200 g bread and 150 mL water, with 410 kcal, 19.4% protein, 27.3% fat, 53.3% carbohydrate. Parameters of EGG in the study were Fp (dominant or peak frequency, cpm), Ap (amplitude, uv), DPIC and DFIC (dominant power and frequency instability coefficient, %), and PGF (percentage of normal range 2.4-3.7 cpm) of gastric frequency.

RESULTS: (1) Visual inspection of relation between MMC and EGG: Among 6 MMCs recorded in healthy group, at the changeover from phase Ⅱ to phase Ⅲ increase in Ap could be distinguished in 2 MMCs, while at the change over from phase Ⅲ to phase Ⅰ decrease in Ap could also be seen. Among 9MMCs recorded in FD group, at the changeover from phase Ⅰ to phase Ⅱ increase in Ap was seen in one MMC, at the changeover to phase Ⅲ an obvious Ap increase could be recognized in 3MMCs, and at the changeover from phase Ⅲ to phase Ⅰ Ap decrease was also seen in the same 3 MMCs. However, Ap increase from phase Ⅰ to phase Ⅱ or from phase Ⅱ to phase Ⅲ was not as high in FD group as in healthy group. (2) Comparison between MMC and running spectrum analysis of EGG in healthy subjects: In healthy group, Fp was higher during phase Ⅲ (2.29 ± 0.83) than during phase Ⅰ (P < 0.05), Ap levels were 168.5 ± 65.2 in phase Ⅰ, 181.3 ± 72.8 in phase Ⅱ and 233.3 ± 96.5 in phase Ⅲ. Although there was a trend of phase Ⅰ < phase Ⅱ < phase Ⅲ in Ap levels, no statistical significance among them. Both DPIC and DFIC during phase Ⅱ were 38.1 ± 10.0 and 35.7 ± 11.3, respectively, which were lower than those during phase Ⅰ (79.9 ± 31.5 and 46.5 ± 13.7, respectively) (P < 0.05). There was no difference in PGF values among different phases of MMC. Ap and Fp were higher after meal (247.3 ± 82.6 and 2.65 ± 0.88, respectively) than during phase Ⅰ (P < 0.05). DPIC increased more obviously in fed state (85.2 ± 35.0) than during phase Ⅲ (P < 0.05), but DFIC (35.2 ± 13.3) decreased more obviously than during phase Ⅰ (P < 0.05). PGF after meal was 58.4 ± 11.4, higher than those during phase Ⅰ (46.1 ± 16.4) and during phase Ⅲ (46.0 ± 10.6, respectively) (P < 0.05). (3) Comparison of EGG between FD group and healthy group: During phase Ⅱ, Fp was lower in FD (2.06 ± 0.50) than in healthy group (2.17 ± 0.60) (P < 0.05). Both in phase Ⅱ and in phase Ⅲ, PGF levels in FD were 37.4 ± 9.5 and 29.9 ± 7.2, respectively, which were lower than those in healthy group (55.5 ± 15.0 and 46.0 ± 10.6, respectively)(P < 0.05). The result suggested that there was a high incidence of dysrhythmias during interdigestive period in FD patients. Half an hour before and after meal, the postprandial to fasting Ap ratio was decreased in FD patients (1.01 ± 0.03) as compared to healthy group (2.05 ± 0.82) (P < 0.01). DPIC increase from phase Ⅲ to the postprandial period and DFIC decrease from phase Ⅰ to the postprandial were more obvious in FD group than in healthy group (P < 0.05).

CONCLUSIONS: (1) Although there are differences of some of EGG parameters during different phases of MMC, in general, it is difficult to precisely identify the gastric motility phases only *via* the cutaneous EGG, either actual waveforms or running spectrum analysis. (2) Some abnormal EGG parameters were found during fastintg cycle and postprandially in FD patients, which were in agreement with gastric motor disorders. This suggested that EGG can reflect gastric motility.

Yang CM, Hao W, Xu WJ, Zhou L, Chi BJ, Chao CP, Liu ZM, Wang JR. Relationship between interdigestive motor complex and electrogastrography in healthy subjects and patients with functional dyspepsia. *World J Gastroenterol* 1996; 2(Suppl1): 64 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/64.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.64

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ABSTRACT

Analysis and processing of electrogastroenteric signal

Wen-Jie Xu, Wen-Bin Yang

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Abstract

AIM: Electrogastroenteric signal is very weak and is always buried in strong noises. It suffers from interference originating from the patient's body and various environmental factors; In addition, the signal itself has random characteristics. Obviously, by means of simple waveform analysis, it is difficult, even impossible, to show the physiological information expressed by this special bioelectrical signal.

METHODS: This paper will introduce an electrogastroenteric analyzer (Model WCDF) which has carried out extracting the signal steadily with weak signal detection technique. At the same time, the analyzer makes use of the software developed by ourselves to analyze the waveforms recorded. First, the signal of time domain is divided into time segment and processed with Fourier spectrum analysis method; Them the signal is transferred from time domain to frequency domain. The analyzer simultaneously monitors several points on the abdominal surface and uses the running spectrum method to expand the power spectrum into a function of time. The running is expressed by a pseudo three dimensional expansion to study the dynamic regularity of the signal. Meanwhile, the disorder index of electrogastric rhythm is shown in histograms. The 3 D diagram and histogram give us a straight forward criteria. Second, we used the experiences from gastroenterologists at home and abroad for reference and progressively summed up several parameters that could reflect the variation regularity of waveforms. We strived for providing identification criteria in a quantitative basis for clinical analysis, and achieved a good effect.

RESULTS: The paper will also describe the general health investigation for several thousand people and their clinical analysis by WCDF-4B electrogastro-enteric analyzer. Some heavy symptomatic patients with upper digestive tract illness underwent the test with gastroscopy, or GI and did not find abnormality; However they were found to be function obstacle of gastric motion by means of the electrogastroenteric analyzer.

CONCLUSION: We believe that the electrogastroenteric analyzer will by a non-invasive and effective method for clinical diagnosis along with the advance of the technology and spreading clinical application of the analyzer to achieve more mature experiences.

Key words: Analysis and processing; Electrogastroenteric signal

Xu WJ, Yang WB. Analysis and processing of electrogastroenteric signal. *World J Gastroenterol* 1996; 2(Suppl1): 65 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/65.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.65

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ABSTRACT

Electrogastrography variation of the interdigestive and digestive periods in healthy subjects and patients with functional dyspepsia

Ying Sun, Cheng-Ming Gu, Ge Gao, Mei-Yun Ke, Zhi-Feng Wang

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Abstract

AIM: To investigate the gastric myoelectric activity and rhythmicity of various phase of the interdigestive and digestive states in healthy subjects (HS) and the patients with functional dyspepsia (FD).

METHODS: Ten HS (6 male, 4 female, mean age: 35.4 years) and ten patients with FD (7 male, 3 female, mean age: 40.3 years) paticipated in this study. Both antroduodenal manometry (ADM) and electrogastrography (EGG) (Synectics with a bipolar and WCDF-4B with 4 unipolars along with the proximal to distal stomach) were recorded simultaneously. After an overnight fast, an ADM catheter was placed under fluoroscopy. Three hours fasting of EGG and ADM recording were obtained. The following parameters were used for analysis: (1) The area under electrogastrographic wave (AUEW) during phase Ⅰ, Ⅱ, Ⅲ of the migrating motor complex, (2) The amplitude (AP) of electrogastrographic wave, (3) The percentage of abnormal dominant frequency (AB-DF), (4) The power and (5) power increment of the proximal over the gastric fundus.

RESULTS: (1) AUEW during the phase Ⅰ, Ⅱ, Ⅲ of migrating motor complex (MMC) were 4618 ± 1697, 7095 ± 2831 (*vs* phase Ⅰ, $P < 0.05$), 6072 ± 2674 (*vs* phase Ⅱ, NS) in HS, and 3681 ± 978, 6134 ± 1907 (*vs* phase Ⅰ, $P < 0.005$), 3514 ± 1141 (*vs* phase Ⅱ, $P < 0.05$) in FD. (2) Percentage of AUEW above 5000 uV·S/min during phase Ⅰ, Ⅱ, Ⅲ was 40%, 80%, 57.1% in HS (phase Ⅱ *vs* Ⅰ, $P < 0.05$, Ⅲ *vs* Ⅱ, $P < 0.01$), and 11.1%, 77.8%, 0% in FD (phase Ⅱ *vs* Ⅰ, $P < 0.01$, Ⅲ *vs* Ⅱ, $P < 0.01$). There was significant differences of phase Ⅲ between 2 groups ($P < 0.01$). (3) The highest AP and power of EGG during phase Ⅰ, Ⅱ, Ⅲ were in the proximal antrum shown in HS but in FD. (4) The power ratio of the proximal gastric antrum over the gastric fundus was 1.54, 1.56, 1.50 in HS during phase Ⅰ, Ⅱ, Ⅲ, and 1.41 ($P < 0.01$), 1.29 ($P < 0.01$), 1.20 ($P < 0.01$) in FD. (5) The percentage of abnormal dominant frequency (AB-DF) was 13%, 25%, 25% in phase Ⅰ, Ⅱ, Ⅲ (*vs* Ⅱ, Ⅲ, $P < 0.05$) in HS, and 20%, 20%, 10% (*vs* phase Ⅰ, Ⅱ, $P < 0.05$) in FD. AB-DF was 4.7% and 20.5% ($P < 0.01$) between 0-30 min after the meal in HS and FD, respectively.

CONCLUSIONS: (1) Parameters of EGG in various phases of MMC were not consistent in both HS and FD. (2) Decrement of AP and power of EGG at the proximal antrum as well as increment of dysrhythmias may take part in pathogenesis in FD. Therefore, parameters obtained from multi leads may provide available data for analysis. A suitable duration of EGG recording needs to be considered.

Key words: Electrogastrography; Interdigestive motor complex; Functional dyspepsia

Sun Y, Gu CM, Gao G, Ke MY, Wang ZF. Electrogastrography variation of the interdigestive and digestive periods in healthy subjects and patients with functional dyspepsia. *World J Gastroenterol* 1996; 2(Suppl1): 66 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/66.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.66

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ABSTRACT

Observation on the diagnosis value of 4-lead electrogastrogram to gastric cancer

Liang-Cai Qin, Li-Ping Chen, Dao-Zhi Chen

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Abstract

AIM: To study 4-lead electrogastrogram's diagnosis value for gastric cancer patient, we observe it's sensitivity, specificity and accuracy and compare it with barium meal X-ray film.

METHODS: According to clinic epidemiology, we took gastroscope and pathobiology test as gold standards, and observed surface body electrogastrogram in 203 patients with gastric disease through double blind comparison, 89 cases were gastric cancer, 83 gastric ulcer, 31 chronic gastritis. We choose randomly 50 patients and took double blind comparison between barium meal X-ray film and electrogastrogram test. Barium meal X-ray film of every patient had more than 4 films.

RESULTS: (1) Repeated test for abnormal electrogastric wave of gastric cancer patient: We take the result of 4 lead electrogastrogram of gastric cancer patient as control group. Of 203 patients, 69 cases, 32 cases and 7 cases showed the abnormal electrogastric waves in gastric cancer patients, gastric ulcer patients and chronic gastritis respectively. The sensitivity, specificity, and accuracy in gastric cancer patients was 77.53%, 65.79%, and 70.94%, respectively. (2) In 50 patients double blind comparison between barium meal X-ray film and electrogastrogram test, the sensitivity of electrogastrogram test was higher than barium meal X-ray film, the specificity was lower than barium meal X-ray film, but had no significant difference, accuracy of both tests was close.

CONCLUSION: Electrogastrogram diagnosis in gastric cancer patient had good sensitivity, specificity and accuracy. As a simple method, the electrogastrogram had significant diagnostic value in patient with progressive gastric cancer.

Key words: Electrogastrogram; Gastric cancer; Diagnosis

Qin LC, Chen LP, Chen DZ. Observation on the diagnosis value of 4-lead electrogastrogram to gastric cancer. *World J Gastroenterol* 1996; 2(Suppl1): 67 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/67.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.67

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ABSTRACT

Observation on 4-leak electrogastrogram feature of gastric carcinoma

Liang-Cai Qin, Li-Ping Chen

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Abstract

AIM: We observed 4-lead electrogastrographic characters in chronic gastritis, gastric ulcer, and gastric cancer on fast and aftermeal condition and found that the body surface electrogastrogram has practical value to diagnose gastric cancer.

METHODS: We used YWC-4 type gastrointestinal electric detector and NEC-361 8 lead physiologic recorder to simultaneously record bipolar electrogastrogram and unipolar electrogastrogram respectively before and after meal 130 cases were progressive gastric cancer, 136 cases gastric ulcer, 120 cases were chronic gastritis.

RESULTS: The electrogastrogram in progressive gastric cancer patients showed: High amplitude of 700-1000 uV. Electrogastric frequency > 4 cpm over 10 min; Bradygastria; Low amplitude of below 50 uV. In 130 progressive gastric cancer patients, 107 cases showed abnormal electrogastric waves, the incidence was 82.31%; In 250 patients without gastric wave, the incidence was 26.95% (P < 0.001). In gastric cancer patients, high amplitude incidence was 44.62%, in 107 cases of gastric cancer, 32 cases had abnormal electrogastric waves, the incidence was 29.91%. Among 130 gastric cancer patients, there were 63 cases showed abnormal electrogastric wave. In 71 cases of gastric antrum and pyloric the incidence was 88.73%. In 59 cases with corpus cancer the incidence was 74.58%. According to Borrman classification, 130 progressive gastric cancer patients were divided into 4 types by gastroscope, their incidence of abnormal electrogastric wave had no significant difference.

CONCLUSION: The abnormal electrogastric wave of gastric cancer patients is a significant indication through analysis of surface body electrogastrogram come gastric cancer patients abnormal electrogastric wave can be evoked meal so the surface body electrogastrogram can screen gastric cancer.

Key words: 4-lead electrogastrogram feature; Gastric carcinoma

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ABSTRACT

Effect of -6° head-down bed rest on EGG

Jing-Chen Pei, Lei Chang, Zhi-Qiang Liu, Jing-Xue Zhang, Cheng-Min Wang, Kong-Zhi Song

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Abstract

AIM: To observe the change of EGG and to study the effect of simulated weightlessness on gastric motility.

METHODS: The weightlessness model was made by lying on bed with head down tilt -6° for 21 d. EGG was recorded in 15 volunteers before and after meal using an ambulatory EGG.

RESULTS: The results showed that nausea, pain and loss of appetite appeared initially and weight of body declined significantly ($P < 0.01$). Bradygastria (< 2.4 cpm) increased apparently after 8 d bedrest. There was significant difference ($P < 0.05$) between preprandial and postprandial proportion of bradygastria using paired t test. The dynamics parameters of bradygastria declined significantly and bradygastria rhythm increased with duration of bedrest.

CONCLUSION: Simulated weightlessness caused gastric rhythm and gastric motility declining.

Key words: Weightlessness; Gastric rhythm; Motility

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ABSTRACT

Relationship between symptom pattern and gastric electrical dysrhythmia in functional dyspepsia

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Abstract

AIM: Previous study showed an increase gastric dysrhythmia in patients with functional dyspepsia (FD). The aim of this study was to investigate the relationship between symptom pattern and gastric electrical dysrhythmia in FD.

METHODS: The subjects were 10 normal persons (4M, 6F, mean age 36.1), 56 patients (24M, 32F, mean age 37.4). Gastric activity was measured by inserting needle electrodes in gastric wall, the electrogastrographic recording was made for 0.5 h in the fasting state and 0.5 h in the postprandial state.

RESULTS: 56 patients with FD were categorized on the basis of predominant symptoms as: dysmotility like dyspepsia (23), ulcer like dyspepsia (10), gastroesophageal reflux like dyspepsia (5), complex dyspepsia (15) and nonspecific dyspepsia (3). The dysrhythmia was seen in 1 of 10 normal group and 41 of the 56 patients with FD. Among the FD group 16 had arrhythmia, and 14 had tachygastria, and 6 had bradygastria, and 5 had electrical shutdown. Among the 18/23 of dysmotility like dyspepsia had dysrhythmia (arrhythmia = 11, and tachygastria = 2, and bradygastria = 5). The 5/10 of ulcer like dyspepsia had dysrhythmia (arrhythmia = 1, and tachygastria = 3, and electrical shutdown = 1). The 3/5 of gastroesophageal reflux like had tachygastria and 2/5 had electrical shutdown. The 10/15 of complex dyspepsia had dysrhythmia (arrhythmia = 4, and tachygastria = 4, and bradygastria = 1, and electrical shutdown = 1). The 2/3 of nonspecific dyspepsia had tachygastria, and the 1/3 had electrical shutdown.

CONCLUSION: It is concluded that gastric electrical abnormalities are found in a high proportion of patients with FD. Arrhythmia and bradygastria were most found in dysmotility like dyspepsia, tachygastria was most found in ulcer like and gastroesophageal reflux like dyspepsia, they had significant difference.

Key words: Gastric electrical dysrhythmia; Functional dyspepsia

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ABSTRACT

Research of specific wave figure of EGG in chronic gastritis

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Abstract

AIM: The diagnostic standard of electrogastrogram (EGG) used in this country now lacks specificity, so there is dispute in its clinical use. This research, according to specific EGG wave figure and EGG diagnostic standard used now, compared the true diagnostic rate of superficial gastritis and that of atrophic gastritis.

METHODS: Choose 60 normal persons as control group. The group of patients contained 480 persons (218 superficial gastritis, 166 chronic atrophic gastritis, 96 other gastric disease). The disease duration was from half year to 17 years. Age was between 20 to 64 years. Males 298, females 182. The SC2C-B EGG machine was used to record the EGG wave for 15 min before meal and after meal separately. The following day after EGG recording, gastro fibroscope and pathology were performed to assure the diagnosis. Then compare the results with that of EGG diagnosis.

RESULTS: In control group, according to EGG diagnostic standard, 57 were normal, 124 superficial gastritis, 101 atrophic gastritis. Compared with the gastrofibroscope and pathology diagnosis, coincident rate of superficial gastritis was 57%, that of atrophic gastritis was 61%. According to the specific wave figure, sine wave appeared in 60 normal persons: low, flat and quick wave appeared in 213 superficial gastritis; Low flat and quick wave appeared or not as standard for diagnosis of superficial gastritis, the coincident rate was 98%; For low, flat and slow wave as standard for diagnosis of atrophic gastritis, the coincident rate was 90%. Low, flat and quick wave, low flat and slow wave did not appear in other stomach diseases.

CONCLUSION: When EGG wave figure low, flat, quick wave and slow wave is separately used as standard for diagnosis of superficial gastritis and atrophic gastritis, the true diagnostic rate is much higher than the EGG standard used now ($P < 0.01$). The conclusion is that specific EGG wave figure used as standard for diagnosis of superficial gastritis and atrophic gastritis has clinical significance.

Key words: Wave figure; Electrogastrogram; Chronic gastritis

Wang DS, Zhang LD, Chai JY, Zhang Y, Lu YY. Research of specific wave figure of EGG in chronic gastritis. *World J Gastroenterol* 1996; 2(Suppl1): 71 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/71.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.71

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ABSTRACT

Retarded gastric emptying and abnormal antral myoelectric activities in patients with bile reflux gastritis

Wan-Dai Zhang, Jin-Zhang Zeng, Wu-He Peng, Zhen-Shu Zhang, Hong-Hai Zhang, Dian-Yuan Zhou

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Abstract

AIM: Several studies have domesticated that antroduodenal dysmotility is associated with bile reflux and chronic gastritis, but the pathophysiologic importance remain obscure. In this study, we investigated the patterns of gastric emptying for solid and liquid and antral myoelectric activities to explore the possible mechanism of gastric motility disorders in the pathogenesis of bile reflux gastritis.

METHODS: 59 patients with chronic gastritis diagnosed by endoscopy and histology examination. Concentration of bile salts > 58 μg/mL and pH ≥ 3.0 in gastric fluid, and a total scores of the histology of gastric muscosa > 9.0 were used as a standard of selection for pathogenic bile reflux. Thus, of them, 18 patients with bile reflux gastritis (BRG) and 17 patients with non reflux gastritis (NRG) were chose for measurement of gastric emptying, and 10 healthy volunteers were selected as controls (HC). Gastric emptying was measured by a standardized meal labeled with dual isotope by scintigraphy. Parameters of solid lag period (SLP), half solid emptying time (HSET) and half liquid emptying time (HLET) were obtained from gastric emptying curves based on a fixed isocount level relative to the maximum count value of each image from a free region of interest (ROI) of the stomach. 13 subjects from group BRG, 10 from group NRG and 10 from group HC were randomly selected for the examination of antral myoelectric activities during fasting for at least 30 min by a peroral suction electrode sucked to antrum and the signal were transmitted to a type of RM 6000 eight channel electrogastrography. The electric signals were analyzed for mean slow wave frequencies (MSWF) and dysrhythmias (DRM).

RESULTS: The patients with bile reflux gastritis showed a significant prolongation of SLP (43.3 ± 17.0 min, *vs* group NRG 24.7 ± 12.3 min, $P < 0.01$; *vs* group HC 21.6 ± 8.1 min, $P < 0.01$), of HSET (103.9 ± 30.6 min, *vs* group NRG 80.5 ± 23.7 min, $P < 0.05$; *vs* group HC 58.2 ± 17.7 min, $P < 0.01$) and of HLET (43.0 ± 17.1 min, *vs* group NRG 31.0 ± 13.9 min, $P < 0.01$; *vs* group HC 23.5 ± 9.4 min, $P < 0.01$). Patients with non reflux gastritis also showed prolonged HSET when compared with group HC ($P < 0.05$), while parameters of SLP and HLET revealed no statistic difference between these two groups. The three groups showed no significant difference of MSWF, in group BRG (7/13), low in group NRG (3/10) and group HC (1/7). When these abnormal individuals were compared, dysrhythmias were severe in group BRG and in group NRG, but mild in group HC.

CONCLUSION: Patients with BRG have a notable delay in gastric emptying for both solid and liquid, and high occurrences of dysrhythmias in antrum, indicating that severe dysmotility in stomach, especially in antrum, as an important factor in the induction of pathologic bile reflux. Dysfunctional antrum fails to effectively evacuate the excessive reflux ates and incurred prolonged retention after meals, which may play a critical role in pathogenesis of bile reflux gastritis.

Key words: Retarded gastric emptying; Abnormal antral myoelectric activities; Bile reflux gastritis

Zhang WD, Zeng JZ, Peng WH, Zhang ZS, Zhang HH, Zhou DY. Retarded gastric emptying and abnormal antral myoelectric activities in patients with bile reflux gastritis. *World J Gastroenterol* 1996; 2(Suppl1): 72 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/72.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.72

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ABSTRACT

Application of electrogastrogram in the researches on whole body vibration

Fu-Sen Ma, Jian-Zhong Liu, Yao-Rong Yu, Ai-Guo Jin, Hua-Xiang Yang, Yi-Bao Han, Zhi-Ming Xu

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Abstract

AIM: Mechanical vibration is a kind of mechanical environment being widespread in modern manufacture and having obvious influence on human body. It not only influences comfort and work efficiency of people, but also endangers personal health and safety, even influences overall property of man machine system. This text described the effects of low frequency vibration and ultra low frequency vibration of human body with electrogastrogram.

METHODS: The subjects were 9 workers and 10 university students. The test device was the electro hydraulic vibrator with 0.001-200 Hz frequency range and 100 mm maximum amplitude.

RESULTS: The electrogastrogram changes of human body exposed to 8-20 Hz low frequency vibration were coordinated with the subjective feeling. In the 0.25-1 Hz ultra low frequency range, the frequency and amplitude of the electrogastrogram during vibration had evident changes comparing with that of pre vibration, but the divergence was related with pre vibration function condition of subjects.

CONCLUSION: The electrogastrogram can be regarded as an objective index of human response to mechanical vibration. It provides scientific basis to evaluate objectively the effects of whole body vibration on people.

Key words: Electrogastrogram; Researches; Whole body vibration

Ba FS, Liu JZ, Yu YR, Jin AG, Yang HX, Han YB, Xu ZM. Application of electrogastrogram in the researches on whole body vibration. *World J Gastroenterol* 1996; 2(Suppl1): 73 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/73.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.73

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ABSTRACT

Relationship between plasma motilin and electrogastrointestinal gram in patients with chronic gastritis

Hui-Yin Zhou, Huai-Zhong Song, Zhi-Ming Tan, Tie-Sheng Liang, Yu Cui

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Abstract

AIM: To study the relationship between fasting plasma motilin gastrointestinal electric activity and gastrointestinal motility.

METHODS: The 45 cases of chronic gastritis were diagnosed by gastroscopy. Fasting plasma motilin (normal 326 ± 58 ng/L) were determined by radioimmunoassay (RIA) and fasting electrogastrointestinagram were recorded.

RESULTS: The level of plasma motilin in 45 cases of chronic gastritis was 24.55-539.51 ng/L. Average was 201.81 ± 100.86 ng/L. The level of plasma motilin of 7 cases (15.56%) was normal, in 36 cases (80%) it was obvious low, and in 2 cases (4.44%) it was high. The frequency of electrogastrogram of 16 cases (35.56%) was normal. In them, 12 cases (26.67%) had bradygastria, 7 cases (15.56%) had tachygastria and 10 cases (22.22%) had arrhythmia. Amplitude and average area of electrogastrointestinogram were lower than normal.

CONCLUSION: The changes of clinical symptoms, fasting plasma motilin and electrogastrointestinogram are correspondent to each other. The motilin concordant with function of gastrointestinal motility. Intensity of gastrointestinal electric activity is directly affected by concentration of motilin.

Key words: Motilin; Electrogastrointestinogram

Zhou HY, Song HZ, Tan ZM, Liang TS, Cui Y. Relationship between plasma motilin and electrogastrointestinal gram in patients with chronic gastritis. *World J Gastroenterol* 1996; 2(Suppl1): 74 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/74.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.74

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ABSTRACT

Comparative study on clinical diagnostic value of EGG with microcom puter a clinical analysis of 137 cases

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Abstract

AIM: It has been still an argument about the clinical diagnostic value of gastrointestinal (GI) disease by electrogastrograph (EGG), and the clinical application of EGG with micro computer has been also on a trial stage.

METHODS: In order to study the clinical application value of EGG, the author has observed 137 cases if GI disease (71 male, 66 female, average 47.4 years.) by EGG Inc. Among them, 60 cases were confirmed pathologically by gastroendoscopy as a control group.

RESULTS: (1) EGG showed abnormality in 133 cases (97.1%). Among them, EGG indicated parenchymal disease and dysfunction change in 127 cases (92.7%) and 119 cases (86.9%) respectively. This data suggested that almost all GI parenchymal diseases accompanied with some changes of GI. (2) Some characteristic of EGG showed in following special diseases:diabetogenous gastric paralysis: It showed gastric dysrhythmia and motion hypofunction, the gastric motion was fast before meal and slow after meal test, the amplitude decreased remarkably after meal test. Uremigenic gastritis: EGG showed chronic inflammation, gastric dysrhythmia and gastric motion hypofunction.

CONCLUSION: It has suggested that EGG has a significant diagnostic value for some GI diseases especially for GI parenchymal diseases accompanied with some changes of GI motility.

Key words: Electrogastrograph; Diagnostic; Motility

Cai X, Liao SY. Comparative study on clinical diagnostic value of EGG with microcom puter a clinical analysis of 137 cases. *World J Gastroenterol* 1996; 2(Suppl1): 75 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/75.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.75

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ABSTRACT

Discussion about 130 cases of digestive tract diseases diagnosis by EGG analyzer

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Abstract

AIM: Electrogastroenteric analyzer is a noninvasive technique for electrophysiology which is related to the motility of digestive tract. This paper reported 130 cases and discussed the diagnostic value for upper digestive tract by means of electrogastrograph.

METHODS: 130 out patients, male 74, female 56. mean age 49 (range from 6-92). WCDF electrogastroenteric analyzer was used.

RESULTS: (1) 105 of 130 patients were accompanied by abnormal gastric motility, both in ulcer and nonulcer dyspepsia. (2) Bradygastria is related to excessive contraction or weakened motion of gastric antrum, clinic symptom was dominated by abdomen flatulence, which was about 79%. Tachygastria was caused by decreased gastric motility and was related to nausea or vomit, this accounted for about 85%. Reflux or heartburn were related to non coordination of gastric motion and were about 90%. (3) Compared with gastroscopy, GI test, the EGG coincidence rate was over 86%. (4) Some severe patients underwent the test with gastroscopy, GI, or CT scan, but did not find abnormality. However, they were found to be abnormal in gastric motion by means of the electroenteric analyzer. After proper therapy, it was improved. 12 other cases of gastric ulcer were undergone the therapy of diminishing inflammation, sterilizing, acid inhibition and improving gastric motility, after 4 wk, the ulcer healed when checked with gastroscopy; Meanwhile, its EGG reexamination showed that abnormal wave forms disappeared and quantitative parameters returned to normal range.

CONCLUSION: The research show that advantages of EGG analyzer are noninvasive, no cross infection, painless and acceptable for patients. The analyzer has certain value in examining functional diseases of digestive tract and monitoring the usage of drugs; In addition, it can be used as a screening method for diagnosing organic diseases in digestive tract.

Key words: Digestive tract diseases; EGG analyzer

Li P, Wu X, Li F, Liu GX. Discussion about 130 cases of digestive tract diseases diagnosis by EGG analyzer. *World J Gastroenterol* 1996; 2(Suppl1): 76 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/76.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.76

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ABSTRACT

Nursing experience on examination with electrogastroenteric analyzer

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Abstract

AIM: Model WCDF electrogastroenteric analyzer uses surface electrodes to examine the electrical variation related to alimentary tracts and its feature are low noise, low drift, high stability and high sensitivity. Because the electrical signal of stomach and intestine is very weak and easy to be interfered. Each measuring step must be done carefully and skillful operators were needed.

METHODS: This paper summarized the experiences of 500 medical cases which had been performed the test with the analyzer.

CONCLUSION: We found, besides correct operation, it is important to acquire good cooperation from patients. The patients must be in a quiet and relaxing state. The interference occurred in patients must be eliminated by relevantly nursing measures. The rate of success is 89.3%, the rate of failure is 10.7%, and $P < 0.001$.

Key words: Nursing experience; Electrogastroenteric analyzer

Wu X, Li P. Nursing experience on examination with electrogastroenteric analyzer. *World J Gastroenterol* 1996; 2(Suppl1): 77 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/77.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.77

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ABSTRACT

Studies on EGG and gastrointestinal hormones in non-ulcerative dyspepsia patients

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Abstract

AIM: Non-ulcerative dyspepsia (NUD) is a common clinical disease. More attention has been drawn on the role of disturbance of upper digestive tract motility and gastrointestinal hormones in the NUD pathogenesis.

METHODS: In present study, 27 cases were diagnosed (to the criteria of Delmente), male 17, female 10, age 26-72 and mean 45.8 ± 7.3. All cases were examined with WCDF-2B electrogastrograph.

RESULTS: In typical group, 72.2% (11/18) showed tachykinesia, in which 50% were allorhythmia. In non typical group, 66.7% were bradykinesia or allorhythmia.

CONCLUSION: Our results suggested that tachykinesia occurred more frequently in typical group while bradykinesia in non typical group, usually accompanied with allorhythmia. The plasma motilin level was lower than that of the normal control group, while cholecystokinin (CCK) was higher, which is consistent with the hypothesis that the secretory disturbance of the two types of gastrointestinal hormones which promote or inhibit the gastric motility may be the important pathogenic factors of NUD.

Key words: EGG; Gastrointestinal hormones; Non-ulcerative dyspepsia patients

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ABSTRACT

Electrogastrography in patients with disordered gastric motility in diabetes and effect of cisapride

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Abstract

AIM: Diabetes mellitus (DM) is a clinical syndrome, which affects all systems of human body. Digestive symptoms, such as abdominal distention, nausea, constipation or diarrhea, are often seen in long term cases of DM, which is believed resulted from visceral neuropathy. Approximately, half of diabetic patients are found to have gastric dysrhythmias including bradygastria, tachygastria and arrhythmias. We investigate the effect of different dose of Cisapride (CIS) in 25 cases of DM by comparing the surface electrogastrograms (EGG) before and after the therapy for two weeks. The aim of this report is to study the gastric myoelectrical activity of diabetic patients.

METHODS: 25 patients had history of NIDDM from two months to three years. No upper digestive tract diseases was found by radiograph or gastroscopy in these patients. Hepatic and biliary disease were not seen by B mode ultrasound. 15 patients received 5 mg CIS three times daily and other 10 received 10 mg CIS three times daily for two weeks. For EGG analysis, four standard electrodes were connected to WCDF electrogastroenteric analyzer for subsequent data analysis, the dominant frequency (FP), pass zero frequency (FZ), center frequency (FC) and average peak (AP) were worked out, the statistical analysis was then performed using the student's paired t test.

RESULTS: Bradygastria, bradyarrhythmia and lower amplitude were seen in these patients before the treatment with CIS. After two weeks on CIS, FP did not change significantly ($P > 0.05$) in "5 mg group", while in "10 mg group" FP changed significantly ($P < 0.01$), which showed the patients with bradygastria developed normal EGG. The statistical analysis did not indicate the effect on AP.

CONCLUSION: Disordered gastric motor function in DM can lead to not only the symptoms of gastrointestinal tract but also the worse control of serum glucose. Such phenomenon is often seen in asymptomatic diabetics. CIS is a prokinetic agents for relief of symptoms, which is believed more effective than 15 mg of CIS daily. EGG can be used to investigate the effects of prokinetic agents on gastrointestinal motility and rhythm.

Key words: Electrogastrography; Gastric motility disorder; Cisapride

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ABSTRACT

Relationship between ^{99m}Tc-labled gastric empty and electrogastrography in the patients with gastric dynamic

Chuan-Ping Cao, Chun-Min Yang, Lan Tang, Lu-Na Ma, Wen-Jie Xu, Wei Hao, Lu Zhou

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Abstract

AIM: To probe relationship between delayed gastric empty and gastro electric activity and appraise the diagnostic value of electrogastrography (EGG) in the dynamic diseases of stomach.

METHODS: Subjects 6 healthy volunteers, 4 patients with functional dyspepsia (FD) and 11 patients with type 2 diabetic mellitus. All the subjects were fasted over 8 h. Solid gastric emptying test ^{99m}Tc-DIPA 500 (Ci was mixed with 100 g EGG and fried, after meal, the γ-ray prober was put toward the gastric area and developed for one minute everytime in the 15th, 30th, 45th, 60th, 90th and 120th respectively after meal and the results were analyzed by using computed programme for the gastric empty. EGG was recorded in the gastric corpus and antrum in fasting and the course of solid gastric emptying test for 30 min respectively, and Ap, Fz, Fc, Fp and the percentage of Fp < 2.4 cpm, 2.4-3.7 cpm and > 3.7 cpm were analyzed.

RESULTS: Statistical difference were demonstrated among FD group, DM with peripheroneural lesions. But there were no significant differences between healthy volunteer group and DM group without peripheroneural lesions, and between FD group and DM with peripheroneural lesions. On the basis of above results, the subjects were divided into normal gastric emptying group (NGE) and delayed gastric emptying group (DGE). EGG analysis showed that no statistical differences existed in Ap, Fz and Fc preprandially between NGE and DGE; While there was the significant difference in frequency spectrum of the gastric antrum in the time of fasting and after meal between NGE and DGE. In NGE, Fp after meal in gastric antrum was mainly arranged from 2.4 cpm to 3.7 cpm, but in DGE, the percentage of Fp from 2.4 cpm to 3.7 cpm was obviously reduced after meal when it was compared with NGE.

CONCLUSION: On the basis of above findings, it was concluded that delayed gastric emptying in the patients with DM may be results of DM accompanied peripheroneural lesions; Tc gastric emptying test was a valuable method for detecting gastric dynamic diseases; The reduced percentage of Fp (range 2.4-3.7 cpm) or left migrated frequency spectrum of Fp may be valuable parameter for diagnosing delayed gastric emptying.

Key words: ^{99m}Tc-labled gastric empty; Electrogastrography, gastric dynamic disease

Cao CP, Yang CM, Tang L, Ma LN, Xu WJ, Hao W, Zhou L. Relationship between ^{99m}Tc-labled gastric empty and electrogastrography in the patients with gastric dynamic. *World J Gastroenterol* 1996; 2(Suppl1): 80 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/80.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.80

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ABSTRACT

Relationships between electrogastric dysrhythmias and leucin enkephalin in rats

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Abstract

AIM: Electrogastric dysrhythmias are very common in clinic. It correlates with gastrointestinal diseases, but its pathogenesis is rarely understood. In the present study, we established rat model of electrogastric dysrhythmias and investigated the relationships between dysrhythmias and enkephalin.

METHODS: Sixty wistar rats were randomly divided into 3 groups: (1) control (n = 20); (2) test group (n = 30). Rats were fed irregularly for 4 wk: fasted for 24-h every other day, drinking water randomly, 1 mL HCl was added to water to disturb the pH of stomach. Then the silver electrodes were implanted on antrum. 7 d after operation, gastric myoelectric activity, the contents of leucin enkephalin (L-ENK) in plasma and tissues of antrum and duodenum were measured by RIA, the distribution and number of LEK immunoreactive nerves in duodenal myenteric plexus were measured by immunochemistry and image analysis system. (3) Drug group (n = 10). To investigate the effects of morphine (0.1 mg/kg, ip), naloxone (0.1 mg/kg, ip.) and morphine after pretreatment with naloxone on gastric myoelectric activity.

RESULTS: (1) A short tachygastria or arrhythmia occurred only in 2 rats of control. Dysrhythmia index was 1.25% in control. Dysrhythmias occurred in 27 rats in test group. Dysrhythmia index was 36.67%. (2) The content of L-ENK in plasma had no significant difference between control (55.49 ± 23.41 ng/g) and test group (65.38% ± 19.37% ng/g) (P > 0.05), but the content of L-ENK in the tissues of antrum and duodenum were significantly higher in test group (5.75 ± 2.13 ng/g; 21.64 ± 8.73 ng/g) than in control group (3.62 ± 1.94; 12.37 ± 4.93 ng/g) (P < 0.01). The number of L-ENK immunoreactive nerves in duodenal myenteric plexus was significantly increased in test group compared with control group (P < 0.01). (3) Morphine induced dysrhythnias in all rats after ip.administration, but naloxone didn't. After naloxone pretreatment, morphine didn't induce dysrhythmias in 9 rats, a short bradyrhythmia occurred only in 1 rat.

CONCLUSION: We successfully established rat model of electrogastric dysrhythmias. Morphine could induce electrogastric dysrhythmias, the effect could be reversed by naloxone. The increase of L-ENK in antral, duodenal tissues and myenteric plexus played an important role in electrogastric dysrhythmias.

Key words: Electrogastric dysrhythmias; Morphine; Naloxone

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ABSTRACT

Experimental study of estimating effect of Chinese drugs and acupuncture by electrogastrotrogram

Tai-Lai Weng, Xian-Qun Lu, Lei-Fen Lu, Hui-Zhen Fei

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Abstract

AIM: In this article we investigated the feasibility and reliability of estimating effects of acupuncture and Chinese drugs with a responsive indication-electrogastrotrogram (indication-EGG).

RESULTS: The following results were obtained (1) 17 patients after needing Zusanli (ST36) point with even reinforcing and even reducing method, the amplitude of EGG as increased from 60.92 ± 9.08 μV to 319.12 ± 58.47 μV, $P < 0.001$) and the amplitude decreased after stopping the acupuncture. (2) The acupuncture effect at different points: After needling for 20 min at Zusanli point of stomach meridian, the amplitude of EGG was excited or inhibited $P <$ 0.05-0.001, in 35 patients. After needling for 20 min at Yinlingquan (SP9) point of spleen meridian, the amplitude of EGG the biphasic changes in 18 patients. (3) To estimate the effect of herbs with EGG: "Qing Hao Su" (Sodium Artesunate) had an apparent effect in treating Malaria, the effect of Qing Hao Su on electrical gastric activity (EGA) of dog stomach had been studied by EGG. When the dose of Qing Hao Su was accumulated 160 mg by *i.v.* injection, the amplitude of EGG was increased from 160.50 μV to 641.30 μV. When the dose was added up to 320 mg by *i.v.* injection the body temperature (T), blood pressure (BP), respiration (R), EGG, electrocardiogram (EGG) gradually decreased. When the dose was added up to 640 mg above 5 index of dog were all depressed. We have studied the effect of Siwu tang decoction on EGG in rabbits. The results indicated that in the stomach perfusion with Siwu decoction of 10 mL, the amplitude of EGG was increased, after perfusion for 20-30 min, the amplitude of EGG was increased from 1086.30 μV to 1722.20 μV. After perfusion for 90 min, the amplitude of EGG was maintained at a high level (1449.50 μV).

CONCLUSION: The results indicated that acupuncture at different. Point had different points had different effects, one of the key points in acupuncture was to obtain the needling sensation (got Qi), and to transfer Qi to the lesions. Effect of FA on gastrointestinal tract was mainly local, the gastric electricity provided an objective basis for traditional Chinese spleen stomach theory.

Key words: Chinese drugs, acupuncture; Electrogastrotrogram

Weng TL, Lu XQ, Lu LF, Fei HZ. Experimental study of estimating effect of Chinese drugs and acupuncture by electrogastrotrogram. *World J Gastroenterol* 1996; 2(Suppl1): 82 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/82.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.82

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ABSTRACT

Electrogastrogram changes of intermission of the recurrent abdominalpain of 50 children

Song-Hua Yang, Wen-Hong He, Hai-Feng Xie

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Abstract

AIM: At present, the recurrent abnormal pain of children is commonly seen among infants and school-age children, but its cause has not yet been clear. Modern medicine's treatment of such disease by relieving spasm and pain often fails to achieve satisfactory curative effects. In 1994, we reported that, as found by B-ultrasonography, the gastric frequency of 92% of the children suffering from recurrent abdominal pain after drinking water before breakfast was obviously lower than that of the control group. So far, the systematic reports on the electrogastrograph examination of intermission of such disease before meal and after drinking water and having a meal have rarely been seen. The purpose of this paper is to provide a systematic objective index and basis for the clinical diagnosis and preventive treatment so as to better guide the clinical treatment.

METHODS: The instrument used was EGEG-4D4 4-lead wise gastrointestinal electrograph. The method was to draw 3 lines on the upper abdominal region, *i.e.* a cross line through the middle point in the line connecting the umbilicus and the xiphoid process (Line No.1) and 2 oblique lines connecting the umbilicus and the 2 nipples (Line No.2 and No.3) and found the cross point of the 3 lines, the slightly upper part on the left being the gastric body and the part on the right was the marking point on the body surface of gastric antrum projection. The electrogastriophic variations of the gastric antrum and the gastric body of 50 children suffering from recurrent abnormal pain with B-ultrasonography in the past were compared with 30 cases of healthy children at the equivalent ages as the control group.

RESULTS: The frequency of the gastric antrum of the 50 cases of children suffering from recurrent abdominal pain, as found by electrogastrogram was: 2.64 ± 0.79 times/min before meal, 2.84 ± 0.64 times/min after drinking water, and 2.77 ± 0.57 times/min after meal; For the 30 cases of healthy children of the control group, 3.12 ± 0.28 times/min before meal, 3.14 ± 0.21 times/min after drinking water, and 3.11 ± 0.16 times/min after meal. The *t*-test shows that the difference between the 2 groups was of significant importance ($t > 3$, $P < 0.01$) while there was no significant difference between the 2 groups in the frequency of the gastric body (before meal, after drinking water and after meal); To compare the amplitude of the gastric antrum and the gastric body between the 2 groups, it was found that there was no significant difference before meal ($t < 2$, $P > 0.05$) and after drinking water and meal, the amplitude of the former was larger than that of the latter and there was a significant difference ($t > 3$, $P < 0.01$).

CONCLUSION: The children suffering from recurrent abdominal pain have trouble in the dynamic function of the gastric antrum, especially in the condition of empty abdomen, which counteracts the inadequate display of electrogastric physiological condition and motor function by B-ultrasonography, X-ray and gastroscope, thus providing an objective index of diagnosis, prevention and treatment, changing the old concept of treatment only according to symptoms and proposing the new idea of applying or adding the dynamics stimulating medicine at intermission.

Key words: Electrogastrogram

Yang SH, He WH, Xie HF. Electrogastrogram changes of intermission of the recurrent abdominalpain of 50 children. *World J Gastroenterol* 1996; 2(Suppl1): 83 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/83.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.83

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ABSTRACT

Diagnostic value of gastroenterologram in gastroenteropathy in high land area

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Abstract

AIM: Gastroenteropathy is a common disease in high land area. The methods of clinical diagnosis were X ray barium meal and gastroscopy *etc*. These methods were difficult to accepted by vast number of patients. Use of gastroenterogram supplies a new noninvasive diagnosis method.

METHODS: We used 5-lead gastroenterogram. Random sampling, patients were fasted for 24 h, quietly lay down for five minutes. The electrodes were placed on abdominal gastric antrum, gastric body and relevant point, gastroenterogram was recorded before and after meal.

RESULTS: 395 patients suffered from surface layer gastritis, 284 were surface-gastric atrophia, 99 were gastric atrophia, 8 were normal gastric rhythm, 63 were ulcer, 25 patients suffered from ulcer intermittent stage, 9 were cancer of the stomach, 8 were gastric rhythm disorder, 1 was gastric rhythm super-slow: The rates in according with gastroscopy were: surface layer gastritis 95%, surface-gastric atrophia 96%, gastric atrophia 73%, cancer of the stomach 87%. In clinical, gastroenterogram had no-wound, no-contraindication, no side effect, but a high diagnosis rate.

CONCLUSION: It is a new general investigation method for clinic screening stomach cancer.

Key words: Gastroenterogram; Stomach cancer; Gastric rhythm

Chang FG, Han YH, Guo Y, Li P, Qi Y. Diagnostic value of gastroenterologram in gastroenteropathy in high land area. *World J Gastroenterol* 1996; 2(Suppl1): 84 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/84.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.84

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ABSTRACT

Clinical analysis of electrogastrogram of 102 cases

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Abstract

AIM: Surface electrogastrogram (EGG) is a non-invasive examine technique for stomach diseases, we analyzed EGG of 3-year, so as to improve diagnosis and the EGG examining method.

METHODS: 102 patients, male 73, female 29, age between 20 and 70. EGG were performed.

RESULTS: Their EGG showed that 8 cases were gastric ulcer, 34 cases were duodenal ulcer, 10 cases were duodenal bulbitis, 41 were surface gastritis, 7 were atrophic gastritis, 2 were stomach cancer. The frequency and amplitude of gastritis were 2.68-2.93 c/min and 70-120 μV, respectively; F and A atrophic gastritis were 2.40-2.50 c/min, and 47.6-55 c/min respectively; Frequency of ulcer was above 3.24 c/min, and its amplitude was between 200 and 350 μV; F and A of duodenal bulbitis were lower than those of ulcer, while F of cancer was 2.3-2.4 c/min, A was 47.6-53 μV.

CONCLUSION: The gastric electric waves were arrhythmic in ulcer, chronic gastritis, and gastric-pain patients. After treatment, gastric pain was relieved, and gastric electric rhythm tended to be regular.

Key words: Electrogastrogram; Stomach disease

Yu GJ. Clinical analysis of electrogastrogram of 102 cases. *World J Gastroenterol* 1996; 2(Suppl1): 85 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/85.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.85

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ABSTRACT

Research on electrogastrogram in diagnosis of duodenal ulcer

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Abstract

AIM: By using Electrogastrogram, we checked total 68 patients with duodenal ulcer.

RESULTS: The electrical frequency in patients with duodenal ulcer showed no obvious change after meal ($P > 0.05$); In active duodenal ulcer with gastritis the frequency is much higher; In chronic duodenal ulcer the frequency is relatively lower. The Electrogastrogram amplitude and waveform had different characteristics in different kinds of duodenal ulcer. The active duodenal ulcer showed an irregular waveform and high amplitude wave. The electrogastrogram amplitude in 56% of patients was increased obviously after meal ($P < 0.001$); The Electrogastrogram of duodenal ulcer with gastritis had low wave in 59% of patients and the Electrogastrogram amplitude was increased after meal ($P < 0.001$); And in chronic duodenal ulcer the electrogastrogram all showed low wave before and after meal.

CONCLUSIONS: (1) The Electrogastrogram showed the following 2 characters: the frequency is above 3.5 cpm and irregular and the amplitude is high (> 200 μV); and (2) a frequency above 3.5 cpm with low wave (< 100 μV) can be diagnosed as duodenal ulcer in combination with clinical manifestation.

Key words: Electrogastrogram; Duodenal ulcer

Zhang HZ, Wang HJ, Li Y, Wang YP. Research on electrogastrogram in diagnosis of duodenal ulcer. *World J Gastroenterol* 1996; 2(Suppl1): 86 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/86.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.86

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ABSTRACT

Reproducibility of EGG spectrum in healthy subjects

Jin-Mei Xiao, Mei-Yun Ke, Zhi-Feng Wang

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Abstract

AIM: Although a great deal of clinical research has been done, limited data are available about the reproducibility of electrogastrography (EGG) and the recording times are also controversial. The aim of the study was to investigate the reproducibility of EGG spectrum in healthy subjects.

METHODS: Sixteen healthy subjects without, symptoms (4M, 12F, mean age 39 ± 18 years) were studied using 4-channel EGG recorder (WCDF-4B). No medication and alcohol had been taken 3 d before study. Four unipolar electrodes were positioned on the abdominal surface overlying fundus, gastric body, proximal and diatal antrum. The corresponding positions were determined by X-ray films. The skin was carefully cleaned and prepared. After an overnight fast, EGG tracing was recorded for 1 h in the fasting and 1 h in the fed after ingestion of a standard test meal (400 Kcal.). The same examination was repeated 1 wk later. Frequency spectrum was used for analysis. Parameters were analyze d from different intervals, that is, every 13.33 min (D1), 26.66 min (D2), 53.32 min (D3) during fasting and postprandial periods between the first and second EGG recording, including wave amplitude of EGG (AP), mean frequency (MF), central frequency (CF), dominant frequency (DF) and the percentage of arrhythmia.

RESULTS: (1) AP, MF, CF and DF were 150 ± 16 μV, 2.93 ± 0.09 cpm, 2.76 ± 0.06 cpm, 2.89 ± 0.09 cpm, at the proximal antrum during the first D1 interval, which were no difference between each D1 interval in the same recording or two recordings. (2) When compared data from D2 interval, AP (0%), MF (12.5%), CF (62.5%), DF (12.5%) showed significant difference between two EGG recordings. (3) AP (25%), MF (50%), CF (100%), DF (50%) showed significant difference between two EGG recordings when compared in D3 interval. (4) Total percentage of dysrrhsmia (DF < 2.4, > 3.7 cpm) was similar in either the first (8.75%) or second recording (16.75%, $P > 0.05$) during fasting, 5.3% and 8.0% after meal. (5) A meal significantly increased most parameters.

CONCLUSION: Our results indicated that the reproducibility of EGG spectrum is related to the time interval of EGG recording. The reproducibility decreases as the time interval increases. There is a significant difference between fast and fed states. This data suggests that EGG recording should include both fasting and fed states and prolonged EGG recording is unnecessary in fasting state.

Key words: Electrogastrogram; Reproducibility

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ABSTRACT

Analysis of EGG and gastroendoscopy of 110 cases

Shu-Yao Chen, Qi-Hui Zhang, Shu-Huai Yang, Zhi-Yong Yu

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Abstract

AIM: To understand the clinical value of body Electrogastrogram (EGG), we compared it with results of endoscopy.

METHODS: Patients included duodenal ulcer (DU) 6, gastric ulcer (GU) 21, complex ulcer (CU) 4, gastric cancer (GC) 6, chronic superficial gastritis (CSG) 12, and healthy adults 6.

RESULTS: Frequency > 3.7%/min: DU 21, GU 4, CSG 2, GC 1; Amplitude > 250 μV: DU 9, GU 4, GC 1, CSG 1, healthy 2; Amplitude 150-250 μV: DU 16, GU 5, CU 3, GC 2, CSG 3, healthy 3; Amplitude < 150 μV: DU 36, GU 12, CU 3, GC 3, CSG 8, healthy 1. There was no significant difference between different groups (P > 0.05). In addition, the profile of EGG was obviously irregular in DU 32, GU 18, GC 5, CU 2, CSG 2, healthy 1. The result of 58 meal test was: 49 cases had faster frequency, 9 had slower frequency, in 5 cases, after-meal slow waves were more regular than those before-meal. Fourty nine had increased after-meal amplitude, average increase was 68 μV, 9 cases had decreased or unchanged amplitude of EGG had no diagnostic value. Most GU, GC had gastric dysrhythmia, but other disease groups and healthy group also showed dysrhythmia, therefore, dysrhythmia was not characteristic of certain disease. Meal test provides some help in understanding of gastric empty function.

Key words: Electrogastrogram; Gastroendoscopy

Chen SY, Zhang QH, Yang SH, Yu ZY. Analysis of EGG and gastroendoscopy of 110 cases. *World J Gastroenterol* 1996; 2(Suppl1): 88 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/88.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.88

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ABSTRACT

Value of electrogastrogram frequency and amplitude parameters

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Abstract

AIM: Electrogastrogram frequency and amplitude parameters of 500 cases were analyzed to evaluating their value in clinical diagnosis.

METHODS: In 500 cases, there were 200 males and 300 females. The mean age was 57 years. The medicine which could influence gastric function were stopped for 1-2 d before examination and patients were fasted for 12 h before examination the electrodes were placed at the projective sites of antrum and body of stomach. The patient took 50 g of bread after recording for 10 min, then recorded for another 10 min.

RESULTS: The frequency of electrogastrogram showed obviously lower in the series of patients of gastric dysrhythmia syndrome and combined gastric ulcer, no obvious change in other series of gastric illnesses. The after meal amplitude of superficial atrophic gastritis, gastric cancer 1 and gastric dysrhythmia syndrome was lower than the before-meal amplitude, but the after-meal of other diseases, esp. dudenitis, hyperacid syndrome, duodenal ulcer, complex ulcer, was higher than before-meal amplitude ($P < 0.05$). In addition, normal gastric electric variation coefficient of amplitude was below 30%, in other diseases, the variation co-efficient of amplitude was above 40% some even reach 76%.

CONCLUSIONS: (1) There is no significance to evaluate mean value of frequency and its variation co-efficient, but more significant to evaluate the mean value and its variation co-efficient of electrogastrogram amplitude. (2) The slow waves about 3 times per minute were recorded on patients suffered from variant gastric diseases. It suggested that the slow waves of electrogastrogram could reflect the stimulating rhythm but not the gastric contraction strength. (3) The mean value of gastric electric amplitude had variation in several gastric diseases before and after meal. It suggested it could reflect the contraction strength of gastric muscles.

Key words: Electrogastrogram; Frequency; Amplitude

Lu YH. Value of electrogastrogram frequency and amplitude parameters. *World J Gastroenterol* 1996; 2(Suppl1): 89 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/89.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.89

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ABSTRACT

Clinical experimental study of therapy for gastric functional diseases by stimulation of gastric pace maker *via* abdominal surface

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Abstract

AIM: The aim of this paper was to make an investigation on the curative effect of the "gastrointestinal bioelectrical feedback therapy" (GBEFT) for gastric functional diseases, which had been built by the study of the animal model. The following was the 2nd stage of this study.

METHODS: Among 63 cases there were 14 cases of gastric dysrhythmia syndrome (GDS), 34 cases of gastric functional dysrhythmia (GFD) with CSG and 15 cases of GP. The average of their ages was 41.8 (11.2 years old) max. 70 years, min, 19 years. The patients were divided into 2 groups according to the frequency of the slow wave was made before and after the treatment. The frequency of treatment was (0.1-0.3 cpm higher than that of patient's EGG. The amplitude was lower than 400 (A. A course of treatment was 10 d. One time per day, 30 min per time. The position of surface electrodes were on the projection of the corpus ventriculi (cv) and antrum pyloricum (ap) pacemaker respectively. Negative electrode was on the cv pacemaker.

RESULTS: (1) After one course, the total effective rate of recovery or relief of symptoms of patients was 84.2%. (2) The changes of EGG parameters of 1 group of F < 3.0 cpm: parameters were markedly better than those before the treatment. The rate of better cases was 77.1% (26/360; B. group of F > 3.0 cpm: The rate of the better parameters cases was 75.8% (25/33), and the rate with normal value of EGG was 68.7% (22/32). (3) The total effective rate s of 16 cases, confirmed by gastroscope (or X-ray with barium meal), EGG and recovery of symptoms, were 75.0%, 81.3% and 93.8%, respectively. (4) The effective rate of long term: 11 cases after this therapy had no relapse after 6 mo. (5) In 17 cases not cured by medicine treatment for 1-20 years the effective rate was 70.6%.

CONCLUSION: Stimulation on the gastric pacemaker is effective for the treatment of gastric functional diseases, including gastroptosis.

Key words: Gastric functional diseases; Gastric pacemaker; Gastroptosis

Ouyang S, Zhang JZ. Clinical experimental study of therapy for gastric functional diseases by stimulation of gastric pace maker *via* abdominal surface. *World J Gastroenterol* 1996; 2(Suppl1): 90 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/90.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.90

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ABSTRACT

New investigation on wave from of electrogastrography

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Abstract

METHODS: Fourty two cases of patients suffering from bile-inducing gastritis, which were all diagnosed by X-ray or gastroscope, were examined by EGG through the method of both synthetical and segmental analysis. Some new indexes of EGG were used for the description of wave form. They were the difference of gastric phase (Dp), the rate of negative Dp, the area of frequency change and the difference of frequency and amplitude (△F, △A) of antrum pyloricum (AP) and corpus ventriculi (CV) or after and before meal in same part of stomach *et al*.

RESULTS: (1) The standard errors of Dp was from 3. to 4.7, which means Dp had a great separate degree; (2) The rate of negative Dp was from 0.225 to 0.420, which indicated the reverse gastroelectric activity occupying a large proportion. (3) The △A between AP and CV and △A after and before had significant changes; (4) Fourty of 42 cases were divided into two syndromes of TCM: incordination between liver and spleen-24 cases (57.1%) and depression of liver and deficiency of spleen-16 cases (38.1%); and (5) The analysis of new EGG indexes based on a conception of wholism of digestive system, which was similar to the view point of traditional Chinese medicine.

CONCLUSION: It is useful to make "synthetical" and "segmental" analysis for the wave form of EGG by the introduction of some new indexes. On the basis of this method, the physiological and pathological significance of EGG's wave form might be understood more deeply and it provided a effective method for the diagnosis and treatment of digestive diseases in the clinic of western or traditional Chinese medicine.

Key words: Investigation; Wave form; Electrogastrography

Ouyang S. New investigation on wave from of electrogastrography. *World J Gastroenterol* 1996; 2(Suppl1): 91 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/91.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.91

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ABSTRACT

Effects of rhizoma atractyl macrocephalae on small intestinal myoelectric activities in rats

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Author contributions: All authors contributed equally to the work.

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Abstract

AIM: The effect of 100% rhizoma atractyllodis macrocephalae (RAM) on the small intestinal myoelectric activities in waking rats was examined. The results suggested that RAM markedly facilitate the myoelectric activities, increase the spike discharge rate and the frequency of spike ($P < 0.01$); Increase the spike intensity and the rate of slow wave ($P < 0.05$). After pretreatment with atropine, exciting effect of a RAM on rat intestinal myoelectricity was weakened markedly.

CONCLUSION: The results indicate that RAM has an exciting effect on the small intestinal myoelectric activities in rats, which may be mediated *via* M receptor.

Key words: Rhizoma atractylodis macrocephalae; Small intestine; Myoelectric activities

Ma XS, Chen Z, Fan XP. Effects of rhizoma atractyl macrocephalae on small intestinal myoelectric activities in rats. *World J Gastroenterol* 1996; 2(Suppl1): 92 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/92.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.92

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ABSTRACT

Effects of H_2 blocker on EGG of duodenal ulcer patients

Ying Han, Ge Gao, Shu-Jin Xue, Shi-Rong Li

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Abstract

AIM: It has been supposed that high EGG amplitude might be associated with hyperacidity although the mechanism is not clear. The purpose of this study was to compare the EGG changes before and after the use of H_2 receptor blocker-cemitidine, in order to identify the relations of EGG changes and gastric acidity.

METHODS: 20 cases of duodenal ulcer (DU) diagnosed endoscopically were included with mean age of 43.8 years. (1) Antacid was discontinued for at least 24 h, and the subjects were fasted in the morning for EGG. (2) EGG was recorded with LMS-2B physiological recorder. After the basic EGG (fasting state) was recorder for 60 min. 0.4 g of cemitidine was injected intramuscularly. 30 min. later, EGG recording was continued for another 60 min.

RESULTS: (1) Frequency: basic and after treatment with cemitidine were 2.63 ± 0.5/min, and 2.86 ± 0.31/min), respectively (P < 0.001). (2) Amplitude: basic and after cemitidine were 428.90 ± 298.82 μV and 465.90 ± 313.63 μV, respectively (P < 0.001). Both the frequency and amplitude were slightly increased statistically, but the individual variation did exist.

CONCLUSION: Our study demonstrated that H_2 blocker failed to decrease the EGG frequency and amplitude and this phenomenon raise the controversial issue about the relation of hyperacidity and high amplitude of EGG.

Key words: Electrogastrogram; Cemitidine; H_2 blocker

Han Y, Gao G, Xue SJ, Li SR. Effects of H_2 blocker on EGG of duodenal ulcer patients. *World J Gastroenterol* 1996; 2(Suppl1): 93 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/93.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.93

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ABSTRACT

Correlation of superficial gastritis and motility disorders based on the findings of EGG

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Abstract

AIM: Gastroenterologists are often perplexed by the management of the patients with "superficial gastritis" (SG). One of the important reasons is that the term of SG is only an endoscopic finding. Whereas, the symptoms in different individuals are variable. Practically, the diagnosis based on the endoscopic findings could not satisfy the need of clinical practice. It is necessary to have the disorders subclassified according to further specific tests or examinations. The purpose of this study was to evaluate the correlation between the endoscopic findings and the EGG changes. Fourty two cases of SG diagnosed endoscopically was included. EGG was recorded with WCDF-gastrointestinal electrical analyzer (Anhui Aike Medical instruments Co. limited). Recordings from 4 leads (two reflect the body of the stomach, two the antrum) were calculated and analyzed.

RESULTS: In terms of Fc (frequency) 37 (88%) cases were found to be bradygastria, the remaining 5 were of within normal ranges. Of the 42 cases, 11 (26%) were noticed to be abnormal (8 of low amplitude, and 3 of high).

CONCLUSION: According to our study, most of the cases with SG suffered from gastric motility disorders esp. bradyrhythmia. Practically, Gastroenterologists should pay much attention to gastric motility function and, if possible, to do further examinations including EGG. EGG had better reference value in evaluating gastrointestinal motility function.

Key words: Superficial gastritis; Electrogastrogram

Han Y, Zhou JP, Gao G, Ji X, Li SR. Correlation of superficial gastritis and motility disorders based on the findings of EGG. *World J Gastroenterol* 1996; 2(Suppl1): 94 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/94.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.94

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ABSTRACT

Studies in patients with niddm by gastric emptying time and electrogastrogram

Kai-Guang Zhang, Yun-Biao Hu, Cheng-Dang Wang, Jian-Zhong Mo, Shao-Xian Wang, Shu-Dong Xiao

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Abstract

AIM: To investigate the gastric emptying and Electrogastrogram (EGG) in non insulin dependent diabetes mellitus (NIDDM) patients.

METHODS: Fourty eight patients with NIDDM were studied by gastric emptying time (GET) and EGG. Among them, 23 patients with uncontrolled blood glucose levels underwent both GET and EGG examinations, while 26 patients with controlled blood glucose levels were tested by EGG only. 20 normal subjects were selected as controls.

RESULTS: The emptying curve and T50 for liquid in NIDDM were similar to those in controls. However, T50 of solid in NIDDM was significantly longer than that in controls. AR and DR in two NIDDM groups were significantly higher than controls. But no significant difference were found between two NIDDM groups. There was poor correlation between GET and EGG.

CONCLUSION: Uncontrolled NIDDM had both delayed GET and abnormal pattern of EGG, blood glucose levels was not an important factor to arrhythmia. We can't predict a delayed GET by an abnormal EGG.

Key words: Diabetes mellitus; Electrogastrogram; Gastric emptying

Zhang KG, Hu YB, Wang CD, Mo JZ, Wang SX, Xiao SD. Studies in patients with niddm by gastric emptying time and electrogastrogram. *World J Gastroenterol* 1996; 2(Suppl1): 95 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/95.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.95

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ABSTRACT

Study on the relations between some common gastrointestinal disorders and testing results of electrogastrogram

Gui-Rong Ma, Sui-Cheng Guo, Jie Sun

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Abstract

AIM: The gastric electricity is closely related to the gastric motility.

METHODS: We observed indirectly the stomach states of 212 patients with enterogastritis and compare them with those of 36 normal subjects.

RESULTS: After analyzing 278 electrogastrograms of 248 cases, we are sure that, both on fed and fasting state, amplitude of these functional dyspepsia are lower, obviously those of healthy subjects on fasting state, the amplitude of gastric ulcer are either higher or lower than those of healthy subjects; On fed state, the amplitude of chronic gastritis are obviously higher than those of healthy subjects.

Key words: Gastrointestinal diseases; Electrogastrogram; Investigation

Ma GR, Guo SC, Sun J. Study on the relations between some common gastrointestinal disorders and testing results of electrogastrogram. *World J Gastroenterol* 1996; 2(Suppl1): 96 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/96.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.96

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ABSTRACT

Functionship of electrogastrogram in the diagnosis of GI diseases in children

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Abstract

AIM: To investigate the function of electrogastrogram in the diagnosis of GI diseases in children (EGG).

METHODS: 155 cases of children electrogastrogram (EGG), 200 cases of children electroenterogram (EEG) were, compared with those of adults.

RESULTS: The electrogastrogram and electroenterogram of children were similar to those of adults, the frequency and amplitude of the EGG were 2.73 ± 0.02 cpm and 147.16 ± 4.37 μV, respectively, the frequency and amplitude of EEG were 2.93 ± 0.04 cpm, and 244.49 ± 11.57 μV, respectively. In children enjoying sweet food, of abdominal pain and reflux, the frequency of EGG increased to 3.03 ± 0.04 cpm, its amplitude increased to 314.82 ± 6.57 μV ($P < 0.01$ compared to normal control), while in children of anorexia vomiting, the EGG frequency and amplitude reduced to 2.53 ± 0.08 cpm and 75.5 ± 6.19 μV, respectively esp. Changes in 2 lead. In children of pain and constipation, frequency and amplitude of EEG reduced obviously, to 2.65 ± 0.06 cpm and 109.05 ± 9.71 μV, the changes in 2 and 4 lead were more prominent.

CONCLUSION: EGG and EEG are easy to operate, noninvasive, no pain, and easy to be accepted by patients. Further research on them has practical value.

Key words: Electrogastrogram; Electroenterogram; Children

Zhang J, Chen D, Gao HY. Functionship of electrogastrogram in the diagnosis of GI diseases in children. *World J Gastroenterol* 1996; 2(Suppl1): 97 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/97.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.97

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ABSTRACT

Changes of duodenal myoelectric activity in experimental "Pi Xu" (weakness of spleen) tree shrews

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Author contributions: All authors contributed equally to the work.

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Abstract

AIM: "Pi Xu", or the weakness of spleen, has been investigated extensively in our laboratory, and several ("Pi Xu" animal models (in mice, rats and golden hamsters) have been established. The change of structure and function in the gut, digestive glands and the reproductive organ were studied. In order to explore the mechanisms of "Pi Xu" and obtain experimental evidence more close to pathologic status of human beings, the lowest primate animals tree shrews had been introduced into this field for the first time in our lab. More and more evidence shows that the myoelectric activity and motor activity of gastrointestinal tract change significantly in this syndrome. Here we investigated the changes of duodenal myoelectric activity in the experimental "Pi Xu" tree shrews.

METHODS: Fourty eight male tree shrews (Tupaia belangeri chinensis), 105-170 g, were divided into 2 groups in one groups infusodecoction of rhubarb (Rheum Palmatum L.et. R. Palmatum var, tanguticum Maxim) (2 g/100 g B.W./d) was given by gastrogavage to induce "Pi Xu", other group the same volume of water was given as control. On the 9th experimental day, in part of animal from each group bipolar electrodes were implanted on the serosal surface of duodenal bulb to record myoelectric activity after animals' recovering from the operation 2 d later. All animals were anesthetized to record myoelectric activity after absolute diet for 18-24 h. The rest "Pi Xu" animals were divided into other 3 groups: one was given (Sijunzitang), another was continuously given rhubarb, the rest was given water. On the 18th day, all animals were treated as above to record the myoelectric activity.

RESULTS: Our results showed in the "Pi-Xu" tree shrews, the slow wave frequency (SWF) of duodenal myoelectric activity increased significantly in animals treated with rhubarb for 18 d (31 ± 1 cycles/min, n = 5, P < 0.01), although there was no difference in SWF between "Pi Xu" group (21 ± 6 cycles/min, n = 5) and the control (22 ± 6 cycles/min, n = 5). The duration of phase 3 of interdigestive myoelectric complex (IDMEC) was 6.3 ± 2.7 min. In control tree shrews. In "Pi Xu" tree shrews, this duration (3.5 ± 0.7 min, n = 6) was greatly decreased compared with the controls (P < 0.05). Those treated with rhubarb for 18 d (1.6 ± 0.8 min, n = 5) did not differ significantly from "Pi Xu" animals but did differ greatly from the controls (P < 0.01).

CONCLUSION: All above suggested that the malfunction of intestine in the "Pi Xu" syndrome may partially result from the decrease of myoelectric activity in duodenum.

Key words: Duodenal myoelectric activity; "Pi-Xu" (weakness of spleen); Tree shrews

Gao XB, Zhang QY. Changes of duodenal myoelectric activity in experimental "Pi Xu" (weakness of spleen) tree shrews. *World J Gastroenterol* 1996; 2(Suppl1): 98 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/98.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.98

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ABSTRACT

Treatment of gastroparesis with gastroelectricity and omeprazole

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Abstract

AIM: Though the gastroparesis was common clinically, it was little reported in China. The main symptoms of it were vomiting, satiety, pain, loss of appetite. Under gastroscopy, peristalsis disappeared, fluid retarded in stomach and pylorus relaxed. In clinic, when the common treatment such as fasting, gastrointestinal decompression, correction of dehydration, disorder of electrolysis and acid base disturbance, *etc*., were less effective. The purpose was to provide guide for the treatment of gastroparesis.

METHODS: The gastroelectricity instrument was used, it was put in the pacemaker point of the body of stomach, to produce stimulus. Omeprazole was used to treat gastroparesis.

RESULTS: The stimulus produced by the gastroelectricity instrument could cause the stomach recover its peristalsis. Omeprazole treating was effective to gastroparesis.

CONCLUSION: We could gain excellent effect with gastroelectricity stimulus and omeprazole in treating gastroparesis.

Key words: Gastroparesis; Gastroelectricity; Omeprazole

Wu DW, Zhang SL, Liu GY. Treatment of gastroparesis with gastroelectricity and omeprazole. *World J Gastroenterol* 1996; 2(Suppl1): 99 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/99.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.99

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ABSTRACT

Experience in clinical application of electrogastrogram

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Abstract

AIM: It has been nearly 10 years to diagnose and treat gastropathy with the aid of electrogastrogram. Comparing with gastrophotography and gastrofiberscope in thirty thousand cases, electrogastrogram is one of the important methods on research for disorder of gastric motility. It also supplies certain information for gastric organic diseases. In order to improve the electrogastrography, 1 put forward proposals below: (1) Research and production of the apparatus should be integrated with clinical research. (2) According to experiences of clinical application, it is the best choice to produce single conductor electrogastrograph instead of intelligent type. (3) Only one explore electrode is needed. Routine test is only used before meal. For the observing norms. We should put stress on gastric rhythm. And (4) Electrogastrography is mostly applied to diagnosis and treatment of disorder of gastric motility.

Key words: Clinical application; Electrogastrogram

Li JS. Experience in clinical application of electrogastrogram. *World J Gastroenterol* 1996; 2(Suppl1): 100 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/100.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.100

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ABSTRACT

Effect of gastrointestinal peptides on gastric emptying of rats with experimental duodenal ulcer

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Abstract

AIM: To study the effect of gastrointestinal peptides on gastric emptying of rats with duodenal ulcer.

METHODS: Gastrointestinal peptides were made from gastrointestinal muscosa in newborn cows. Wistar rats were randomly divided into groups. With phenolsulfonaphthalin as a marker the rate of gastric emptying was counted. The ulcer index was measured.

RESULTS: The rate of gastric emptying in non-ulcer control group was 75.43 ± 7.82, and in ulcer control group 94.41 ± 9.34 ($P < 0.01$). Treatment group was 78.01 ± 9.26. Compared with ulcer control group, the rate of gastric emptying and ulcer index in treatment group were remarkably decreased ($P < 0.01$).

CONCLUSION: Gastrointestinal peptides can promote ulcer healing and delay gastric emptying.

Key words: Gastric emptying

Zhong XJ, Wu GY, Wang LH. Effect of gastrointestinal peptides on gastric emptying of rats with experimental duodenal ulcer. *World J Gastroenterol* 1996; 2(Suppl1): 101 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/101.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.101

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ABSTRACT

Changes of electrogastrogram in diabetes mellitus

Gang-Shi Wang, Zhi-Jie Liu, Lei Zhang, Hui-Zhen Lin

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Abstract

AIM: Gastrointestinal motility disturbances occur frequently in patients with diabetes mellitus (DM). Our study investigated the change of electrogastrogram (EEG) in DM patients, in order to study the gastric motility and its relation to upper gastrointestinal symptoms.

METHODS: Type 2 diabetic patients without hepatic, gallbladder, pancreatic and upper gastrointestinal diseases were selected randomly from in patients in endocrinology department. EEG was performed on patients fasted overnight (> 10 h) before and 2 h after breakfast.

RESULTS: (1) Patients with symptoms showed their Fp levels lower than normal range ($P < 0.01$). Fp levels showed no differences ($P > 0.05$) between pre and post prandial status. Ap levels were within the normal range. There existed differences of Ap and Fp levels between bulbitis duodena and corpus ventriculi ($P < 0.05$). (2) Patients without symptoms showed low pre prandial Fp levels. Post prandial Fp levels were significantly higher ($P < 0.05$) than pre prandial ones. Ap levels were within the normal range. (3) With regard to the Fp abnormality rates in bulbitis duodena, there existed differences (< 0.05) between patients with and without symptoms. And (4) The percentage of patients with duration of diabetes more than 10 years was higher ($P < 0.05$) in symptom group (55.54%) than that in non symptom group (29.0%).

CONCLUSION: EEG abnormalities, as bradygastria and stomach duodenal motility disorders, were common in type 2 diabetes, and was in correspondence with gastroparesis symptoms. To pay attention to the non symptom patients' gastric motor abnormalities, and to treat it as early as possible will be of benefit to the control of diabetes mellitus.

Key words: Electrogastrogram; Diabetes mellitus

Wang GS, Liu ZJ, Zhang L, Lin HZ. Changes of electrogastrogram in diabetes mellitus. *World J Gastroenterol* 1996; 2(Suppl1): 102 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/102.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.102

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ABSTRACT

Clinical application of EGG

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Abstract

AIM: To study the practical value of EGG in clinic diagnosis and therapy.

METHODS: In this study electrogastrogram (EGG) results of 3178 cases were reported.

RESULTS: There were totally 86 percent of positive rate. The coincidence rate of EGG, X-ray barium meal examination and fibergastroscopy was more than 85 percent in gastric ulcer and duodenal ulcer. The detectable rate of EGG was distinctly higher than that of X-ray barium meal examination in chronic superficial gastritis, and coincident with fibergastroscopy basically.

CONCLUSION: It was believed that EGG might be crucial examination in the diagnosis of gastric dysrhythmia syndrome. We believed that EGG was one of the important methods in the diagnosis and therapeutic evaluation of gastric and duodenal diseases following the development of medicine and electric technology.

Key words: Electrogastrogram; X-ray barium meal; Gastric dysrhythmia

Li SR. Clinical application of EGG. *World J Gastroenterol* 1996; 2(Suppl1): 103 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/103.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.103

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ABSTRACT

Analysis of electrogastrography of 718 patients with gastroduodenal diseases

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Abstract

AIM: The electrogastrogram of 718 cases of gastroduodenal diseases were studied.

RESULTS: The percentage of dysfunction of gastric motility was 64.17% (bradygastria 42.5% and transgastric 21.67%) in chronic gastritis and 50% in duodenitis. We observed bradygastria (68.48%) in gastric ulcer, and tachygastria (64.1%) in duodenal ulcer by electrogastrogram. The electrogastrogram also showed dysfunction of gastric motility (bradygastria 46.3%, and tachygastria 27.78%) in gastric carcinoma.

CONCLUSION: Our study suggested dysfunction of gastric motility was existed in gastroduodenal diseases, gastric ulcer was prominent with bradygastria and duodenal ulcer was with tachygastria.

Key words: Electrogastrography; Gastric motility; Gastroduodenal disease

Xiao JQ, Sun J, Zhou Y. Analysis of electrogastrography of 718 patients with gastroduodenal diseases. *World J Gastroenterol* 1996; 2(Suppl1): 104 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/104.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.104

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ABSTRACT

Observation on effect of acupuncture to smooth muscle electricity in dogs with weak gastrointestinal function

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Abstract

AIM: To study effect of acupuncture on smooth muscle electricity of gastric disease with weak spleen in dogs.

METHODS: Ten adult healthy hybrid dogs were used. A couple of 2 mm round silver electrodes were implanted on serosal surface over gastric antrum of dog model with gastric disease due to weak spleen to record smooth muscle electricity.

RESULTS: The fast wave of dog model with gastric disease due to weak spleen decreased pronouncedly or disappeared ($P < 0.05$); The frequency of gastric smooth muscle electricity was slowed down obviously with dysrhythmia. Four weeks after treated with acupuncture, the smooth muscle electric activity recovered to normal level, while fast wave of control group was lower than that of acupuncture group. The dysrhythmia and abnormal electric rhythm still existed.

CONCLUSION: Acupuncture has good effects in treatment of gastric diseases due to weak spleen. The gastric smooth muscle electricity is a good index of diagnosis, treatment and effect evaluation of gastric diseases.

Key words: Acupuncture; Smooth muscle electricity; Gastrointestinal function

Chen LP, Qin LC, Chen DZ. Observation on effect of acupuncture to smooth muscle electricity in dogs with weak gastrointestinal function. *World J Gastroenterol* 1996; 2(Suppl1): 105 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/105.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.105

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ABSTRACT

Analysis of the waves and parameters of EGG critical points of recognizing EGG

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Abstract

AIM: To study the significance in the analysis on electrogastrogram (EGG) of the inherent relationship and related parameter of wave form of clinic EGG (frequency and amplitude of wave form, rhythm of wave form-dispersing degree, comparison of pre and post prandial, *i.e.* power rate, special wave form), we collected 3650 cases of EGG recorded in 1993 through 1995. We attempt to explore a simple method of recognizing quickly EGG through analysis wave form and parameter of clinic EGG.

METHODS: (1) General data. Collect 3650 cases of EGG, male 2300 cases, female 1350 cases, age ranging from 16 to 70 years. (2) Examining method. Stop taking medicine for 2 d before examining, and EGG is tested on empty stomach in 8:00 to 11:00 a.m. Adapted EGG-2D2 type and EGG-5D2 type are the products of institute of Hefei Science Apparatus. EGG are recorded at gastric antrum and corpus in 5 to 10 min. Pre and post prandial (standard up meal: bread 50 g).

RESULTS: In 3650 cases of EGG, 18 cases with atrophic gastritis, 97 cases with ulcer activities, 65 cases with duodenal bulb inflammation, 32 cases with gastric cancer, 75 cases with hyper acid syndrome, 178 cases with ailment in stomach (including: the syndrome of stomach rhythmic disorder, bradygastria, tachygastria) are diagnosed.

CONCLUSION: We analyzed 3650 cases on clinic EGG and confirmed that critical parameters show valuable in judging EGG such as mentioned above. Classifying graphs (low frequency and high amplitude type, high frequency and amplitude type, high frequency and low amplitude type and gastric disorder type) largely promote the ability of recognizing clinic EGG, especially play an important part in the identifying relative graphs.

Key words: Weaves and parameters; Electrogastrogram

Huang SH, Xu GS. Analysis of the waves and parameters of EGG critical points of recognizing EGG. *World J Gastroenterol* 1996; 2(Suppl1): 106 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/106.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.106

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ABSTRACT

Study on duodenal electrical activity and duodenal motility in experimental spleen deficiency rats

Wei Wang, Rui-Yao Qu, Su-Mei Liu, Xiu-Qin Wang, Xiao-Bei Zeng, Hong-Wei Shang

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Abstract

AIM: In order to study the mechanism of spleen deficiency (SD), we observed the changes of electrical activity and motility of duodenum.

METHODS: Wistar rats (120-170 g) were divided into 4 groups: control group, spleen deficiency group, spontaneous recovered group, Sijunzi tang treated group. After establishment of animal model, the duodenoelectric activity and duodenal motility were detected.

RESULTS: (1) The rats have migrating myoelectric complex and migrating motor complex (MMC) in duodenum. (2) In SD rats, the frequency of slow waves (3.175 ± 0.228 c/min) was significantly lower than that of control rats (3.750 ± 0.228 c/min, $P < 0.001$); The amplitude of slow waves (0.795 ± 0.153 mV) was not significantly lower than that of the control rats (1.075 ± 0.595 mV, $P < 0.05$); And the activity of rats waves was obviously increased, and the duodenal motility was increased, the duration of MMC (9.876 ± 1.598 min) was obviously shorter than that of control group (12.720 ± 1.788 min, $P < 0.001$) and the amplitude of motility (0.980 ± 0.333 mV) was significantly higher than that of control group (0.370 ± 0.055, $P < 0.001$). After treatment with modified Sijunzi tang, the duodenoe lectric activity and duodenal motility were recovered to the levels of control. But in spontaneous treatment group, all activities were not recovered.

CONCLUSION: The increase in electrical activity of duodenum caused the strengthening of duodenal motility and later caused the weakening of absorption of duodenal motility and later caused the weakening of absorption of duodenum. This may be the mechanism of dyspepsia and emaciation in SD rats.

Key words: Duodenoelectric activity; Duodenal motility; Experimental spleen deficiency rats

Wang W, Qu RY, Liu SM, Wang XQ, Zeng XB, Shang HW. Study on duodenal electrical activity and duodenal motility in experimental spleen deficiency rats. *World J Gastroenterol* 1996; 2(Suppl1): 107 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/107.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.107

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ABSTRACT

Effect of propranolol on the small intestinal myoelectric activities increased by Fructus Aurantii Immaturus

De-Zhi Yang, Yi-Quan Wei, Zi-He Huang, Ai-Ling Ding

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Abstract

AIM: To study the mechanism by which Fructus Aurantii Immaturus increases the myoelectric activities of small intestine.

METHODS: The parameters of small intestinal electric activities of the fasted healthy and conscious dogs were recorded with electrophysiological technique and processed by microcomputer. At first, one cycle duration of interdigestive myoelectric complex (IDMC) recorded: On the fifth minute of phase 1 of IDMC, the concentrate solution (100%) of Fructus Aurantii Immaturus was perfused (1 mg/kg) into stomach, and propranolol (5 mg/10 mL) was perfused as soon as the action potential was induced. The other one or two cycle durations of IDMC should be recorded, too.

RESULTS: The cycle duration of IDMC in phase 1 was shortened and in phase 2 prolonged by Fructus Aurantii Immaturus. The effect could not be blocked by Propranolol.

CONCLUSION: The effect of Fructus Aurantii Immaturus may have no relation with β receptor.

Key words: Fructus aurantii; Propranolol; Small intestine

Yang DZ, Wei YQ, Huang ZH, Ding AL. Effect of propranolol on the small intestinal myoelectric activities increased by Fructus Aurantii Immaturus. *World J Gastroenterol* 1996; 2(Suppl1): 108 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/108.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.108

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ABSTRACT

Evaluation on the diagnosis of stomach functional disease with the electrogastrogram

Feng-Xin Guan, Bing-Sheng Han, Xiao-Zhou Yao

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Abstract

AIM: From 1986 to June 1990, we recorded 1412 pieces of electrogastrogram (EGG) among these, there were 216 cases with stomach functional disease.

METHODS: These 216 case were all checked by gastrofiberscope, except 37 cases were chronic surface gastritis, the rest had no organic disease.

RESULTS: 221 cases (98.15%) had the rhythmic disorder syndrome (GDS) in stomach. 3 cases had slow stomach rhythm with low tension, 2 vagus hypertension with hyperacidity. The amplitude was 18-720 μV and the frequency was 1.2-7.6/min, and the wave shapes were irregular.

CONCLUSION: EGG has important value in diagnosis of stomach functional diseases. EGG belongs to noninvasive examination, the patients accept it easily, and can be checked repeatedly, it shows the real state of stomach electrophysiology under physiological state. However, when we make diagnosis with EGG, we must make gastrofiberscope and biopsy in order to offer assistant evidence to EGG.

Key words: Electrogastrogram; Stomach function; Gastro-rhythm disorder

Guan FX, Han BS, Yao XZ. Evaluation on the diagnosis of stomach functional disease with the electrogastrogram. *World J Gastroenterol* 1996; 2(Suppl1): 109 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/109.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.109

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ABSTRACT

Specifide EGG wave figure in gastric and duodenal ulcer

De-Shan Wang, Li-De Zhang, Ji-Yan Chai, Yan Zhang, Ying-Ying Lu

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Abstract

AIM: This research compare the true diagnostic rate of using specific wave figure as standard for diagnosis of gastric and duodenal ulcer.

METHODS: Choosing 60 normal persons as control group. The patient group is 384 cases. Diagnosed by gastrofibroscope, gastric ulcer group included 98 cases, duodenal ulcer group 222 cases, other stomach disease 64 cases. The disease duration was half year to 24 years. The age of patients was between 22 to 68 years, 236 male, 148 female. The SC2C-B EGG machine was used to record EGG for 10 min both before meal and after meal. The following day after EGG recording, gastrofibroscope and pathology were performed to assure diagnosis. Then compare the result with that of EGG diagnosis.

RESULTS: Sine wave appeared in normal persons. The average wave amplitude and frequency recorded before meal were the same as those after meal. No high quick wave and high quick wave with protuberance appeared in normal persons. According to EGG diagnostic standard used now, gastric ulcer patients were 63, duodenal ulcer patients 151. Compared with gastrofibroscope and pathology diagnosis the coincident rate was 64% for gastric ulcer, 68% for duodenal ulcer.

CONCLUSION: The specific wave figure can be used as the standard for diagnosis of gastric ulcer and duodenal ulcer. It has clinical significance.

Wang DS, Zhang LD, Chai JY, Zhang Y, Lu YY. Specifide EGG wave figure in gastric and duodenal ulcer. *World J Gastroenterol* 1996; 2(Suppl1): 110 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/110.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.110

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ABSTRACT

Influence of fasting electrogastrograph in patients with functional dyspepsia using cisapride treatment

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Abstract

AIM: For determining the curative effect of cisapride (CIS) in treating functional dyspepsia (FD), we performed fasting electrogastrography (EGG) pre treatment and post treatment.

METHODS: Twenty seven cases of FD (M: 14; F: 13; Mean age: 45.3 years) were diagnosed by symptoms. All patients were exclusive of gastric carcinoma, peptic ulcer and hepatic, cholecystic, pancreatic diseases. These patients were randomly divided into two groups. Fifteen cases were treated by CIS 5 mg tid for 2 wk and other 12 cases as control group. Wave form and frequency of EGG were examined using WCDF-4B model machine at pre treatment and post treatment. The results should that main EGG expressions of FD were bradygastria. The effective rate of CIS group was 87% and that of control group was 17% ($P < 0.01$), EGG results after treatment showed that frequency of CIS group have become faster. Both body and antrum of the stomach FE, FC, FP were remarkably higher than that of pre treatment ($P < 0.01$). The mean amplitude (AP) also was significantly increased. The wave form become regular. There were no remarkably changes between pre-treatment and post treatment of control group.

CONCLUSION: Cisapride can improve gatroelectric activity, promote gastric emptying symptoms. Cisapride is an effective drug for functional dyspepsia.

Key words: Fasting; Electrogastrograph; Function dyspepsia; Cisapride

Feng YY, Xu RP, Wang Y. Influence of fasting electrogastrograph in patients with functional dyspepsia using cisapride treatment. *World J Gastroenterol* 1996; 2(Suppl1): 111 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/111.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.111

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ABSTRACT

Some characters of electrogastrogram in patients with peptic ulcer

Rui-Ping Xu, Yong-Yi Feng, You-Xue Wang, Xiao-Hui Yu

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Abstract

AIM: As a method of detecting the functional disease of the stomach and intestine electrogastrograph (EGG) has been accepted by more and more people. However, many people still doubt the accuracy of EGG for organic disease.

METHODS: In order to make out how accurate of EGG for diagnosis of peptic ulcer, we make some experiments with WCDF-4B model machine from February 1995 to February 1996. On the patients who were suspected to be suffering from peptic ulcer, we first finished EGG examination, then carrying out endoscopic examination by other doctors.

RESULTS: We found that the results were very similar between endoscopy and EGG ($P < 0.05$). This shows us the results of the 2 ways must be interrelated. With the results of gastroscopy as the standard, the sensitivity rate of EGG for PU was 90%; The accuracy rate was 78%; The positive estimate value was 67%; Negative estimate value was 55%. It is very sensitive to diagnose PU but is not accurate enough. We has also paid attention to characters of the wave form of EGG. Main expression were Mwaves (52%), high amplitude waves (20%), shivering waves (15%) and other wave forms (13%).

CONCLUSION: EGG is a suitable method to diagnose PU. Because of its convenience, low expense and noninvasive. It can be used as preliminary diagnosis and general investigation of PU.

Key words: Electrogastrograph; With peptic ulcer

Xu RP, Feng YY, Wang YX, Yu XH. Some characters of electrogastrogram in patients with peptic ulcer. *World J Gastroenterol* 1996; 2(Suppl1): 112 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/112.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.112

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ABSTRACT

Analysis of 21 cases with gastroduodenal diseases by electrogastrography

Yue-Xin Liu, Jun-Gun Xiong, Ming Wang, Hui-Fen Ding

Author contributions: All authors contributed equally to the work.

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Abstract

AIM: In order to evaluate the clinical values of EGG, the study of one hundred and ten cases with gastroduodenal diseases by EGG was carried out. This paper will report 21 cases with the complete clinical data, EGG and gastroduodenoscopy data at the same time.

METHODS: 21 cases with gastroduodenal diseases were studied. They were 47.3 years on the average. The manifestations are abnormal distention, satiety, nausea, sour regurgitation, eructation, and melena, uncomfortable or pain at the upper abnormal part. EGG, gastroduodenoscopy, gastric acid and biopsy for testing *Helicobacter pylori* were performed in each patient. The instrument WCDF3 was used for EGG. Before examination of EGG, all of them were forbidden to take any drugs or wine.

RESULTS: The results of EGG in 21 cases showed that Fp of 11 cases was < 2.0, Ap of 20 cases was normal, Ap of one case was abnormal. M value of 11 cases was less than 23, Fc of antrum of 9 cases was < 2.0. There was high frequency in nine cases, the highest level reached 24.4%. The high wave was seen in 2 cases with the gastric ulcer. The results of gastroduodenoscope: 10 cases with CSG + CEG, 3 cases with CSG, 2 cases with CAG, 2 cases with GU + CSG, 2 cases with DU + CSG, 2 cases with chronic verrucous gastritis.

Key words: Electrogastrography; Gastroduodenal disease; Gastroduodenoscopy

Liu YX, Xiong JG, Wang M, Ding HF. Analysis of 21 cases with gastroduodenal diseases by electrogastrography. *World J Gastroenterol* 1996; 2(Suppl1): 113 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/113.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.113

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ABSTRACT

Disorders of electrocolonogram spectrum in patients with chronic diarthea and constipation

Zhi-Cheng Lian, Xue-Fen Liang, Yong Chen

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Abstract

AIM: Few clinical applications of electrocolonogram (ECoG) as an index of motility have been reported. The aims were to observe the disorders of ECoG, main analyses of frequency spectrum (FS) in patients with chronic diarrhea and constipation and explore the possibility of ECoG as a means for identifying types of abnormal colonic motility.

METHODS: ECoGs of 110 patients with diseases of gastrointestinal tract (chronic gastritis, duodenitis and duodenal ulcer, chronic colitis and irritable bowel syndrome (IBS), 77 patients of other diseases (hyperthyroidism, myasthenia gravis) and 71 healthy adults were measured applying "The Detect analyzing System for Electric Activity of Gastrointestinal Tract". The electrodes were put on abdominal surface in projections of gastric antrum, ascending/descending/sigmoid colon. The fasting (20 min) and feeding (40 min) ECoG were recorded continuously. The running frequency spectrum of ECoG was analyzed by Fast Fourier Transform.

RESULTS: (1) In patients with loose stool, the electric activities of colon were lower or tended to be lower than normal, which suggested low colonic tension and weak local movement. (2) In patients of diarrhea with IBS, the electric activities of colon were higher or tended to be higher than normal, which suggested hyperfunction of colon. (3) In constipation patients, propulsive activities of colon were inhibited, which was termed as asthenic colon. (4) In patients of constipation with IBS, the activities of colon were lower than normal. But abnormal frequency exist in descending and sigmoid colon; Which may be related to disturbance of outlet.

CONCLUSION: ECoG examination and its spectrum might be used as a valuable means for identifying types of abnormal colonic motility in patients with chronic diarrhea and constipation.

Key words: Electrocologram spectrum; Chronic diarrhea; Constipation

Lian ZC, Liang XF, Chen Y. Disorders of electrocolonogram spectrum in patients with chronic diarthea and constipation. *World J Gastroenterol* 1996; 2(Suppl1): 114 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/114.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.114

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ABSTRACT

Clinical research of electrogastrography for the postoperative patients with chemotherapy

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Abstract

AIM: In order to observe chemotherapeutic effect on electrogastrography, 21 postoperative patients were examined by electrogastrography before and after chemotherapy.

METHODS: Electrogastrography was recorded on epigastrium of patients in fasting state before and after chemotherapy.

RESULTS: Before chemotherapy, there were 10 patients with bradygastria and frequency range was 1.60 ± 0.85 cpm, 6 patients with dysrhythmia and after chemotherapy, there were 15 patients with bradygastria and the frequency range was 1.26 ± 0.73 cpm, 5 patients with dysrhythmia. The wave amplitude was lower after chemotherapy than that before chemotherapy.

CONCLUSIONS: (1) Electrogastrographic rhythm was lower and irregular after operation of stomach. (2) Electrogastrographic frequency and amplitude declined after chemotherapy, and this result showed that chemotherapy inhibits gastric motility.

Key words: Electrogastrography; Postoperation; Chemotherapy

Guo RB, Wang YH, Zheng WY. Clinical research of electrogastrography for the postoperative patients with chemotherapy. *World J Gastroenterol* 1996; 2(Suppl1): 115 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/115.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.115

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ABSTRACT

Relationship of gastric lesion, *Hp* infection and EGG

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Abstract

AIM: 66 patients with endoscopic lesions (superficial gastritis 28, ulcerous gastritis 2, gastric or duodenal ulcer 35, and gastric cancer 1) were studied with mono polar EGG to observe FP/min and AP um, 59 of these patients had been examined for *Hp* infection, with results of positive in 35, and negative in 24.

RESULTS: The results showed AP is not correlative with the severity of gastric lesions ($P > 0.05$), but FP is closely related to the degree of lesions ($P < 0.05$). The authors consider that EGG is not dependable to differentiate hyperemia, ulceration and cancerous change, but it is useful in studying electricity dysrhythmia of stomach musculature. We observed that *Hp* infection apparently increased the amplitude of gastric electricity. This might explain that gastric retention is rare in *Hp* infection.

Key words: Gastric lesion; *Hp* infection; EGG

Wang XM. Relationship of gastric lesion, *Hp* infection and EGG. *World J Gastroenterol* 1996; 2(Suppl1): 116 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/116.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.116

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ABSTRACT

Study on clinical application of electrogastrogram

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Abstract

AIM: Perspective survey for nonulcer dyspepsia (NUD) group (20 cases), gastrointestinal operation group (20 cases), non operation group (20 cases) and normal control group (20 cases) by electrogastrogram (EGG).

METHODS: The non operation group and normal control group was routinely examined by EGG. The patients in operation group were examined both before operation and three days after operation, in each patient, the basic EGG took for about 15 min in the X-rays room with better environment of sound proof, the patients took 45% barium sulfate 150 mL by mouth in 5 min, and then EGG was recorded for 15 to 30 min under fluorescent screen of X-rays, at the same time, gastric peristaltic was continuously reexamined for 60 to 90 s.

RESULTS: Frequencies of EGG at fasting and after meal of normal control group were 2.96 ± 0.4 cycles/min and 3.04 ± 0.3 respectively; Amplitudes of that were 199.1 ± 22 μV and 263.3 ± 28.8 μV respectively; While no marked difference was found between nonoperation group and control ($P > 0.05$. Frequencies and amplitudes of NUD group were 2.95 ± 0.5 and 2.82 ± 0.1 cycles/min at fasting, 124.0 ± 25.6 and 89.2 ± 13.5 μ V after meal, respectively; In gastrointestinal operation group, the amplitude before operation (164.6 ± 32 and 258.8 ± 54 μV) exceeded greatly to that after operation (118.1 ± 44.6 μV and 119.5 ± 37.2 μV) ($P < 0.05$).

CONCLUSION: EGG reflects the state of gastric motility and tension. Operation, especially gastrointestinal operation may interfere gastric motility. EGG may be used for clinical diagnosis and evaluation of curative effect in gastric dysfunction disease.

Key words: Non-ulcer dyspepsia; Electrogastrogram; Gastric motility

Wang HY. Study on clinical application of electrogastrogram. *World J Gastroenterol* 1996; 2(Suppl1): 117 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/117.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.117

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ABSTRACT

Neural network based adaptive time frequency analysis of EGG signals

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Abstract

AIM: This abstract introduces our study work on Neural Network based Adaptive Time frequency Analysis of EGG signals, which aims at adaptively extracting time frequency (TF) information of EGG signals by parameters learning algorithm based on Neural network and providing better TF resolution without any cross term interference.

METHODS: Given an EGG signal Egg (*t*) and a base function g(t) $\subset LR^2$ which satisfies $\| g(t) \| = 1$, Egg (t) can be estimated by the following relation,

$$Egg(t) = \sum_{k=0}^{k-1} w—kg—Ip(k)(t) = \sum_{k=0}^{k-1} w—k \frac{1}{\sqrt{s(k)}} g\left(\frac{t-u(k)}{s(k)}\right) \cos(\xi(k)t + \theta(k)) \quad (1)$$

Where $IP(k) = \{s(k), u(k), \xi(k), \theta(k) \mid k = 0, 1, \cdots\cdots K\} \subset LR^+ \times R^3$ is the index parameter set which corresponds to scaling, shifting, center frequency and initial phase. $D = g—ip(k)$, With $\| g—ip(k) \| = 1$, forms the dictionary of time frequency atoms, which is a very redundant set of function in L^2 (R) that includes window Fourier frames and wavelet frames. W—*k* is the weight parameter set. Given the size of the index set and the weight set, *K*, and the approximation error, ε, we can adjust these two sets by neural network based learning algorithm so that $\| Egg(t) - Egg(t) \| < \varepsilon$.

Defining the least mean square (LMS) energy as

$$E = \frac{1}{2} \sum_{t=0}^{T-1} [Egg(t) - \hat{Egg}(t)]^2$$

one can learn the parameter sets by gradient algorithm, for example, $W^{i+1}—k = W^i—k - \alpha[(\partial E)/(\partial—k)]$, $S^{i+1}—k = S^i—k—\beta[(\partial E)/(\partial—k)]$. Where subscript i is the iteration time and α, β are the learning vectors. As soon as the desired estimation estimation of Egg (*t*), Egg(t), is obtained, the next work is to computer the TF energy distribution. Performing Wigner distribution on Egg (*t*) in terms of that

$$Egg(t) = \sum_{k=0}^{\infty} w—kg—IP(k) \text{ and } \| Egg(t) \| = \sum_{k=0}^{\infty} | wk |^2$$

We have

$$WEgg(t,\omega) = \sum_{k=0}^{\infty} | w—k |^2 wg—Ip(k)(t,\omega) + \sum_{k=0}^{\infty}\sum_{I=0}^{\infty} w— k \cdot w—1w[g—IP(k),\ g—IP(I)](t,\omega) \quad (2)$$

Because

$$\int_{-\infty}^{+\infty}\int_{-\infty}^{+\infty} wg—IP(k)\ (t,\omega)dtd\omega = \| g \|^2 = 1$$

we can define a new TF energy distribution of Egg (*t*) by removing the crossterms of (2) as

$$EEgg\ (t,\ \omega) = \frac{1}{2} \sum_{k=0}^{\infty} | w—k |^2 \cdot \left[wg\left(\frac{t-U—k}{S—k},\ S—k(\omega+\xi—k)\right) + wg\left(\frac{t-U—k}{S—k},\ S—k(\omega-\xi—k)\right) \right]$$

where wg (t, ω) is the Wigner distribution of the base function g (t). The TF energy distribution of Egg (*t*) statisfies

$$\int_{-\infty}^{+\infty}\int_{-\infty}^{+\infty} EEgg(t,\omega)\ dtd\omega = \| Egg \|^2$$

and its estimation is

$$EEgg\ (t,\ \omega) = \frac{1}{2} \sum_{k=0}^{k-1} | w—k |^2 \cdot \left[wg\left(\frac{t-U—k}{S—k},\ S—k(\omega+\xi—k)\right) + wg\left(\frac{t-U—k}{S—k},\ S—k(\omega-\xi—k)\right) \right]$$

RESULTS: The simulations are performed by taking morlet wavelet base on four typical EGG data, representing normal, Tachygastria, Bradygastria and Arrhythmia respectively, which are provided by the Baptist medical center in United States. The two of the gray images of the TF energy distribution of the four sets of data are shown as

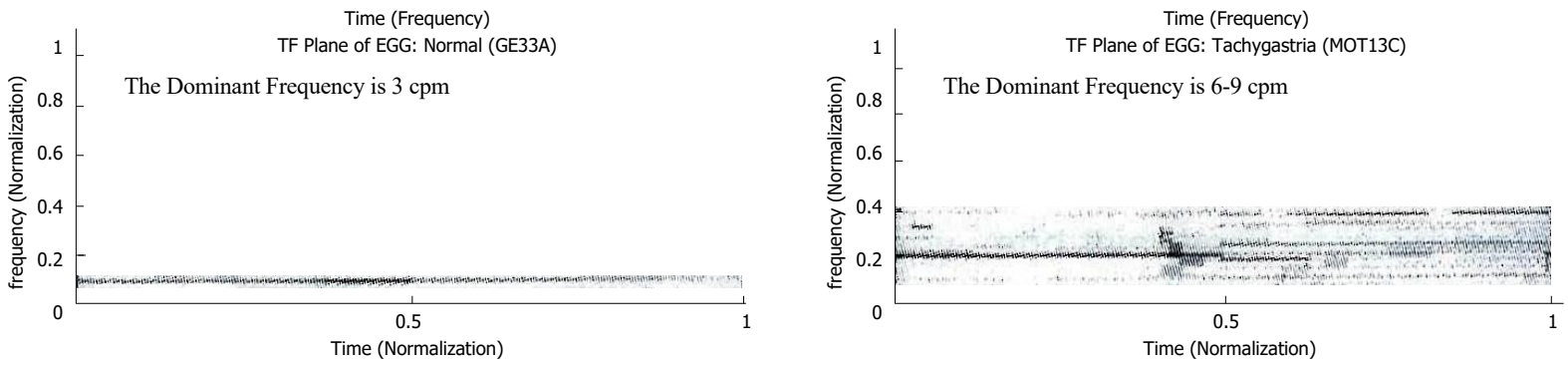

Figure 1 The two of the gray images of the time frequency energy distribution of the four sets of data.

follows (Figure 1).

Wang ZS, Li WH, He ZY, Chen JZ, Liang J, Yang DZ. Neural network based adaptive time frequency analysis of EGG signals. *World J Gastroenterol* 1996; 2(Suppl1): 118-119 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/118.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.118

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ABSTRACT

Neural network based noise cancellation of EGG signals

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Abstract

AIM: This abstract introduces our study work on Noise Cancellation of EGG Signals by Neural Network, which aims at removing noise from the noisy EGG signals.

METHODS: Noise cancellation can be considered as a mapping from noise included signal space to noise free one. In general, such a mapping is a complex nonlinear function. Although Volterra filter can perform nonlinear mapping, the processing procedure is very tedious and complicated because the number of the parameters resulting from Volterra series expansion increases exponentially with the series order. The multilayer perceptron can implementation complicated nonlinear mapping and specially the one required for performing the mapping from noise included to noise free space by some learning algorithm. And thus a complete noise cancellation system is formed. Such a system has a very good adaptive and robust property. As an example, we propose a four layers of perceptron model and analyze its mechanism to suppress noise. For a given four layers of perceptron, the transform from input to output can be divided into three subtransforme, *i.e.*, from input to the second layer and then to the third layer, fimally to output layer. Supposing X to denote N—0 dimensions of input EGG signal vector with noise, Z do N—1-D the second layer output vector, then

$Z = f(Y)$ $Y = WX + Q$

Where W is $N—0 \times N—1$-D weight matrix; Q is N-1 D threshold vector which is made of the thresholds of the second layer of neutrons; $F = \{f—i, N-1\}$ D vector function ($i = 1, 2..., N—1$). $f—i$ is defined as Sigmoid function, in the form

$(f—i)\{1/[1 + exp(-y—i)]\}$

One can perform singularity decomposition on W, *i.e.*

$W = UDV^T$

Where D is the diagonal matrix composed of singularities, $d-1 \geq d-2 \geq \ldots\ldots d_{N-1} \geq 0$; U, V are two orthogonal matrix made up of the left and right singularity vectors, respectively. It can be proved that the waveform corresponding to the singularity vector with large values is similar to that in the input signal X, while the waveform corresponding to the singularity vector with small values is similar to that of noise. Thus a part of the noise can be suppressed by the transform WX.

In the sub transform from the second layer to the third layer, nonlinear function, Sigmoid (.), play a prominent role. If the input consists only of noise, most of values from the output of the second layer are less than the threshold of Sigmoid and consequently the neutrons are in the restrained state. The output is very small and thus the noise is further suppressed.

If the transfer function of the network output layer is the same as that of the second layer or the third layer, so is the noise suppressed mechanism. If it is linear, the noise is suppressed at the same degree as is done by using WX.

After the these three sub transforms, the noise cancellation of the whole neural network from the input to the output is fulfilled.

RESULTS: The simulation is performed on three sets of noisy EGG data. The root mean errors are in Table 1.

Table 1 The Root Mean Errors

	GE33A	MOT13C	LINA	GE70A
RMSE	6.43	7.56	7.72	6.78

Wang ZS, Li WH, He ZY, Chen JZ, Liang J. Neural network based noise cancellation of EGG signals. *World J Gastroenterol* 1996; 2(Suppl1): 120 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/120.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.120

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ABSTRACT

Spike detection of gastric electrical activity by wavelet transform

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Abstract

AIM: A novel mathematical method of characteristic points detection is developed for detecting spikes from GEA (Gastric Electrical Activity) signals.

METHODS: A significant property of wavelet transform is that it well adapted for finding the location and the spatial distribution of singularities. We make use of this for detecting the spikes in GEA by using a quadratic spline wavelet, ψ (t), with compact support and one vanishing moment, which is a first derivative of a smooth function (a cubic spline). The Fourier transform of ψ (t) is given by

$\Psi(\omega) = i\omega Sac^4(\omega) = i\omega\,[sin(\omega/4)]/(\omega/4)\}^4$

Now one can find out the wavelet transform W[1]—SEgg(t) based on

W^1—$sEgg$ (t) = $IFT[Egg(\omega)\Psi(s\omega)]$

where IFT denotes the inverse Fourier transform. The simulation is done by constructing a GEA signal which is a synthesized wave with 3 cpm slow wave and the spikes imposed on the slow wave. The results are shown in the following Figure 1 where one can clearly see that two spikes are reflected into two local maximas of the wavelet transform |W[1]—SEgg(t)|. The further work is to investigate the general properties of the singular detection using wavelet transform for developing a robust method used detecting spikes from practical

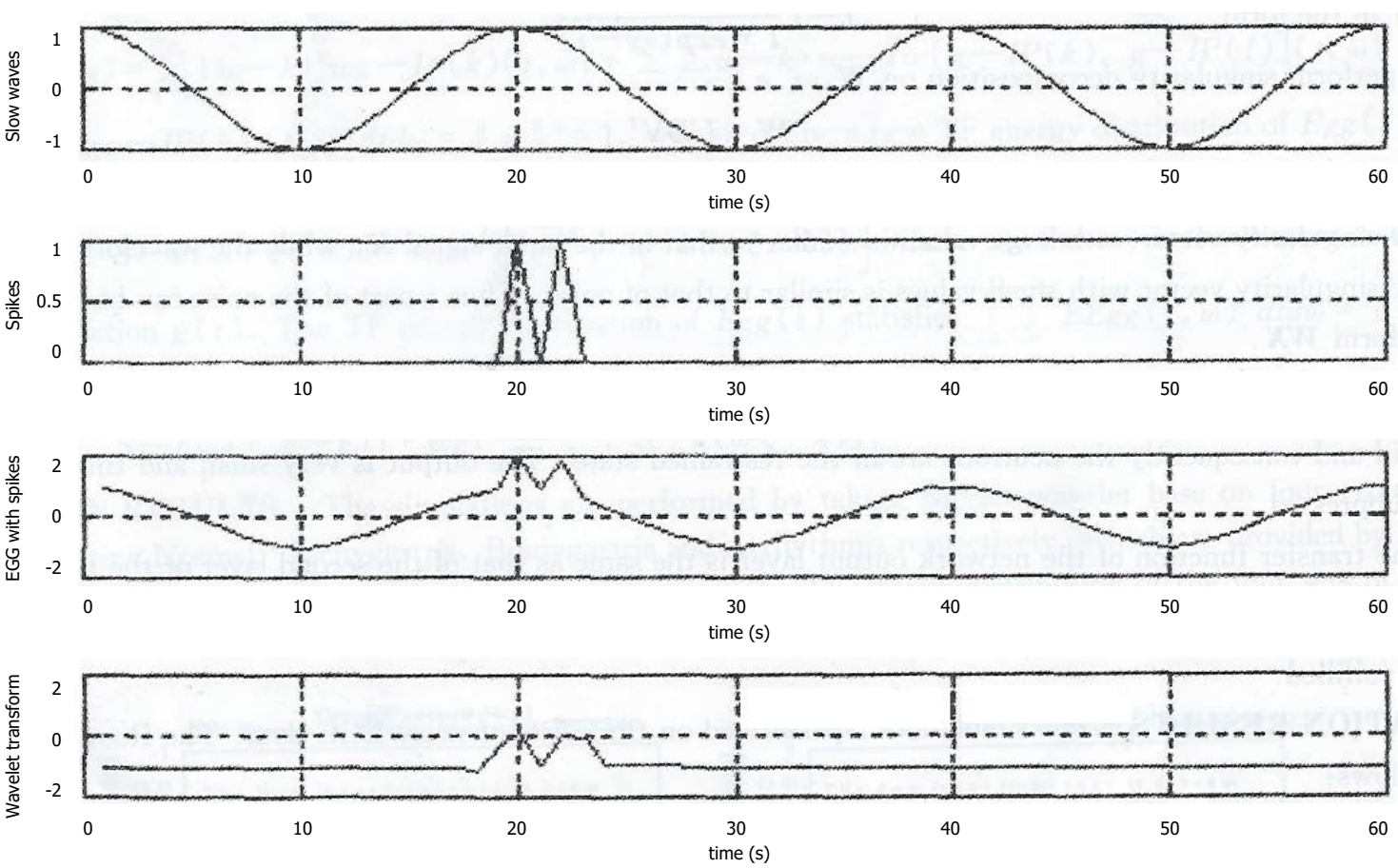

Figure 1 Two spikes are reflected into two local maximas of the wavelet transform |W1—SEgg(t)|

GEA signals.

Wang ZS, Li WH, He ZY, Chen JZ, Liang J. Spike detection of gastric electrical activity by wavelet transform. *World J Gastroenterol* 1996; 2(Suppl1): 121-122 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/121.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.121

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ABSTRACT

De-noising of electrogastrogram signals by wavelet shrinkage

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Abstract

AIM: This abstract introduces our study work on De-noising of electrogastrogram signals by wavelet shrinkage, which aims at removing noise from the noisy Electrogastrogram (EGG) signals.

METHODS: The noisy EGG signals are transformed into the wavelet domain using an orthogonal periodic wavelet transform based on Nearly Symmetric wavelets with 8 vanishing moments (S8). The wavelet coefficients are subjected to soft thresholding, $\theta—t(\omega) = \mathrm{sgn}(\omega)(|\omega|—t)—+$, with threshold $t—tn = (2\log(n)\sigma)^{-1/2}$. The results is then inverse transformed. If we let W—*S8* denote the wavelet transform with Symmlet 8 wavelets, the whole de noising process amounts to a nonlinear operator $T\theta$, *S8*(*Y*), where $T\theta$, *S8* = *W1—S8°*θ*—tn°W—S8.*

RESULTS: The computer simulation are performed for four typical sets of noisy EGG data (Table 1), which represents Normal, Tachygastria, Bradygastria and Arrhythmia (Figure 1), stored in files, GE33A, MOT13C, LINA and GE70A, respectively, Noisy signals and de-noised signals are illustrated in Figure 2. It is shown that the proposed method used de noising EGG signals is efficient.

Table 1 The computer simulation are performed for four typical sets of noisy Electrogastrogram data

	GE33A	MOT13C	LINA	GE70A
RMSE	9.9170	11.9289	11.2523	10.6053

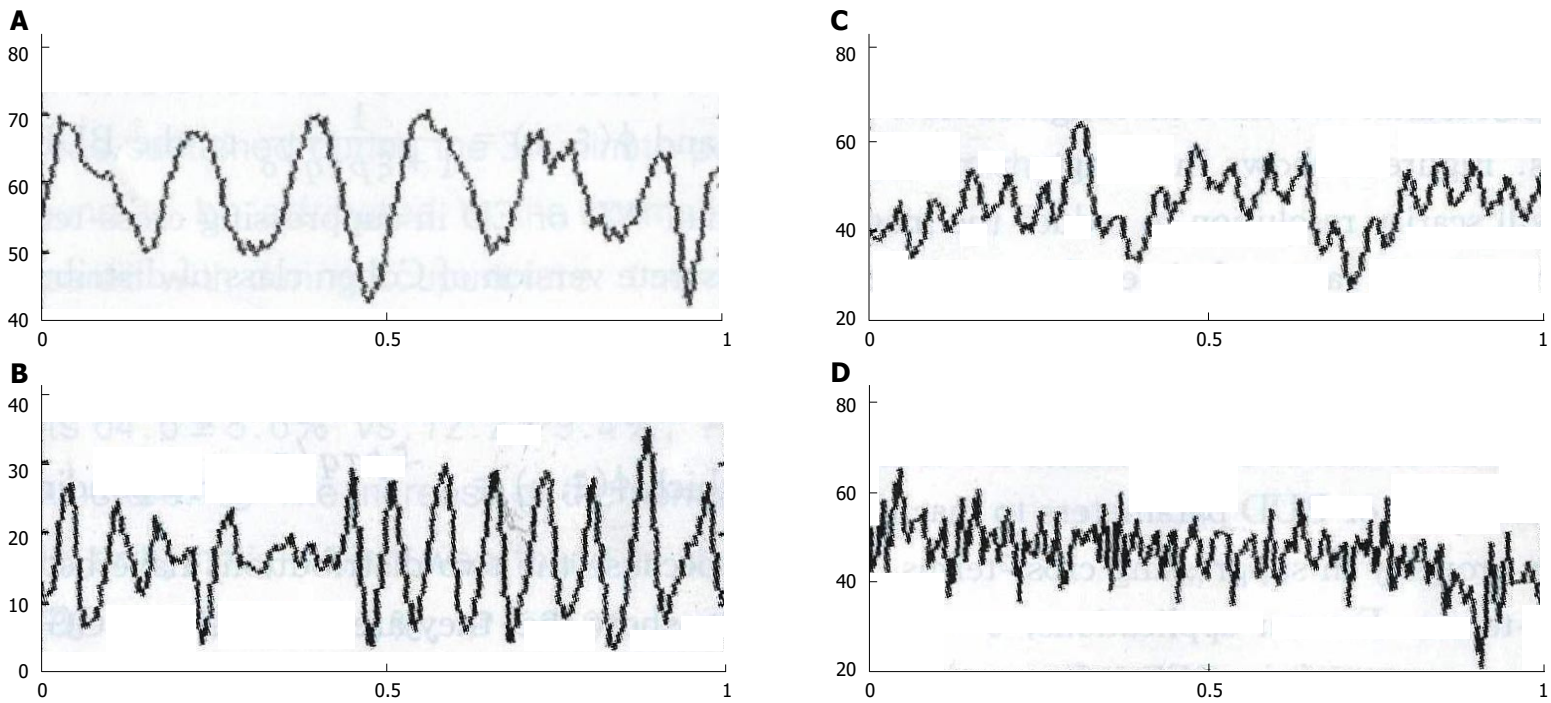

Figure 1 A: Noisy GE33A (Normal); B: Noisy MOT13C (Tachygastria); C: Noisy LINA (Bradygastria); D: Noisy GE70A (Arrhythmia).

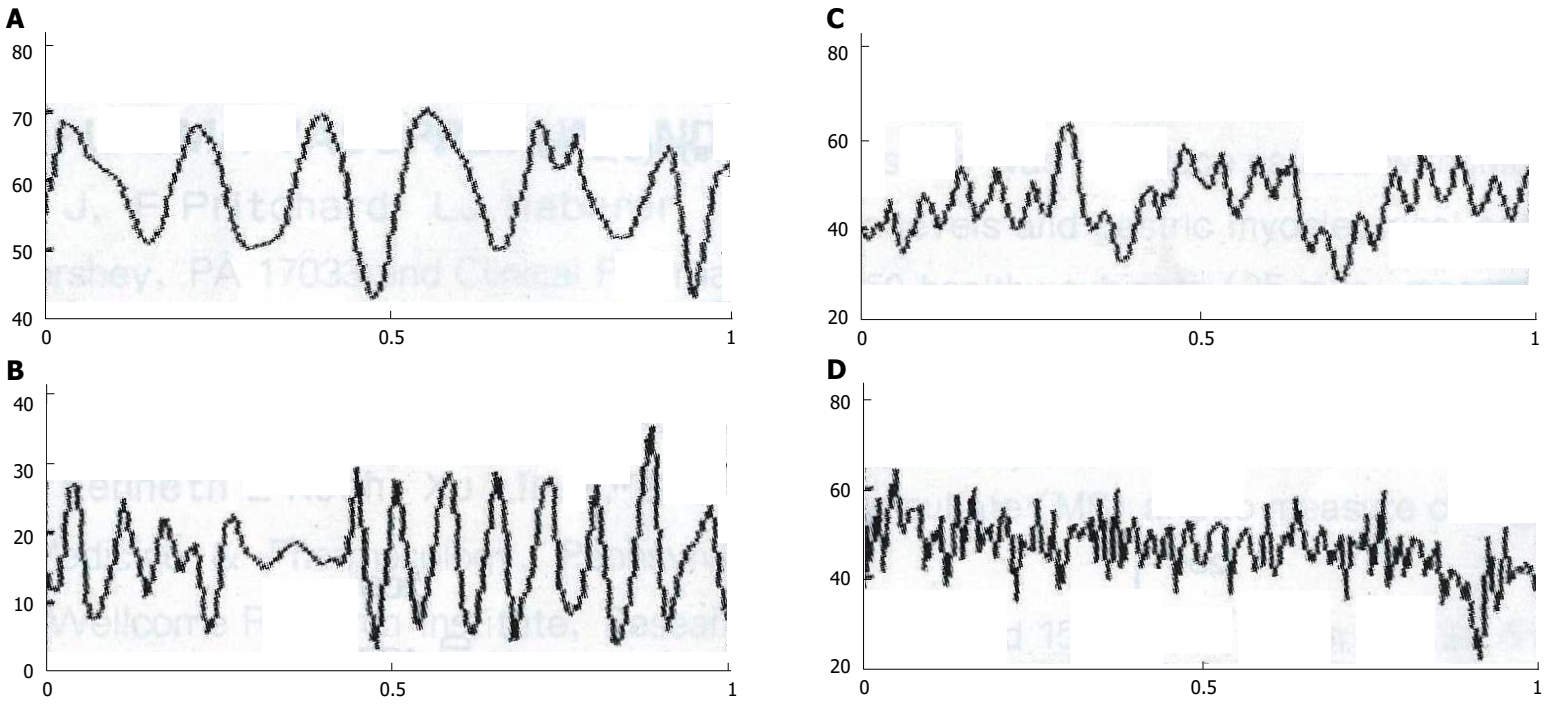

Figure 2 A: Denoisied GE33A; B: Denoisied MOT13C; C: Denoisied LINA; D: Denoisied GE70A.

Wang ZS, Li WH, He ZY, Jiande Z. Chen, Liang J. De-noising of electrogastrogram signals by wavelet shrinkage. *World J Gastroenterol* 1996; 2(Suppl1): 123-124 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/123.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.123

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ABSTRACT

Time-frequancy analysis of EGG signals by using GED and BUD

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Abstract

AIM: This abstract introduces our study work on Time-frequency Analysis of EGG Signals by Generalised Exponential Distribution (GED) and Butterworth Distribution (BUD), which aims at extracting more efficiently time-frequency characteristics from EGG signals with less cross-term interference, compared with Wigner Distribution.

METHODS: Now that the EGG signals are nonstationary, time-frequency representations (TFRs) becomes one of powerful tools used for analysing them. TFRs can be separated into two classes, *i.e.* linear TFRs and Quadratic TFRs. The well-known short-time Fourier transform (STFT), Gabor transform and newly proposed wavelet-transform (WT) belong to linear TFRs, while Wigner distribution (WD) and its smoothed versions, such as Chol William (exponential) disrtibution (CWD or ED) and its generalised version (GED) as well as Butterworth distribution (BUD) and so on belong to Quadratic TFRs. After making a profound investigation, we will focus on GED and BUD for our purpose. Quadratic Cohen class of distributions is defined as

$$CEgg(t,\omega;\phi)=\frac{1}{2\pi}\int\int\int -e^{-j(t\xi+\tau\omega-\mu\xi)}\phi(\xi\tau)\,Egg(\mu+\tau/2)\,\bar{E}gg(\mu-\tau/2)\,d\mu d\tau d\xi$$

where ω = frequency, $\phi(\xi, \tau)$ = kernel function, for example, $\phi(\xi, \tau) = 1$ corresponding to the WD, $\phi(\xi, \chi) = e^{-(\xi^2\tau^2/\sigma)}$ to the ED. Different kernel functions provide different properties to suppress cross-terms. We will focus on the two cases in which $\phi(\xi, \tau) = e^{-\xi p\tau q/\sigma}$ corresponding to the GED and $\phi(\xi, \tau) = 1/(1 + \xi p\tau q/\sigma)$ to the BUD (p, q = even integer), because the two distributions have better properties than WD or ED in suppressing cross-terms and our investigations show that they are suitable for EGG signals. The discrete version of Cohen class of distributions described above is given by

$$CEgg(kT,\omega;\phi)=\frac{1}{2\pi}\sum_{\tau=-\infty}^{+\infty}\sum_{\mu=-\infty}^{\infty}\left[\int_{-\pi}^{\pi} e^{-j(kT\xi+\tau\omega-\mu\xi)}\phi(\xi,\tau)d\xi\right]Egg(\mu+\tau)Egg(\mu-\tau)$$

The effects of the TFR parameters are crucial to the analysed results. We have investigated how to best or adaptively choose GED or BUD parameters to mach the EGG signals. Figure 1 shows that larger *p* or smaller σ will provide better property in suppressing cross-terms. But smaller σ will scarify resolution to reduce the magnitude of these same cross-terms. For our applications, σ = 0.1-1.0 is a better trade-off range. It is easily seen by comparing with ED that the property of the GED is better than that of the ED in suppressing corss-terms. The properties of the BUD approach the GED in trade-off between suppressing cross-terms and resolution, but the BUD has a closed representation while it is difficult to derive such a representation for the GED especially when *p* or *q* becomes larger. The some practical TFR simulations are performed by using BUD on the clinically recorded EGG signals and the same conclusion can be drawn.

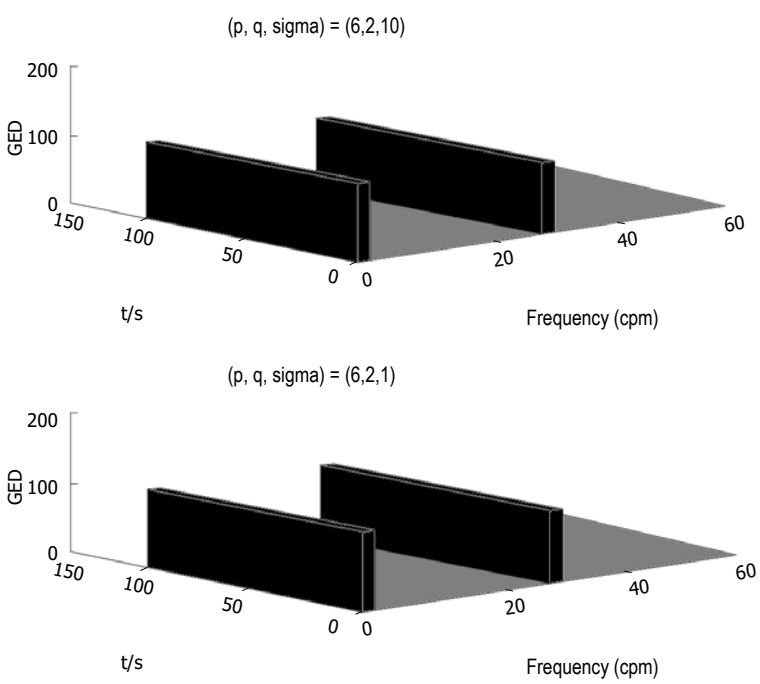

Figure 1 Magnitude of the Generalised Exponential Distribution for a signal composed of the sum of two sinusoids, $s(n) = A_{1e}^{jw1n}+A_{2e}^{jw2n}$, for (p, q) = (6, 2) and for a range of σ.

Wang ZS, Li WH, He ZY, Chen JZ, Liang J. Time-frequancy analysis of EGG signals by using GED and BUD. *World J Gastroenterol* 1996; 2(Suppl1): 125 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/125.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.125

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ABSTRACT

Effect of acupuncture on the regularity of gastric myoelectrical activity

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Abstract

AIM: Acupuncture has been shown to stimulate gastric motility. It can improve gastrointestinal motility and reduce the severity of symptoms of motion sickness. The aim of this study was to test our hypothesis that acupuncture enhances the regularity of gastric myoelectrical activity in humans.

METHODS: Nine healthy Chinese (5M, 4F, mean age 45) and seven Chinese patients with upper abdominal discomfort (1M, 6F, mean age 41) participated in this study. Gastric myoelectrical activity was recorded using surface eletrogastrography (EGG). The EGG recording was made for 30 min in the fasting state, 30 min during acupuncturing with Zusanli and Neiguan points being electrically stimulated continuously, and 30 min after acupuncture. The following parameters were analyzed: (1) the percentage of 2-4 cycles/min (cpm) waves, which reflects the regularity of the gastric myoelectrical activity; (2) Acupuncture significantly increased the percentage of gastric arrhythmia (no rhythmic activity), bradygastria (0.5-2 cpm), and tachygastria (4-9 cpm).

RESULTS: (1) The percentage of regular slow waves was found to be low in Chinese in comparison with that in American published in the literature, but no difference was noted between the two groups (64.8% ± 10.1% *vs* 64.6% ± 8.6%, normals *vs* patients). (2) Acupuncture significantly increased the percentage of 2-4 cpm in both groups (normal 64.8% ± 10.1% *vs* 74.8% ± 6.9%, $P < 0.05$; Patients 64.6% ± 8.6% *vs* 72.2% ± 9.4%, $P < 0.02$). This increase was sustained during the 30 min period after acupuncture. (3) The increase of the normal 2-4 cpm activity was found to be attributed to the normalization of gastric arrhythmia which was found in the baseline recording compared with during acupuncture (normals 26.9% ± 8.5% *vs* 10.8% ± 3.6%, $P < 0.01$; Patients 22.9% ± 6.6% *vs* 11.5% ± 4.1%, $P < 0.02$). (4) Acupuncture showed no significant effects on the percentage of tachygastria or bradygastria.

CONCLUSION: Acupuncture enhances the regularity of the gastric slow wave in both normals and patients by normalizing gastric arrhythmia.

Lin XM, Ren J, Liang J, Mu F, Zhang M, Chen JZ. Effect of acupuncture on the regularity of gastric myoelectrical activity. *World J Gastroenterol* 1996; 2(Suppl1): 126 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/126.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.126

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ABSTRACT

Morphine induced nausea: Relationship among gastric myoelectrical activity, plasma vasopressin and nausea

Kenneth L Koch, Li-Hua Xu, S. Bingaman, J Summy-Long, F Pritchard, LJ Haberer

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Abstract

AIM: Narcotic induced nausea is poorly understood and a major problem in many patients requiring pain control. The aim of this study was to induce nausea with infusion of morphine sulfate (MS) and to measure changes in plasma vasopressin levels and gastric myoelectrical activity.

METHODS: 50 healthy subjects (35 men, mean age 26.5 ± 8 years, and 15 women, mean age 24.5 ± 3 years) were given morphine (0.15 mg/kg *i.v.*). Nausea scores were recorded and blood samples were collected before and every 15 min after MS infusion for 180 min. If no nausea was reported after 60 min, then another 0.05 mg/kg of MS was given (max dose/subject was 15 mg). Plasma vasopressin (AVP) levels were measured by RIA. Nausea scores were recorded on a 1-10 scale (0 indicated no nausea and 10 severe nausea). Gastric myoelectrical activity was recorded by electrogastrography and the electrogastrograms (EGGs) were analyzed visually and by running spectral analysis.

RESULTS: Forty-two of 50 (84%) of the subjects developed nausea with scores from 1 to 10. AVP levels did not change from baseline in subjects who had no nausea despite receiving MS (n = 8). AVP increased significantly 15 to 30 min after the nausea was first reported, AVP levels correlated with the maximum nausea score (r = 0.42, P = 0.002), 3.6-9.9 cpm tachygastria activity correlated with the nausea score (r = 0.40, P = 0.004) and tachygastria activity also correlated positively with vasopressin levels (r = 0.40; P = 0.0004).

CONCLUSIONS: (1) Morphine infusion was a safe and efficient method to evoke moderate to severe nausea in healthy subjects; (2) Tachygastria and plasma vasopressin levels are objective physiological markers for that correlated with the intensity of opioid induced nausea, and (3) Whether plasma vasopressin causes tachygastria or tachygastria causes vasopressin release is a brain gut interaction that requires further study.

Koch KL, Xu LH, Bingaman S, Summy-Long J, Pritchard F, Haberer LJ. Morphine-induced nausea: relationship among gastric myoelectrical activity, plasma vasopressin and nausea. *World J Gastroenterol* 1996; 2(Suppl1): 127 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/127.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.127

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ABSTRACT

Interrelation between cutaneous electrogastrogram and interdigestive motor complex

Qin-A He, Ping He, Suo-Cheng Zhou, Yi-Ming Ren, Zi-Tan Feng, Cheng-Ming Gu, Yu-Jin Wang

Qin-A He, Ping He, Suo-Cheng Zhou, Yi-Ming Ren, Zi-Tan Feng, Cheng-Ming Gu, Yu-Jin Wang, Department of Gastroenterology, Bethune International Peace Hospital, Shijiazhuang 050082, Hebei Province, China

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Abstract

AIM: A cycle of electromechanical activity, called interdigestive myoelectric complex (IDMC) has been found in human gastrula and duodenum in fasting state. To record antrodudenal motility and cutaneous electrogastrogram (EGG) simultaneously is necessary during fasting to distinguish each phase of IDMC only by cutaneous EGG. The aim was to assess the value of cutaneous electrogastrography in detecting IDMC by examine the characteristics of cutaneous EGG in each phase of IDMC.

METHODS: In 29 patients with nonulcer dyspepsia and 8 patients with duodenal ulcer antroduodenal manometry was undergone by catheter perfusion technique in a fasting period of 3.5 h. In each phase of IDMC cutaneous EGG was the recorded for four hundred seconds. Frequency of EGG was not different among phase one, phase 2 and phase 3 of IDMC. Amplitude of EGG was the highest in phase 3, higher in phase 2 than in phase 1.

CONCLUSION: During interdigestive period, the frequency of EGG is relatively constant, the amplitude of EGG changes periodically, the periodicity is consistent with the periodicity of IDMC.

He QA, He P, Zhou SC, Ren YM, Feng ZT, Gu CM, Wang YJ. Interrelation between cutaneous electrogastrogram and interdigestive motor complex. *World J Gastroenterol* 1996; 2(Suppl1): 128 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/128.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.128

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ABSTRACT

Preliminary study of electrogastrogram in patients with carcinoma of stomach

Min-Sheng Zhang, Yang-Qing Feng, Zhi-Rong Cai, Mei Li

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Abstract

AIM: To investigate the electrogastrograms (EGG) of the patients with gastric cancer.

METHODS: The EGG were recorded with EGG 2B type electrogastrogram in 46 unoperated patients with carcinoma of stomach and 60 cases of healthy persons.

RESULTS: In the 46 patients, electrogastrograms of 27 cases (59%) were same as those of healthy persons; While rhythm disturbance, low frequency and amplitude were observed respectively in 14 patients (28%) and 6 patients (13%), which had significant difference compared with healthy control group.

CONCLUSION: This study showed that carcinoma of stomach could influence activity of stomach, the changes of EGG had no specificity.

Key words: Carcinoma of stomach; Electrogastrogram

Zhang MS, Feng YQ, Cai ZR, Li M. Preliminary study of electrogastrogram in patients with carcinoma of stomach. *World J Gastroenterol* 1996; 2(Suppl1): 129 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/129.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.129

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ABSTRACT

Study on gastric motility and gastrin, somatostatin epidermal growth factor with peptic ulcer disease before and after healing

Wen-Yao Zheng, Zhao-Hua Nie, Rong-Bin Guo, Xiao-Hua Sun

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Abstract

AIM: To investigate relationship between gastric motility and serum gastrin (GAS), somatostatin (SS), epidermal growth factor (EGF), motilin (MOT) levels of peptic ulcer disease before and after treatment.

METHODS: 42 patients with peptic ulcer and 24 patients with chronic superficial gastritis were studied. All patients were diagnosed with endoscopy. *Hp* was determined by radioimmunoassay. Among them, 19 patients were examined by electrogastrography (EGG).

RESULTS: The healing rate of DU was 86.1% after 4 wk treatment, the eradication rate of *Hp* was 88.8%. The levels of GAS, SS, EGF and MOT before treatment were significantly different from those after treatment. MOT is parallel with motility in DU. Increase of high frequency wave and mixture wave indicated that motility of stomach was increased. After healed, some hormone levels reduced to normal, while MOT and motility still abnormal. This indicated further treatment or observation were necessary.

CONCLUSION: Pathology of DU was related to not only the abnormal secretion and regulation of gut hormones, but also abnormal gastric motility. Before healing of DU the levels of GAS and MOT were higher, while SS, EGF were lower than those after healing of DU.

Key words: Gastric motility; Gastrin; Somatostatin; Epidermal growth factor; Peptic ulcer disease

Zheng WY, Nie ZH, Guo RB, Sun XH. Study on gastric motility and gastrin, somatostatin epidermal growth factor with peptic ulcer disease before and after healing. *World J Gastroenterol* 1996; 2(Suppl1): 130 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/130.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.130

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ABSTRACT

Evaluation of superficial intestinal electrogram in diagnosis of irritable bowel syndrome

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Abstract

AIM: Irritable bowel syndrome (IBS), one of the most common diseases of digestive system, is thought as an intestinal dysfunction disease. The purpose was to observe the specific changes of intestinal electrogram (IEG) in IBS and evaluate the significance of IEG in the diagnosis of IBS.

METHODS: The superficial IEG in 56 patients with IBS and 20 healthy controls was recorded by using model EGEG-5D computer system.

RESULTS: The IEG in patients with IBS had specific changes. The specific IBS IEG was the abnormal slow wave superiority waves that appeared 3 times per minute continuously and contained many complexes, and it had not been found in 20 controls.

CONCLUSION: This study showed that IEG had a useful function in the diagnosis of IBS.

Key words: Intestinal electrogram; Irritable bowel syndrome

Zheng ZX, Chen YL. Evaluation of superficial intestinal electrogram in diagnosis of irritable bowel syndrome. *World J Gastroenterol* 1996; 2(Suppl1): 131 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/131.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.131

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ABSTRACT

Application of non-invasive electro-physiologyical examination on the stomach and duodenal bulbur ulcer

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ABSTRACT

Study of the electrogastrograms and gastric emptying in nonulcer dyspepsia

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ABSTRACT

Clinical analysis of electrogastrograms of 102 aged cases

Mei-Zhen Zheng, Li-Ping Gan

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ABSTRACT

Electrogastrograms in 13 old cases with mental disorder

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Abstract

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ABSTRACT

Electrogastrograms of children with 4 types of spleen deficiency dyndrome

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ABSTRACT

Clinical analysis of electrogastrogram in 30 cases of gastrectomy patients

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Analysis of thirty cases in teenagers by electrogastrography

Jun-Guang Xiong, Yue-Xin Wang, Ming Wang, Hui-Fei Ding

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Effect on treatment of nude with prepulsid and electrogastrography predicting

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ABSTRACT

Imitating gastro bioelectric feedback to treat chronic gastritis

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ABSTRACT

Analysis of body surface localization of stomach by ultrasound

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ABSTRACT

Comparision of the lower esophageal sphincter in healthy young and eledrly subjects

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Abstract

AIM: Previous studies have shown that resting lower esophageal sphincter (LES) pressure and length of the intra-abdominal (IAL) segment of the LES are important factors in competency of gastroesophageal reflux barriers. However, the effect of aging on this barrier has not been systematically studied. The aim of this study was to determine what differences exist in the gastroesophageal reflux barrier between healthy young and elderly subjects.

METHODS: We studied 10 healthy young (mean age 33 ± 1.8 years) and 8 healthy elderly volunteers (mean age 74 ± 1.5 years) in supine position after overnight fasting. Manometry was performed according to the "rapid pull-through" (RPT) and "station pull-through" (SPT) technique and withdrawn from the stomach back into the esophagus at 0.5 cm increments every 10 s. A pneumograph was used concurrently and recorded at 10 mm/s. The total length (TL), intra-abdominal length (LAT), intra-thoracic length (ITL), and ratio of IAL to ITL were measured.

RESULTS: A comparison of the measurements of LES length between young and elderly are shown in Table 1.

CONCLUSIONS: (1) In both young and elderly, TL is similar; (2) IAL is shorter in healthy elderly subjects, the ratio of IAL to ITL was decreased in elderly compared to that of the young, possibly due to age-related physiologic changes. These finding may partially explain why GER is common in the elderly.

Table 1 Lower esophageal sphincter length (CM) Mean ± SE

	TL(RPT)	LT (SPT)	IAL	ITL	Ratio IAL/ITL
Elderly (n = 8)	3.3 ± 0.16	3.1 ± 0.24	1.3 ± 0.13	1.8 ± 0.20	0.8 ± 0.13
Young (n = 10)	3.6 ± 0.16	3.7 ± 0.19	2.4 ± 0.17	1.3 ± 0.06	1.9 ± 0.15
P value	> 0.05	> 0.05	< 0.01	> 0.05	< 0.01

TL: Total length; RPT: Rapid pull-through; SPT: Station pull-through; IAL: Intra-abdominal length; ITL: Intra-thoracic length

Key words: Elderly; Esophageal manometry

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ABSTRACT

Significance of functional esophagogram with a marshmallow bolus

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Abstract

AIM: To assess the role of marshmallow bolus for the evaluation of the esophageal symptoms and to compare the usefulness to March conventional esophagogram (CE) and functional esophagogram with a marshmallow bolus (FEMB).

METHODS: EEMB was undertaken in 54 patients (dysphagia 9 patients: globus symptom 14 patients; Chest pain 31 patients) and 10 healthy controls. The severity of dysmotility was graded as normal, mild, moderate, and severe grade according to hesitation or impaction of marshmallow bolus.

RESULTS: All healthy controls were normal both in CE and FEMB. Forty five percent of the FEMB were abnormal in patients with normal CE. All patients with normal FEMB was normal in CE. The symptom reproducibility was more common in patients with dysphagia (55%) than other groups ($P < 0.05$) and was more common in severe grade ($P < 0.05$). The severe grade and symptom reproducibility were more common in patients with non specific esophageal motor disorder than normal manometric study ($P < 0.05$).

CONCLUSION: Functional esophagogram with a marshmallow bolus is inexpensive, safe and is thought to be valuable as one of the diagnostic tools for esophageal motility disorders.

Key words: Functional esophagogram; Marshmallow bolus

Park HJ, Seo JK, Lee KS, Lee SI, Park IS. Significance of functional esophagogram with a marshmallow bolus. *World J Gastroenterol* 1996; 2(Suppl1): 143 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/143.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.143

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ABSTRACT

Reflux esophagitis in South Korea and it's relationship to hiatal hernia

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Abstract

AIM: We carried out this study to evaluate the prevalence of reflux esophagitis (RE) and/or hiatal hernia (HH) in Korea and to examine the relationship between endoscopic HH with and without concomitant esophagitis.

METHODS: This study was carried out prospectively in 1, 010 patients referred for upper gastrointestinal (UGI) endoscopy at Severance Hospital because of symptoms referable to the gastrointestinal tract from September 1994 to March 1996. The presence of HH was defined as a circular extension of the gastric mucosa of 2 cm or more above the diaphragmatic hiatus.

RESULTS: Hiatal hernia was found in 5.4%, reflux esophagitis 4.1%, duodenal ulcer (DU) 7.3%, and gastric ulcer (GU) 8.3%. The prevalence of HH but not RE appeared to be increased with age. Both HH and the degree of esophagitis on endoscopy. Duodenal ulcer was the most frequent concomitant finding among other gastrointestinal conditions.

CONCLUSION: The prevalence of RE and/or HH in South Korea is relatively lower, compared with peptic ulcer disease, and other reports from western countries. Our study confirms a close association between HH and RE.

Key words: Reflux esophagitis; Hiatal hernia

Park HJ, Yeom JS, Jung JK, Lee SI, Pard IS. Reflux esophagitis in South korea and it's relationship to hiatal hernia. *World J Gastroenterol* 1996; 2(Suppl1): 144 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/144.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.144

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ABSTRACT

Potential significance of midgastric transverse band and its relationship with gastric emptying in healthy subjects and functional dyspepsia

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Abstract

AIM: Although the existence of midgastric transverse band (MTB) has been described for many years, its physiological and pathophysiological roles remain unclear. The aim of this study was to explore the physiological significance of MTB and its relationship with gastric emptying in healthy subjects (HS) and patients with functional dyspepsia (FD).

METHODS: Eight HS ranging from 23-60 years and 19 cases of FD ranging from 15-78 years were investigated. A solid test meal consisting of fried EGG (490 Kcal, C:P:F = 4:1:5) labeled with 300 μci ^{99m}Tc-Sc was used and images were taken by ECT for 150 min after meal. The regions of interest of total, proximal and distal parts of the stomach were drawn according to MTB when antrum had a maximum filling.

RESULTS: The existence of MTB could be observed satisfactorily in all HS and FD by ECT imaging technique. (1) The percentages of gastric content remaining in total and proximal stomach at 150 min after meal were 18.0% ± 8.0%, 14.0% ± 7.3% in HS, and 41.3% ± 23.9% (P < 0.01), 30.9% ± 18.5% (P < 0.01) in FD, respectively. (2) Lag phase and T1/2 were 43.5 ± 9.5 min and 44.9 ± 13.4 min in HS and 60.9 ± 24.4 min (P < 0.01) and 73.9 ± 29.8 min (P < 0.01) in FD, respectively. (3) The width of MTB was 7.9 ± 2.4 cm in HS and 11.3 ± 4.7 cm in FD (P < 0.05). (4) The width of MTB was closely related to total gastric emptying (R = 0.63, P < 0.01) in HS but not in FD. (5) A very stable distribution pattern was found from 15-120 min during gastric emptying in healthy subjects but not in FD.

CONCLUSIONS: (1) MTB could be clearly demonstrated by ECT imaging technique. MTB may be a physiological functional maker in dividing the stomach into the proximal and distal. (2) MTB plays as a functional band in regulation of gastric emptying in HS, its dysfunction may be one cause of gastric dysmotility in functional dyspepsia.

Key words: Midgastric transverse band; Gastric emptying; Functional dyspepsia

Gu CM, Ke MY, Zhu ZH, Chen LB, Li F. Potential significance of midgastric transverse band and its relationship with gastric emptying in healthy subjects and functional dyspepsia. *World J Gastroenterol* 1996; 2(Suppl1): 145 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/145.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.145

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ABSTRACT

Temporal and spatial relationship of pylorus to antroduodenal motility during fasting and fed states in functional dyspepsia

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Abstract

AIM: To observe (1) the pyloric motility pattern during fasting and fed states, (2) its relationship to antroduodenal motility in functional dyspepsia (FD).

METHODS: We studied 9 healthy subjects (HS, range 23-60 years, mean 34 years) and 11 patients with FD (range 15-65 years, mean 41 years). An 8 channel Dent Sleeve catheter was positioned under fluoroscopy across antropyloroduodenal region. Pressure waves were recorded onto PC Polygraph (CTD) for 3 h of fasting and 2 h after ingestion of 40 g solid test meal (80 Kcal). Motility indexes were calculated as the area under curve with a build in computer program.

RESULTS: (1) The incidence of phase Ⅲ was 7/9 in HS and 5/11 in FD in antrum ($P < 0.05$), 8/9 and 5/11 in pylorus ($P < 0.05$), 9/9 and 5/11 in duodenum ($P < 0.01$), respectively. (2) Motility indexes of pylorus during phase Ⅰ, Ⅱ and Ⅲ of migrating motor complex (MMC) were 98 ± 81, 397 ± 195 (*vs* phase Ⅰ, $P < 0.01$), 1523 ± 1184 mmHg.s/min (*vs* phase Ⅱ, $P < 0.01$) in HS, and 130 ± 152, 372 ± 316 (*vs* phase Ⅰ, $P < 0.01$), 1366 ± 1473 mmHg.sec/min (*vs* phase Ⅱ, $P < 0.01$) in FD, respectively. (3) The percentage of isolated pyloric pressure waves (IPPW)during phase Ⅱ was 8.3% in HS and 20.4% in FD ($P < 0.001$). The percentage of IPP -Ws after meal was 20.1% in HS and 38.8% ($P < 0.01$) in FD. (4) The percentages of anterograde and retrograde contractions in the distal antrum during phase Ⅱ were 70% and 30% in HS, 30% and 70% in FD, respectively ($P < 0.01$). (5) The distal antral contractions occurred earlier than, simultaneous with, or later than closure of pylorus during phase Ⅱ were 78.8%, 12.9% and 8.2% in HS and 63.3% ($P < 0.05$), 26.7% ($P < 0.05$), 10% (NS) in FD, respectively. (6) The percentage of antropyloroduodenal contractions was 68.5% and 21.5% ($P < 0.001$) during phase Ⅱ, 63.3% and 36.7% ($P < 0.001$) after meal in HS and FD, respectively.

CONCLUSIONS: (1) The pyloric motility are closely related to MMC cycles. (2) Antral hypomotility, increase of pyloric resistence and antropyloroduodenal incoordination may be responsible for delayed gastric emptying in FD. The possible mechanism may be involved abnormal neural reflexes.

Key words: Antropyloroduodenal motility; Migrating motor complex ; Functional dyspepsia

Gu CM, Ke MY, Wang ZF, Sun Y. Temporal and spatial relationship of pylorus to antroduodenal motility during fasting and fed states in functional dyspepsia. *World J Gastroenterol* 1996; 2(Suppl1): 146 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/146.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.146

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ABSTRACT

Esophageal motor pattern during fasting and postprandial states in non severe reflux esophagitis

Hui-Min Liu, Mei-Yun Ke, Zhi-Feng Wang, Cheng-Ming Gu, Yuan-Fang Chen

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Abstract

AIM: It is well known that lower esophageal sphincter (LES) dysfunction is a key factor in development of gastroesophageal reflux disease (GERD), however, effective peristalsis is a critical determinant of esophageal acid clearance, The aims of our study were to investigate the LES pressure (LESP) and esophageal peristaltic function in patients with non severe reflux esophagitis (NSRE) during fasting and postprandial states.

METHODS: Ten patients with NSRE confirmed by endoscopy (grade Ⅰ and Ⅱ) and 10 age matched healthy subjects (HS) participated in this study. An upper gut manometry was performed with an 8 lumen Dent sleeve catheter through a capillary pneumohydraulic perfused system and polygraph. The catheter was positioned under fluoroscopy, 2 side holes at the antrum, 3 cm in interval, 3 side holes from the mid esophagus to distal esophagus, sleeve at LES area. Five hour recording was carried out, 3 h for fasting (migrating motor complex, MMC) and 2 h after meal. Swallows of water were used for evaluation of esophageal function.

RESULTS: (1) LESP during the phase Ⅰ, Ⅱ and of MMC were 23.3 ± 3.0, 29.2 ± 3.0, 53.4 ± 6.1 mmHg in HS and 16.1 ± 2.7, 30.5 ± 4.1, 43.4 ± 6.0 mmHg in NSRE. There were statistical significance among each phase in both group (P < 0.01). (2) LESP significantly decreased 1 h after meal in HS (11.75 ± 2.8 mmHg, *vs* phase Ⅰ, P < 0.01), but not in NSRE (13.75 ± 3.37 mmHg, P = 0.59). (3) Primary peristaltic velocity (PV) in fasting significantly decreased in NSRE when compared with HS at the mid esophagus (2.48 ± 0.30 cm/s *vs* 4.10 ± 0.86 cm/s, P < 0.01) and the distal esophagus (3.16 ± 0.10 cm/s *vs* 1.78 ± 0.27 cm/s, P < 0.01). (4) Peristaltic wave duration (D) was prolonged in NSRE compared with HS at the middle (4.77 ± 0.26 s *vs* 3.36 ± 0.18 s, P < 0.01), the distal 1 (4.55 ± 0.24 s *vs* 3.59 ± 0.16 s, P < 0.01) and the distal 2 esophagus (3.95 ± 0.28 s *vs* 3.31 ± 0.23 s, P = 0.08). Wave amplitude (A) and PV decreased 1 h after meal when compared with HS at the mid esophagus (54.8 ± 7.4 mmHg *vs* 70.0 ± 6.0 mmHg, P = 0.12), the distal 1 (78.0 ± 9.2 mmHg *vs* 110.2 ± 7.7 mmHg, P < 0.01) and the distal 2 (62.35 ± 11.2 mmHg *vs* 94.55 ± 7.81 mmHg, P < 0.05), which remained similar at the 2nd hour in both groups. (5) Incidence of peristaltic contraction following water swallows were 88% at the mid esophagus and 47% at the diatal esophagus in NSRE, 88% (NS) and 70% (P < 0.05) in HS, respectively.

CONCLUSIONS: (1) Variations of LESP were similar in HS and NSRE groups, LESP could be normal, even increased, influenced by MMC activity and meal. (2) The abnormal changes predominantly appeared at the distal esophagus in NSRE. Our data suggested that dysfunction of esophageal primary peristalsis may result in acid clearance delay and play a more important role in the pathogenesis of NSRE.

Key words: Reflux esophagitis; Esophageal manometry; Migrating motor complex

Liu HM, Ke MY, Wang ZF, Gu CM, Chen YF. Esophageal motor pattern during fasting and postprandial states in non-severe reflux esophagitis. *World J Gastroenterol* 1996; 2(Suppl1): 147 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/147.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.147

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ABSTRACT

Evaluation of manometry in 59 patients with esophageal diseases

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Abstract

AIM: Using the polygraph HR manometry examination system, features of esophageal manometry were studied in 12 healthy person and 59 patients with esophageal diseases. The results showed that 6 patients with achalasia had the characteristic manometry abnormality, in 28 patients with nonspecific esophageal motility disorders, main manometric features were simultaneous, retrograde, spontaneous and repetitive contractions and low amplitude. The response to wet swallows (> 30%) in patients with diffuse esophageal spasm was mainly simultaneous and repetitive contractions. In the site of the esophageal neoplasm, there were often high pressure and spasmatic changes, and generally secondary motility disorder of esophagus. We concluded that esophageal manometry was useful in the diagnosis of esophageal muscular diseases and helpful in early and differential diagnosis of cardiac diseases.

Key words: Esophageal manometry; Achalasia; DES; Esophageal carcinoma

Sui RL, Xu GM, Zhou DW. Evaluation of manometry in 59 patients with esophageal diseases. *World J Gastroenterol* 1996; 2(Suppl1): 148 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/148.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.148

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ABSTRACT

Esophageal manometric analysis of 23 patients with globus syndrome

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Abstract

AIM: Globus syndrome can be caused by many factors. Our aim is to study the features of esophageal manometry on patient with globus syndrome and to find the relations between globus syndrome and esophageal disorders, especially with dysfunction of esophageal motility.

METHODS: Studies were performed on 23 patients with globus syndrome consisting of 5 men and 18 women aged of 21-65 years and on 14 healthy normal subjects including 6 men and 8 women aged of 27-64 years. All the patients had stopped taking medicine three days and had fasted for four hours before examined. A 4 channel recorder from PC polygraph HR was adopted. LESP, peristaltic waves in esophageal body, UESP, length of UES, the residual pressure of UES relaxation, the duration of UES relaxation were recorded.

RESULTS: The mean UESP in 23 patients and 14 healthy subjects were respectively 55.3 ± 39.8 mmHg ($\bar{x}$ ± SD) and 53.1 ± 27.8 mmHg ($\bar{x}$ ± SD) (P > 0.05). The length of UES respectively 3.4 ± 1.0 cm ($\bar{x}$ ± SD) and 2.9 ± 1.1 cm ($\bar{x}$ ± SD) (P > 0.05). The duration of UES relaxation were 918.6 ± 416.3 msec ($\bar{x}$ ± SD and 745.0 ± 245.9 msec (P > 0.05). However, there are some special manifestations in patients with globes syndrome: 3 cases of hypertonicity of UES (UESP > 120 mmHg), 6 cases of hypotonicity of UES (UESP < 30 mmHg) and 5 cases of incomplete relaxation (the residual pressure of UES relaxation higher than 5 mmHg). The mean LESP of 23 patients and 14 healthy subjects were respectively 18.4 ± 0.3 mmHg ([AKx-D] ± SD) and 17.6 ± 7.6 mmHg ($\bar{x}$ ± SD) (P > 0.05). There were 15 of 23 patients (65.5%) being abnormal in the peristaltic waves in esophageal body and 3 of 14 healthy subjects (21.4%) being abnormal.

CONCLUSIONS: (1) Globus syndrome may manifest special manometric features as hypertonicity of UES, hypotonicity of UES and achalasia of UES. (2) Dysfunction of esophageal motility may be one of the causes of globus syndrome.

Key words: Globus syndrome; Esophageal manometry

Zhu YM, Zou L, Zhao LL, Zhao JT. An esophageal manometric analysis of 23 patients with globus syndrome. *World J Gastroenterol* 1996; 2(Suppl1): 149 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/149.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.149

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ABSTRACT

Observation of the small bowel transit time in non-ulcer dyspepsia patients

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Abstract

AIM: Non ulcer dyspepsia (NUD) patients often have abnormal gastrointestinal motility. It is the purpose of this study to investigate the motility of small bowel in patients with NUD.

METHODS: We have measured the small bowel transit time (SBTT) in 26 NUD patients by lactose hydrogen breath test (LHBT).

RESULTS: The results showed that the SBTT of NUD patients had no significant difference compared with the control ($0.10 < P < 0.20$), but the SBTT of 17 NUD patients was in normal extent, 6 was longer and 3 was short represent 65%, 23% and 12%, respectively, and the abnormal SBTT patterns had significant difference compared with the controls ($P < 0.001$, $P < 0.01$, respectively).

CONCLUSION: It is suggested that NUD patients not only have the abnormal motility of the upper gastrointestinal tract, but also have the disorders of the small bowel motility. Measuring of the small bowel motility will be helpful for further understanding the pathogenesis of NUD and guiding the rational clinical medical care.

Key words: Non-ulcer dyspepsia; Small bowel transit time; Lactose hydrogen breath test

Ren YM, He QA, Feng ZT. Observation of the small bowel transit time in non-ulcer dyspepsia patients. *World J Gastroenterol* 1996; 2(Suppl1): 150 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/150.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.150

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ABSTRACT

24-h intragastric pH rhythm in normal individuals and the influence of proton pump antagonists on intragastric pH levels and serum gastrin levels

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Abstract

AIM: This study reported the 24-h intragastric pH rhythm and the inhibitory effects of Lansoprazole and Omeprazole by oral administration on acid secretion and serum gastrin levels.

METHODS: 38 volunteers participated in the study, mean age 25.4 years old (22-37), male/female 26/12. All volunteers were with negative findings from all medical exams. The female volunteers were not in menstruation. The pH levels were recorded with portable pH recording equipment. The electrode was placed 5 cm below lower esophageal sphincter (LES). They were randomly provided with Lansoprazole 30 mg/d, Omeprazole 20 mg/d or placebo 1 tab/d. Gastrin determinations was performed with radioimmunoassay.

RESULTS: This study showed 24-h intragastric pH rhythm, and pH frequencies were divided into upright, supine, plateau and decline stages according to Fuch's method. Intragastric pH baseline is 1.63 ± 0.34, upright 1.58 ± 0.43, supine 2.17 ± 0.89, plateau 4.32 ± 1.23 and decline 3.57 ± 0.85. In this study, 31%-58% of volunteers had spontaneous reflux, which frequently occurred after midnight, total reflux time reached 180.18 ± 91.60 min. Individual reflux time was 22-108 min and pH value was 7.86 ± 0.65. This is possibly caused by pyloric relaxation due to vagal excitation at night. Acid inhibition of Lansoprazole was stronger than that of Omeprazole the pH > 3 time with Lansoprazole was significantly prolonged to 23.2 ± 6.22 h/d, whereas that with Omeprazole was 18.54 ± 3.14 h/d ($P < 0.05$). Proton pump antagonist could elevate serum gastrin levels, Lansoprazole was more significant than Omeprazole ($P < 0.05$).

CONCLUSION: This study demonstrated intragastric pH through determination of intragastric 24-h levels in 38 normal individuals it showed 31.58% of them had physiological spontaneous reflux at night. It also showed that Lansoprazole has stronger acid inhibition and feedback increase of serum gastrin level than those of Omeprazole.

Key words: Intragastric pH; Rhythm; Proton pump antagonists; Serum gastrin levels

Chen JQ, Xu LW, Zhang Y. 24-h intragastric pH rhythm in normal individuals and the influence of proton pump antagonists on intragastric pH levels and serum gastrin levels. *World J Gastroenterol* 1996; 2(Suppl1): 151 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/151.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.151

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ABSTRACT

Relationship between gallbladder motor function and automatic function, fasting plasma levels of cholecystokinin and motilin in liver cirrhosis

Wang-Ming Hu, Chao-Li Yin, Zai-Ying Lu, Hua Wu

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Abstract

AIM: To study gallbladder motor function in liver cirrhosis.

METHODS: Gallbladder motility function was measured by real time ultrasonography in 30 patients with cirrhosis and 20 normal subjects. Autonomic function was detected by heart rate variability (HRV) analysis and fasting plasma levels of cholecystokinin and motilin were measured by radioimmunoassay in cirrhotic and controls.

RESULTS: (1) Basal and residual gallbladder volumes were significantly higher in patients with cirrhosis than that in controls, gallbladder emptying time was markedly prolonged, and postprandial gallbladder contractile frequencies were significantly decreased in patients with cirrhosis compared to normal subjects $P < 0.001$. (2) Total power, very low frequency power, low frequency, and high frequency power (HF) IN 24 H HRV frequency domain measure were conspicuously reduced in cirrhotic compared to normal controls, respectively. (3) The patients with cirrhosis showed negative correlation between HF and fasting gallbladder volumes ($r = -0.44$, $P < 0.02$). An inverse correlation was also seen between HF and postprandial gallbladder contractile frequencies ($r = 0.62$, $P < 0.001$). (4) Fasting plasma levels of cholecystokinin and motilin were significantly higher in cirrhotic than in normal subjects, respectively.

CONCLUSION: There were gallbladder tension defect and motility abnormalities in patients with cirrhosis. The impaired autonomic function and abnormal metabolism of cholecystokinin and motilin were also seen in cirrhosis. The impaired autonomic function and abnormal metabolism of cholecystokinin and motilin were also seen in cirrhotic. It is likely that gallbladder motility abnormal control of cholecystokinin and motility in cirrhotic.

Key words: Gallbladder motility; Motilin; Cholecystokinin

Hu WM, Yin CL, Lu ZY, Wu H. Relationship between gallbladder motor function and automatic function, fasting plasma levels of cholecystokinin and motilin in liver cirrhosis. *World J Gastroenterol* 1996; 2(Suppl1): 152 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/152.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.152

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ABSTRACT

Effect of erythromycin on the motility of sphincter of Oddi in dog

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Abstract

AIM: The purpose of the present study was, first, to characterize the manometric pattern of the biliary tract (the sphincter of Oddi, SO) in dogs; Second, to evaluate the effect and mechanism of erythromycin (EM) on the motility of SO in dogs.

METHODS: Performance characteristics of the Low compliance pneumohydraulic-capillary infusion system were evaluated by two **METHODS:** (1) bench test, (2) biliary manometry in dogs. The results show that the appliance have high recording fidelity capable of studying on gut, such as esophagus, biliary tract.

RESULTS: The result show as follows: (1) Intravenous administration of EM (7 mg/kg/30 min) caused an excitatory action on the SO in dogs; Increasing the amplitude and duration of phasic contraction (18.8 ± 1.02 mmHg *vs* 14.9 ± 0.87 mmHg, $P < 0.001$; 0.53 ± 0.06 s *vs* 0.34 ± 0.04 s, $P < 0.001$, respectively); Reducing the frequency of phasic contraction (6.1 ± 0.35 cpm *vs* 14.2 ± 0.81 cpm, $P < 0.001$); Having no effect on basal pressure of SO (11 ± 0.60 mmHg *vs* 11 ± 0.80 mmHg, $P < 0.05$). (2) EM administration caused a significant increase in plasma motilin concentration in dogs ($P < 0.01$). A positive correlation ($r = 0.8332$, $P < 0.05$) was found between the amplitude of phasic contraction and peak plasma levels of motilin induced by EM. (3) Atropine completely inhibited the effects of EM on the SO motility and motilin release ($P < 0.01$ by ANOVA). Atropine administration reduced the basal pressure of SO. (4) The effect of EM on motility of SO was abolished by verapamil or glyceryl trinitrate. They also reduced the basal pressure of SO.

CONCLUSION: The finding indicated that the actions of EM on dog SO may be mediated by activating motilin receptor, stimulating the cholinergic pathway and inducing the release of endogenous motilin. EM had excitatory effect on SO, but it had no action on basal pressure of SO and EM reduced the frequency of phasic contractions. All of this may be of benefit to the gallbladder emptying.

Key words: Erythromycin; The sphincter of Oddi

Wang Y, Luo JY. Effect of erythromycin on the motility of sphincter of Oddi in dog. *World J Gastroenterol* 1996; 2(Suppl1): 153 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/153.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.153

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ABSTRACT

Characteristics of gastric and duodenal motility in patients with duodenal ulcer

Qin-A He, Suo-Cheng Zhou, Zi-Tan Feng, Cheng-Ming Gu, Ping He, Yi-Ming Ren, Qiao-Yun Song, Hong Du, Jie-Dong Liu

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Abstract

AIM: Gastric acid hypersecretion is a main mechanism in genesis of duodenal ulcer (DU). Rapid gastric emptying and impaired acid inhibition of gastric emptying has been reported in DU patients. It is possible that accelerated gastric emptying play a role in genesis of DU by increasing the effective acid load delivered to duodenum, our aim is to study the interdigestive and postcibal motility of gastrum and duodenum on DU patients.

METHODS: 11 DU patients and 12 healthy subjects were chose, gastric and duodenal intraluminal pressure was measured by catheter perfusion technique. Interdigestive motility was recorded for 3 h, postcibal motility was recorded for 1.5 h. Mean frequency, mean amplitude and motility index of antral and duodenal contraction were calculated in fasting and fed states, respectively. The number of phase three found and propagation patterns were recorded in interdigestive state.

RESULTS: In fasting state, the frequency of gastric antral contraction was higher in DU group than in healthy controls ($P < 0.05$), amplitude showed no difference, 41 phase three contraction was found in DU, only 18 phase 3 was fond in control group, the cycle of IDMC was shorter in DU than in healthy subjects, phase 3 with abnormal conduction (retrograde or not propagation, accounting for 70.7%) increased more in DU than in controls (27.8%).

CONCLUSION: Accelerated gastric antral motility is present in DU patients, manifested as increase of antral contraction number and shorting of IDMC cycle. Coordinate contraction of stomach and duodenum is impaired in DU, increased phase three number of abnormal conduction is one of its manifestations.

Key words: Gastric and duodenal motility; Duodenal ulcer

He QA, Zhou SC, Feng ZT, Gu CM, He P, Ren YM, Song QY, Du H, Liu JD. Characteristics of gastric and duodenal motility in patients with duodenal ulcer. *World J Gastroenterol* 1996; 2(Suppl1): 154 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/154.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.154

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ABSTRACT

Preliminary study on interdigestive and postprandial antroduodenal motility in patients with ulcer dyspepsia

Suo-Cheng Zhou, Qin-A He, Zi-Tan Feng, Jie-Dong Liu, Ping He, Hong Du

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Abstract

AIM: The pathophysiologic mechanisms of nonulcer dyspepsia (NUD) is still unclear, disturbed gastrointestinal motility has been proposed as a possible etiologic factor. The present study examined interdigestive and postcibal antroduodenal motility by manometry in NUD patients, assessed role of abnormal gastric and duodenal motility in the pathogenesis of NUD.

METHODS: 28 patients with NUD and thirteen healthy subjects entered the study. Each symptom was scored based on intensity and weekly frequency, total symptom score was calculated for each patient. Antroduodenal intraluminal pressure was measured by catheter perfusion technique. Interdigestive antroduodenal motility was recorded in all subjects for at least 3.5 h, a liquid standard test meal (300 mL, 200 cal) was then consumed, postcibal motility was recorded in 16 of 28 patients and all healthy controls over a period of 1.5 h. In each subject mean amplitude, mean number and motility index (MI) of antral and duodenal contraction was calculated.

RESULTS: In interdigestive cycle the third phase was not found in twelve of 28 patients with NUD, showing significant difference compared with one of 13 healthy control ($P < 0.05$). Mean amplitude, mean frequency and MI for interdigestive phase 2 and phase 3 had no difference between NUD patients and healthy controls ($P > 0.05$). The mean amplitude, mean number and MI of postprandial contractions for gastric antrum were lower in NUD patients than in healthy controls ($P < 0.05$), in 7 of 16 patients, postprandial antral MI fell below normal range defined in control group by Mean ± 1.96 SD (3.72-5.6). Total symptom score showed no difference between NUD with interdigestive phase 3 and NUD without phase 3, between NUD with decreased postcibal antral MI and with normal postcibal MI.

CONCLUSION: Motor disorders of gastrum and duodenum is present in some patients with NUD, manifested as absence or delay of phase three in interdigestive cycle and postprandial antral hypomotility, impaired motility is a possible etiologic factor, but it is not the sole factor in pathogenesis of NUD.

Key words: Interdigestive; Postprandial antroduodenal motility; Non-ulcer dyspepsia

Zhou SC, He QA, Feng ZT, Liu JD, He P, Du H. Preliminary study on interdigestive and postprandial antroduodenal motility in patients with ulcer dyspepsia. *World J Gastroenterol* 1996; 2(Suppl1): 155 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/155.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.155

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ABSTRACT

Epidemiology of symoptoms and multifactorial analysis of the efficiency of cisapride on functional dyspepsia

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Abstract

AIM: Functional dyspepsia is considered to be a group of chronic or recurring upper gastrointestinal symptoms. Although the concept of dyspepsia has been accepted by more and more doctors, there are different opinions of it. Moreover, the treatment of functional dyspepsia is still a challenge for the clinicians. In China 500 hospitals in 20 provinces or cities undertook a multicentre study to evaluate the epideminology of the symptoms of functional dyspepsia and to investigate the efficacy of cisapride.

METHODS: The study consisted of 8896 cases, including 4370 men and 4526 women, with a mean age of 42.3 years and a mean history of 16.5 mo (range 1-94). All patients consulted doctor because of one or more of the eight symptoms of epigastric distention, postprandial fullness, belching, early satiety, epigastric pain, poor appetite, nausea, and vomiting. Routine laboratory examination, ultrasonography, upper gastrointestinal endoscopy or GI showed no abnormalities. The severity and history of all the eight symptoms were carefully asked to evaluate the differences among the districts. Multifactorial analysis was used to study the relationship between the severity of the symptoms and sex, age, and history of the patients. Cisapride was given 5 mg three times daily. The efficacy was studied in 2 wk and 4 wk.

RESULTS: Epigastric distention was the most frequency chief complaint (89.7%), followed by postprandial fullness (87.7%), belching (74.7%), early satiety (63.2%), epigastric pain (57.8%), poor appetite (52.8%) and nausea (50.8%). Furthermore there were considerable overlap among these symptoms. The seriousness of the symptom correlated with the history. The longer the history, the more severe the symptoms ($P < 0.01$). Cisapride significantly reduced the severity of all symptoms after 2 wk of treatment, and the effect was more pronounced after 4 wk ($P < 0.01$). The more severe and longer history of the symptoms, the better efficacy of cisapride ($P < 0.01$). During the trial, had 1743 cases (19.6%) side effects, including loose stool (16.1%), increased peristaltic sound (12.9%), and transit spastic abdominal pain (5.2%). All these side effects were mild and needed no medical care.

CONCLUSION: The seven symptoms mentioned above were the most frequent chief complaints of Chinese functional dyspepsia patients. Cisapride was effective in the treatment of functional dyspepsia.

Key words: Epidemiology; Multifactorial analysis; Cisapride; Functional dyspepsia

Zou DW, Xu GM. Epidemiology of symoptoms and multifactorial analysis of the efficiency of cisapride on functional dyspepsia. *World J Gastroenterol* 1996; 2(Suppl1): 156 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/156.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.156

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ABSTRACT

Diagnosis and treatment of patients with suspected sphincter of Oddi dysfunction

Guo-Ming Xu, Duo-Wu Zou, Zhao-Shen Li, Zhen-Xing Sun, Ning Yin

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Abstract

AIM: The purpose of this study was to evaluate endoscopic manometry in the diagnosis of postcholecystectomy patients with recurrent biliary type abnormal pain and how frequently the manometric abnormalities are recorded, and to observe the outcome after ES in SOD patients with elevated basal sphincter pressure.

METHODS: The subjects were 60 post cholecystectomy patients with recurrent biliary type abnormal pain (male 23, female 37 age 45.23 ± 10.23). There were 20 cases with clinical type 1, 22 cases with type 2 and 18 cases with type 3. A triple lumen low compliance system was used to record the sphincter of Oddi basal pressure, phasic contraction frequency, amplitude and direction of wave propagation. Patients with basal sphincter pressure > 35 mmHg were randomly divided into 2 groups. One group was treated with ES, the other group was treated with sham ES. All of the patients were followed up.

RESULTS: The total prevalence of manometric abnormalities was 46.7%. The prevalence in type 1 was 90% which was higher than that in type 2 or type 3 ($P < 0.01$), 80% of the manometric abnormalities were sphincter of Oddi stenosis, and 10% of those were sphincter of Oddi dyskinesia. The prevalence in type 2 was 31.8%, including 13.7% with sphincter of Oddi stenosis and 18.1% with sphincter of Oddi dyskinesia. While the prevalence in type 3 was 6.7%, all were sphincter of Oddi dyskinesia. 3 to 18 mo followed up after ES, 91.7% patients with elevated basal sphincter pressure were free from symptoms which were higher than those of control ($P < 0.05$).

CONCLUSION: Sphincter of Oddi manometry has great value in the diagnosis of SOD, especially in type 1 patients, which can differentiate sphincter of Oddi stenosis from dyskinesia and guide the treatment. Furthermore the long term outcome after ES in patients with elevated basal sphincter pressure was satisfactory.

Key words: Sphincter; Oddi dysfunction

Xu GM, Zou DW, Li ZS, Sun ZX, Yin N. Diagnosis and treatment of patients with suspected sphincter of Oddi dysfunction. *World J Gastroenterol* 1996; 2(Suppl1): 157 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/157.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.157

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ABSTRACT

Effect of ranitidine plus cisapride and ranitidine with gastroesophageal reflux disease

Li Yang, Chao-Ying Li, Jun-Chao Wu, Yi-Ping Wang, Wei Wang

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Abstract

AIM: To investigate the effect of ranitidine and cisapride in gastroesophageal reflux disease (GERD) therapy.

METHODS: 42 patients, who having reflux symptom, 24-h esophagitis confirmed by endoscopy were randomized to two groups. One group was treated by ranitidine (300 mg, bid) plus cisapride (5 mg, tid) (R + C group, n = 25), another by ranitidine (300 mg, bid) (R group, n = 24) for 4 wk.

RESULTS: (1) The symptom relief rate was 88.00% in R + C group, 58.33% in R group (P < 0.05); (2) The effective rate of esophageal pH monitoring was 84.62%, 50.00% (P > 0.05).

CONCLUSION: The results indicate ranitidine plus cisapride is more effective than ranitidine for the treatment of GERD.

Key words: Ranitidine; Cisapride; Gastroesophageal reflux disease

Yang L, Li CY, Wu JC, Wang YP, Wang W. Effect of ranitidine plus cisapride and ranitidine with gastroesophageal reflux disease. *World J Gastroenterol* 1996; 2(Suppl1): 158 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/158.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.158

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ABSTRACT

Relation between OSAS and nocturnal GER and clinical utility of nasal CPAP on GER with OSAS

Xu Zhong, Zhi-Feng Wang, Xi-Zhen Huang, Mei-Yun Ke

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Abstract

AIM: The potential association of gastroesophageal reflux (GER) with obstructive sleep apnea syndrome (OSAS) has been noted and nasal continuos positive airway pressure (nCPAP) is thought to be able to reduce frequency and duration of the nocturnal reflux in this population by elevating the intraesophageal pressure. To confirm these clinical impressions, we performed two night study.

METHODS: On night one, we performed 18 h esophageal pH monitoring, esophageal pressure recording and polysonography (PSG) on 16 patients with snoring, daytime sleepiness and sleep related heartburn and regurgitation of gastric contents into the esophagus.

RESULTS: We confirmed 9 of the 16 patients with OSAS and precipitous drops in pH were frequently preceded by swallow (51.4%, control = 18.6%, $P < 0.005$), gross body movement (16.8%, control = 4.0%, $P < 0.005$), arousal (29.7%, control = 18.8%, $P < 0.038$) and apnea/hypopnea (37.6%, control = 26.7%, $P < 0.05$), the mean lowest esophageal pressure (-13.1 ± 8.7 mmHg) prior to pH drops was also significantly lower than during control periods (-8.7 ± 7.9 mmHg, $P < 0.005$). No significant association between GER and oxygen desaturation was identified. On night two, we administered nasal CPAP to 7 patients, and successfully treated apnea and desaturation in all of these subjects. In 6 of the 7 patients, there was also dramatic reduction in GER frequency and duration on night two. The mean percentage of time < 4 dropped from 14.6 ± 9.8 to 2.9 ± 3.9% ($P < 0.05$), the longest reflux duration dropped from 18.2 ± 8.2 to 5.3 ± 7.7 min ($P < 0.05$).

CONCLUSION: We conclude that: (1) OSAS is the predisposed factor to GER, there is significant association between GER and apnea/hypopnea, gross body movement, swallow and arousal; (2) nCPAP has significant therapeutic effects on OSA with nocturnal GER and maybe also on nocturnal GER patients without OSAS.

Key words: Obstructive sleep apnea syndrome; Nocturnal gastroesophageal reflux; Nasal continuos positive airway pressure

Zhong X, Wang ZF, Huang XZ, Ke MY. Relation between OSAS and nocturnal GER and clinical utility of nasal CPAP on GER with OSAS. *World J Gastroenterol* 1996; 2(Suppl1): 159 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/159.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.159

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ABSTRACT

Clinical application of gastroesophageal pH and electrocaridograph monitoring synchronously

Jun Gong, Jin-Yan Luo, Cong-Xun Zheng, Quan Zheng, Cong-Feng Guo, Song Zhang

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Abstract

AIM: Chest pain of esophageal origin is exactly like angina. According literatures, over half chest pain were caused by gastroesophageal reflux (GER). Most GER are acid reflux and some are alkaline reflux. It is difficult to diagnose alkaline reflux by esophageal single point pH monitoring only. Therefore, we applied esophageal and gastric two point pH monitoring as well as electrocardiograph record synchronously.

METHODS: pH sensor was made by antimony, and it was inserted through the nose. One pH sensor was positioned at 10 cm below the LES in the stomach and another pH sensor was positioned above the LES in the esophagus. Electrocardiograph recording using precardial leads. pH date was collected 5 s record of electrocardiograph synchronously. Finally, all the results were analysed by computer automatically. Eight cases were monitored, in which seven cases have chest pain and one case without any symptom.

RESULTS: Two cases with chest pain were proved to be related to acid reflux, electrocardiagram monitoring test was positive in one of them, but no effect when treated with nitroglycerin and having good result treated with PPI drug. It was found that this case was acid reflux (+) and electrocardiograph was normal by monitoring synchronously. Another case with alkaline reflux, pH rised from 6.5 to 8 in the esophagus and from 2.5 to 8 in the stomach in the same time and lasted for 40 min.

CONCLUSION: Gastroesophageal pH and electrocardiograph monitoring synchronously can be used to distinguish chest pain of esophageal or cardia origin, and it also can be used to distinguish acid from alkaline reflux.

Key words: Gastroesophageal reflux; Electrocardiagram; Monitoring

Gong J, Luo JY, Zheng CX, Zheng Q, Guo CF, Zhang S. Clinical application of gastroesophageal pH and electrocaridograph monitoring synchronously. *World J Gastroenterol* 1996; 2(Suppl1): 160 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/160.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.160

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ABSTRACT

Clinical study on colonic transit test in patients with chronic constipation

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Abstract

AIM: To clarify colonic motor abnormalities, westudied colonic transit time of patients with chronic constipation.

METHODS: Colonic transit time was carried out in 34 patients with chronic constipation and in 20 healthy subjects. Each subjects was asked to withdraw laxative from three days before to end of examination. 20 radiopaque markers were ingested at 8 am before the day of test, and plain abdominal films were obtained at 24, 48, 72 h. Living habits and diet structure were instructed not to be varied during the test. According to gas in the bowel and the anatomy structure of colon, the number of markers in segmentary and total colon was counted.

RESULTS: The normal colonic transit time was 20%, or less ingested markers still present after 72 h. By means of transit time study, 34 constipated patients were classified into 2 group: 12 normal transit patients and 22 slow transit patients. There was no difference in colonic transit time between normal transit patients and controls (P > 0.05). Patients with slow transit had more markers left in right colon, left colon and rectosigmoid colon at 48 h (4.23 ± 3.50 *vs* 0.65 ± 1.04, 6.46 ± 4.64 *vs* 0.90 ± 1.33 and 4.18 ± 3.03 *vs* 1.65 ± 2.32, P < 0.01, respectively) and 72 h (1.82 ± 2.44 *vs* 0.05 ± 0.22, 4.41 ± 3.26 *vs* 0.10 ± 0.31 and 5.91 ± 3.99, P < 0.01, respectively). According to the transit index, 22 slow transit patients were divided into 3 types: colonic stasis 10 cases, outlet obstruction 8 cases and colorectal stasis 4 cases.

CONCLUSION: The study suggested that chronic constipated patients have abnormalities of colonic transit.

Key words: Colonic transit test; Chronic constipation

Dai F, Luo JY, Gong J. Clinical study on colonic transit test in patients with chronic constipation. *World J Gastroenterol* 1996; 2(Suppl1): 161 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/161.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.161

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ABSTRACT

Study of 24-h gastric pH monitoring in the diagnosis of duodenal gastric reflux

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Abstract

AIM: Duodenogastric reflux (DGR) has been regarded a clinical pathophysiologic phenomenon associated with an etiology of various digestive tract disease, which is the result of reflux of duodenal contents into the stomach. At present, the radionuclide examination is the first choice for the diagnosis of DGR, but it is too expensive to spread.

METHODS: In this paper, 10 normal control and 30 chronic gastritic patients with symptoms of DGR were monitored by self developed gastric pH monitoring instrument for 24 h. The efficacy of 24-h gastric pH monitoring was compared with that of radionuclide examination for diagnosis of DGR and 24-h gastric pH was also compared among the normal control, chronic gastritis patients of DGR (+) and DGR (-). According our knowledge, simiar report has not been reported in China.

RESULTS: (1) Normal control group: One case DGR (+) was found by radionuclide examination, and no case DGR (+) was found by 24-h gastric pH monitoring. (2) Nineteen cases DGR (+) and nine cases DGR (-) were found by radionuclide and 24-h gastric pH monitoring. Two cases had different results. (3) Gastric acid pH type in three groups: (1) Normal control group, the time of pH ≤ 2 occupied 81.5% ± 1.6% of the study period, pH > 4, pH > 6 occupied 8.0% ± 0.4%, 3.4% ± 0.3%, respectively. (2) DGR (-) chronic gastritis group, when compared with control group, the percentage of pH ≤ 2 (31.4% ± 2.1%) decreased significantly (P < 0.01), pH > 4 (14.5% ± 0.2%) increased (P < 0.05). (3) DGR (+) gastritis group, when compared with DGR (-) gastritis group, the percentage of pH ≤ 2 (21.1% ± 3.3%) decreased (P < 0.05). pH > 4 (53.5% ± 4.8%), pH > 6 (23.3% ± 4.3%) increased significantly (P < 0.01).

CONCLUSIONS: (1) 24-h pH monitoring can diagnose DGR accurately. (2) The gastric pH is predominant acidic type in normal control group, acidic decreased type and acidic lacked type in DGR (-) and (+) gastritis group respectively.

Key words: Duodenogastric reflux; 24-h gastric pH monitoring; Radionuclide

Zhang J, Tan XL, Luo JY, Gong J. Study of 24-h gastric pH monitoring in the diagnosis of duodenal gastric reflux. *World J Gastroenterol* 1996; 2(Suppl1): 162 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/162.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.162

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ABSTRACT

Investigation of gastric emptying rate by ultrasonography

Xiong Qiu, Qin Ouyang, Chao-Xin Yuan, Lin Li

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Abstract

AIM: Although there were various methods for the investigation of gastric emptying their clinical applications were greatly limited because of their invasiveness or nonphysiological characters. Therefore, it is necessary to establish an accurate, safe, noninvasive and convenient method to determine gastric emptying rate for clinical usage.

METHODS: After taken a semi liquid test meal containing mainly sesame paste (304 Kcal, 500 mL), 19 patients with FD were examined by both scintigraphy and ultrasound (Antral volume method) simultaneously to determine gastric emptying rates and comparison of their correlation and advantages between each other.

RESULTS: 73.00 ± 20.04 min of GET 1/2, 153.88 ± 37.10 min of GET was found in former and 67.33 ± 21.20 min of GET 1/2, 144.30 ± 33.489 min of GET in latter. No significant difference could be found between these 2 methods ($P > 0.05$). The correlation of both gastric emptying rated at different time internal was analyzed. The result showed $r = 0.9981$, $P < 0.001$, implying an excellent correlation between 2 methods.

CONCLUSION: It indicated that semi liquid black sesame paste meal is an ideal test meal for both scintigraphic and ultrasonographic measurements of gastric emptying at the same time. The ultrasound gastric emptying determination supplies some quantitative data to reevaluating gastric emptying and can be used for evaluating the effectiveness of medication in dyspepsia.

Key words: Gastric emptying; Ultrasonography

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ABSTRACT

Gallbladder hypokinesia in patients with functional dyspepsia

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Abstract

AIM: Gallbladder and gastric emptying in response to a liquid meal as studied in 91 patients with functional dyspepsia (FD) and 30 normal subjects in order to know whether these patients present any alternation of gallbladder emptying and whether cisapride can improve the emptying.

METHODS: Serial real time ultrasonography scans were made before meal and every 20 (first hour) or 30 (second hour) min after meal for 2 h. Cisapride was to treat the patients with hypokinetic gallbladder emptying for 1-2 wk.

RESULTS: (1) Gallbladder ejection fractions (GBEF) of GD patients were much lower than that of normal subjects. The GBEF max was 64.8% ± 18.2% in FD group and 77.7% ± 16.1% in normal group (P < 0.001).30 patients (33.0%) were considered to have hypokinetic gallbladder emptying, as their GBEF 60′ AND GBEF max were 2SD above those of the normal subject group. (2) 25 patients with delayed gastric emptying 11 patients (44.0%) also showed hypokinetic gallbladder emptying. The $GBEF_{max}$ in patients with delayed gastric emptying was slight lower than in patients without it, but there was no statistical difference between the 2 groups. (3) The gallbladder emptying was improved in 33 of 30 patients with hypokinetic gallbladder emptying, treated with cisapride. $GBEF_{max}$ increased from 49.2% ± 19.4% to 63.3% ± 12.4% (P < 0.01). After treatment with cisapride, the symptoms of the patients were relieved. There were no statistical correlations between gallbladder and gastric emptying.

CONCLUSION: About one third patients with functional dyspepsia were found with hypokinetic gallbladder emptying, which may be one of the reasons of dyspepsia. It is effective and safe to treat these patients with cisapride.

Key words: Gallbladder hypokinesia; Functional dyspepsia

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ABSTRACT

Observation on the post-cholecystectomy gastric dynamics

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Abstract

AIM: Symptoms such as early satiety, abdominal distention and irregular abdominal pain are the common complaints from the post cholecystectomy patients. The symptoms are similar to those caused by motility abnormality. In order to understand the influence of cholecystectomy on gastric motor function, we observed the gastric emptying in 32 pts who underwent cholecystectomy 6 mo ago by means of real time ultrasonography.

METHODS: 32 post-cholecystectomy pts with no alimentary tract organic diseases or general diseases, M/F = 7/25, age group: 30-72.10 volunteers, healthy. All the examines stopped taking drugs which influence motility for 2 d, fasted for 12 h before examination. When examined, the individual drank 500 mL warm milk within 3 min in erect position, them received the ultrasonic detection (3.5 MHz probe HDI 3000 Doppler's ultrasonic diagnostic apparatus) to visualize the gastric wall and cavity. Using the vernier, the fundus, corpus and antrum were outlined to work out cross areas. The same procedure was repeated 30 min and 60 min after milk drinking, respectively. Then the emptying rate was worked out emptying rate = [(initial cross area tested cross area)/initial cross area] × 100%. Pts with early satiety, abdominal dissension and irregular abdominal pain took 5 mg Cisapride and 3 multi enzyme tablets, 3 times a day for 2 wk and then received the above procedure.

RESULTS: The gastric emptying in post cholecystectomy pts delayed as compared with the normal individuals. Fundus emptying delay occurred late and antrum emptying rate decreased significantly. After medication, the emptying rate and symptoms in 12 pts were improved to possible cause of alimentary tract symptoms in post cholecystectomy pts and that ultrasonic gastric emptying determination in noninvasive and convenient, especially the cross section method is accurate, simple and easy to perform.

Key words: Cholecystectomy; Gastric empty; B-ultrasonography

Xu LW, Zhang Y, Qin SM, Chen JQ. Observation on the post-cholecystectomy gastric dynamics. *World J Gastroenterol* 1996; 2(Suppl1): 165 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/165.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.165

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ABSTRACT

^{131}I-labeled bovine serum ablum: A valuable marker for solid in the measurement of gastric emptying

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Abstract

AIM: Various methods for measurement of gastric emptying have received widely study. In clinic, ^{99m}Tc-sulphur colloid (^{99m}Tc-Sc), ^{131}I fiber and ^{111}In-DAPA have been accepted as a valuable markers for digestive solid, non-digestive solid and liquid component respectively. However, half life period for ^{111}In is only 1.5 h which is so short that incur a problem for shipment, and non digestive marker of ^{131}I fiber cannot response for the physiological function of the gut. In this study, we investigated the validity of ^{131}I-bovine serum album (^{131}I-BSA), a possible candidate for digestive solid marker, together with ^{99m}Tc-DTPA as liquid marker in the determination of gastric emptying for solid and liquid simultaneously.

METHODS: *In vitro*, the solid phase of ^{131}I-BSA labeled EGG were incubated in human gastric juice (pH 2.0), 1 N NaCl (pH 7.0) and 0.1 N HCl (pH 1.0) over a period of 2 h for analysis of its stability. Stability for the liquid phase of ^{99m}Tc-DTPA and another solid phase of ^{99m}Tc-Sc were also studied in the same manner. *In* vivo, gastric emptying were measured using ^{131}I-BSA as solid marker and ^{99m}Tc-DTPA as liquid marker in 35 patients with chronic gastric (group CG) and 10 healthy controls (group HC) to explore the ability of a combination of these 2 labels in the distinguishment of solid and liquid emptying.

RESULTS: Gastric emptying patterns of solid and liquid showed significant difference: solid emptying showed an evidence of lag phase and a significant prolongation of half emptying time for solid than that for liquid. Comparing to group HC, group CG showed a prolongation of solid lag time in 14 patients, slower half solid emptying in 15 patients and retarded liquid emptying rate in 12 patients. Solid emptying parameters for ^{131}I-BSA were significant correlated to those for ^{99m}Tc-Sc (r = 0.989, P < 0.01). Variability of solid emptying for ^{131}I-BSA and ^{99m}Tc-Sc, showed a maximal difference of 9.2% and a minimal difference of 0.8%.

CONCLUSION: ^{131}I-BSA labeled EGG showed a higher stability in different solutions and had a pattern of emptying similar to that of ^{99m}Tc-Sc, suggesting that ^{131}I-BSA is a valuable digestive solid marker for detection of solid emptying. A combination of use of ^{131}I-BSA, ^{99m}Tc-Sc, and ^{111}In-EHIDA imultaneously in the measurement of gastric emptying and bile reflux is anticipated.

Key words: ^{131}I-labeled bovine serum album; Marker; Gastric emptying

Zeng JZ, Peng WH, Zhang WD. ^{131}I-labeled bovine serum ablum: A valuable marker for solid in the measurement of gastric emptying. *World J Gastroenterol* 1996; 2(Suppl1): 166 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/166.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.166

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ABSTRACT

Abnormal manometry findings in distal colon on patients with functional constipation

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Abstract

AIM: Functional constipation is considered to be a colonic motility disorder. The aims of this study are to find out the characteristics of intraluminal pressure changes and the gastrocolic reflex in functional constipated patients.

METHODS: Distal colonic manometry was performed on 16 constipated patients and 8 healthy volunteers. Each subjects had a standardized meal one hour after the recording start and the motility was recorded for two hours. Propulsive contractions and segmental contractions with amplitude > 10 mmHg were analyzed by CTD Synetics Colon analysis and divided in epochs of 30 min.

RESULTS: Two of the 8 healthy volunteers had propulsive contractions and none in the group of constipated patients. The second preprandial 30 min was considered to be basal state. The duration of peaks in proximal descending colon was in the postprandial 60-90 min epoch and the numbers of peaks and MT (Motility Index) of the sigmoid colon in 90-120 min postprandial epoch was significantly increased than the vasal state in the normal group ($P < 0.05$). In the group with functional constipation no significant increase was found. Compared with the normal group, the group with functional constipation had lower amplitude in proximal descending colon and sigmoid ($P < 0.05$). There were no difference in mean maximum resting pressure and length of the anal sphincter in the two groups.

Key words: Abnormal manometry; Distal colon; Functional constipation

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ABSTRACT

Effect of somatostatin on motility of human sphincter of Oddi

Guo-Ming Xu, Duo-Wu Zou, Zhao-Shen Li, Zhen-Xin Sun, Ning Yin

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Abstract

AIM: We undertook a clinical study using endoscopic manometry to investigate the effect of somatostatin on sphincter of Oddi.

METHODS: 20 subjects (7 male, 13 female) with a mean age of 51.32 ± 17.31 years (range 32-72), were referred to ERCP with no evidence of papillary or periampullary diseases. Patients were studied following a 12 hour fast. Diazepam (10 mg IM) was used exclusively for sedation and no other medication which might affect gastrointestinal motility was given. A triple lumen low compliance system was used to record basal pressure, phasic contraction frequency, amplitude, duration, direction of wave propagation of the sphincter of Oddi and common bile duct pressure before and 1 min after intravenous administration of somatostatin in a dose of 250 μg.

RESULTS: The mean latency period of action was 1 to 2 min and the duration ranged from 2 to 5 min. The basal pressure decreased in 16 subjects and the frequency of phasic contractions decreased in 14 subjects. The mean values of both criteria were greatly decrease ($P < 0.01$). The amplitude and duration of wave contraction and wave propagation sequence were not significantly influenced.

CONCLUSION: Somatostatin has an inhibitory effect on sphincter of Oddi motility, which may be helpful to the outflow of biliary and pancreatic juice.

Key words: Somatostatin; Motility; Sphincter of Oddi

Xu GM, Zou DW, Li ZS, Sun ZX, Yin N. Effect of somatostatin on motility of human sphincter of Oddi. *World J Gastroenterol* 1996; 2(Suppl1): 168 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/168.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.168

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ABSTRACT

Preliminary esophageal motility investigation of esophageal varices in liver cirrhosis

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Abstract

AIM: To investigate prospectively the effects of esophageal varices on esophageal function, we performed esophageal manometry on 19 cirrhotic patients with esophageal varices.

METHODS: 13 males and 6 females in patients, mean age 46 years. The type of cirrhosis was HBsAg (+) in 15, HCV-Ag (+) in 1, schistosomasis in 2, and alcoholic in 1. Hepatic function in accordance with child classification, 4 were grade A, 13 grade B, 2 grade C. The endoscopic evidence of varices: The 11 cases were mild, 5 cases middle, and 2 cases serious. 30 healthy volunteers were selected as controls.

RESULTS: (1) The mean resting pressure in esophageal variceal group was 21.5 ± 6.2 mmHg, and in control group was 18.7 ± 4.7 mmHg ($P > 0.05$). There were no significant difference in mild variceal patients between middle and serious variceal patients, and the same between non treatment group and EVS/EVL group. (2) Body of the esophagus:In the lower part of esophagus with varices showed a significantly decreased amplitude (PA), increase of the duration (PD) and the velocity (PV) of primary peristaltic waves with normal controls ($P < 0.05$). The values of PA, PD, PV in patients were 66.51 ± 34.0 mmHg, 38 ± 1.2 s, 4.3 ± 2.4 mmHg/s, respectively; While in volunteers were 90.2 ± 53.1 mmHg, 3.2 ± 0.6 s, 5.7 ± 2.1 mmHg/s, respectively. The results also showed the decreased PA and increase PD in middle and serious variceal group in comparison with mild variceal group. There was no significant difference among 6 cases treated by EVS or EVL and other 13 cases, the reason may be lack of sufficient patients.

CONCLUSION: In our opinion, the esophageal motility changes in liver cirrhosis patients with varices were the decreased PA, increase of PD and PV in lower part of esophagus, and the changes may be associated with the degree of esophageal dysfunction, and it is necessary to use prokinetic drugs for patients after EVS.

Key words: Esophageal motility; Esophageal varices; Liver cirrhosis

Song ZY, Tang QQ, Qian KD. Preliminary esophageal motility investigation of esophageal varices in liver cirrhosis. *World J Gastroenterol* 1996; 2(Suppl1): 169 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/169.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.169

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ABSTRACT

Effects of smoking on esophageal motility function

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Abstract

AIM: To study the relationship of smoking and esophageal motility disorder.

METHODS: From all 380 patients with digestive symptoms and esophageal manometry detection, we selected 2 groups to study: the smoking group consisted of 65 patients who have been smoking for at least 10 years, the non smoking control group consisted of 89 patients. All subjects were detected by pneumohydrolic 4 channel catheter infused by sterile water with a rate of 0.6 mL/min. Lower esophageal sphincter (LESP), esophageal body motility and upper esophageal sphincter (UES) function were recorded and analyzed.

RESULTS: (1) In smoking group, the abnormal manometric rate was 92.3%; In control group, the abnormal manometric rate was 76.4%. The difference between the 2 values was statistically significant (χ^2 test: $P < 0.05$). (2) The frequency of low LESP in esophagitis and non esophagitis group was respectively 56.9%, 33.7% ($P < 0.01$); The frequency of low amplitude of esophageal body contractions was respectively 36.9%, 15.7% ($P < 0.05$).

CONCLUSIONS: (1) In 380 patients with digestive symptoms, the rate of long time smoking patients is 17.7%. So in some degree smoking is correlated with digestive disease, especially in males. (2) In smoking group, the rate of esophageal motility disorder was higher than that of nonsmoking group. This indicated that long time smoking may be the important reason to induce esophageal motility disorder diseases. (3) The main effect was to decrease lower and upper sphincter function and decrease esophageal body cleaning function. The danger of smoking is a generalized damage to the body far from causing esophageal motility disorder.

Key words: Smoking; Esophageal manometry

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ABSTRACT

Esophageal manometry and pH analysis on gastroesophageal reflux disease

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Abstract

AIM: To study the relationship of esophageal dynamics, acid reflux and esophagitis, and to study the mechanism of gastroesophageal reflux disease (GERD).

METHODS: 46 subjects with symptoms of heartburn, regurgitation and/or chest pain for at least 1/2 year were detected by esophageal manometry, ambulatory 24-h esophageal pH monitoring and endoscopy at the same time. In all subjects the pH score, lower esophageal sphincter pressure (LESP) and biopsy pathology were recorded.

RESULTS: (1) 34 cases were diagnosed as GERD. (2) In 34 GERD cases, the positive rate of pH monitoring, endoscopy and manometry was respectively 82.3%, 64.7% and 52.9%. The difference of these rates was significant (χ^2 test, $P < 0.005$). (3) In 34 GERD cases: the 3 way of pH monitoring, endoscopy and manometry were correlated (χ^2 test, $P > 0.05$). (4) pH score value in esophagitis group and non esophagitis group was respectively 54.9 ± 49.9 and 22.2 ± 12.6. Score in esophagitis group was higher than that in non esophagitis group (t test: $P < 0.05$).

CONCLUSIONS: (1) Symptoms of heartburn and regurgitation are important in diagnosis of GERD. (2) pH monitoring, manometry and endoscopy pathology can reflect characters of GERD from different degree and different levels. All three methods in diagnosis of GERD are necessary. (3) Esophagitis, lower LESP and higher reflux score are closely related with each other. The definite relationship of these ways is the key to understand the mechanism of GERD. (4) According to our study, the synthesized way of inflammation factor increasing esophageal motility and decreasing secretion of gastric acid is the effective way to treat GERD.

Key words: Esophageal manometry; Ambulatory pH monitoring

Zou L, Zhao JT, Zhao LL. Esophageal manometry and pH analysis on gastroesophageal reflux disease. *World J Gastroenterol* 1996; 2(Suppl1): 171 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/171.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.171

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ABSTRACT

Primary analysis of gastroparesis pathogenesis

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Abstract

AIM: Generally recognized three main pathogenesis can lead to gastroparesis, including diabetic gastroparesis (DG), surgical gastroparesis (SG) and idiopathic diseases in recent years.

METHODS: We selected 81 patients with symptoms of functional dyspepsia, who had undertaken gastric emptying examination by radionuclide scintigraphy to investigate the primary diseases. It was found 42 patients had delayed gastric emptying (51.8%).

RESULTS: The primary analysis of pathogene was shown in DG 5 patients, SG 4 patients, IG (including chronic gastritis, gastroptosis, functional dyspepsia and unknown) 33 patients.

CONCLUSION: Since the patients of each group were different, it is difficult to make a statistical analysis. But we have some primary impressions: (1) The possibility of diabetic patients with gastroparesis was fairly high, and their degree of gastroparesis was severer than others. (2) There was only 1 patient after gastrectomy, whose gastric emptying was delayed (GET 1/2 was 155 s, 90 s gastric emptying rate was 32%. (3) From these cases of IG we can find some reasons. All of chronic superficial gastritis, chronic atrophy gastritis and functional dyspepsia show motility disorder. This is a very interesting special field. It is worthy to investigate more patients.

Key words: Gastroparesis; Pathogenesis

Wang XM, Zhao JT. Primary analysis of gastroparesis pathogenesis. *World J Gastroenterol* 1996; 2(Suppl1): 172 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/172.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.172

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ABSTRACT

Changes of esophageal and lower esophageal sphincter length in gastroesophageal reflux disease

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Abstract

AIM: We want to define the changes of esophageal and lower esophageal sphincter length and to research the mechanism of gastroesophageal reflux disease (GERD).

METHODS: We used manometry system to measure intraluminal pressure on 63 normal cases and 53 GERD cases with 4 lumen tube assembly in the esophagus, to record the esophageal length from nose to respiration reverse point, the length of LES and the tummy length of LES. The 4 lumens had side opening tips 5 cm apart and perfused with distilled water at a constant rate of 0.6 mL/min.

RESULTS: (1) The length of LES in normal young, middle aged group and old aged group was 2.79 ± 0.53 cm, 2.84 ± 0.64 cm, 3.08 ± 0.49 cm, respectively ($P > 0.05$); The tummy length of LES in 3 groups was 2.00 ± 0.47 cm, 2.03 ± 0.66 cm, 2.23 ± 0.72 cm, respectively ($P > 0.05$); (2) The length of LES in normal group and GERD group was 2.87 ± 0.33 cm, 0.46 ± 0.67 cm, respectively ($P < 0.001$). The tummy length of LES in normal group and GERD group was 2.06 ± 0.61 cm, 0.63 ± 0.43 cm ($P < 0.001$). (3) The related coefficient between esophageal length and body length in normal group and GERD group was 0.6997 and 0.798, respectively ($P < 0.001$).

CONCLUSIONS: (1) In normal group LES length is not changed with age. (2) LES length and tummy LES length are obviously decreased in GERD group. But esophageal body length is not shortened in GERD group.

Key words: Gastroesophageal reflux disease; Lower esophageal sphincter

Zou L, Zhao JX, Zhao JT. Changes of esophageal and lower esophageal sphincter length in gastroesophageal reflux disease. *World J Gastroenterol* 1996; 2(Suppl1): 173 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/173.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.173

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ABSTRACT

Diagnostic value of electrogastrogram in case of biliary disease as sociated with biliary motility disordes

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Abstract

AIM: To evaluate the diagnostic value of electrogastrogram (EGG) in biliary disease with biliary motility disorders.

METHODS: EGG was recorded on body surface over the area of antrum during the cholecystic empty movement by scintigraphy with ^{99m}Tc-EHIDA in 56 subjects, divided into 3 groups: Group 1 consisted of 26 cases of biliary disease with biliary motility disorders proved by cholecystic scintigraphy, including 12 cases of cholelithiasis, 9 cases of chronic cholecystitis, 2 cases of cholecystic polyposis, and 3 cases of biliary dyskinesia syndrome. Group 2 consisted of 15 cases of biliary disease with normal biliary empty function, which was also proved by cholecystic scintigraphy, including 7 cases of cholelithiasis and 8 cases of chronic cholecystitis. Group 3 consisted of 15 normal controls. The activity indexes of EGG were used as parameters for comparative analysis between the 3 groups.

RESULTS: The results showed that the activity indexes of EGG in group 1 were obviously abnormal compared with the normal controls. According to the activity indexes of EGG the patients could be classified into subgroups, the hypoindexes and the hyperindexes (the activity index was 219 ± 112 *vs* 758 ± 139, $P < 0.01$; 1168 ± 674 *vs* 758 ± 139, respectively, $P < 0.01$). Whereas the activity indexes of EGG in group 2 had no significant difference from the normal controls.

CONCLUSION: EGG can be used as a valuable reference index in clinical evaluation of the condition of biliary motility in biliary disease patients, especially in diagnosing biliary functional dyskinesia syndrome.

Key words: Electrogastrogram; Biliary motility; Diagnose

Fu M, Hua EQ. Diagnostic value of electrogastrogram in case of biliary disease as sociated with biliary motility disordes. *World J Gastroenterol* 1996; 2(Suppl1): 174 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/174.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.174

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ABSTRACT

Correlation of esophageal manometry and 24-h ambulatory pH motoring with endoscopic and histological changes in patients with gastroesophageal reflux disease

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Abstract

AIM: To examine the severity of reflux esophagitis and any possible correlation of endoscopic and histological findings with esophageal manometry and 24-h ambulatory pH monitoring.

METHODS: 100 patients with GERD were examined. The results were compared with those of 30 healthy controls. In all patients the endoscopy was performed and the esophageal muscosa biopsies was taken. Esophageal manometry was recorded by using a water perfused system.

RESULTS: The severity of esophagitis, determined by both endoscopy and histology, was significantly related to the amplitude of esophageal peristaltic waves, especially LES dysfunction ($P < 0.01$).

CONCLUSION: The severity of reflux esophagitis is related to the duration of reflux, and the severity of reflux is associated with impairment of the esophageal body motility and LES dysfunction.

Key words: Esophageal manometry; 24-h ambulatory ; PH-motoring; Histological changes; Gastroesophageal reflux disease

Huang Y, Xie Y, Wang CW. Correlation of esophageal manometry and 24-h ambulatory pH motoring with endoscopic and histological changes in patients with gastroesophageal reflux disease. *World J Gastroenterol* 1996; 2(Suppl1): 175 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/175.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.175

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ABSTRACT

Disorder of gastric motility and promoting effect of cisapride in patients with liver diseases

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Abstract

AIM: There are a variety of digestive symptoms such as upper abdominal pain, early satiety, nausea, vomiting and heartburn in patients with cirrhosis or liver cancer. The purpose of the study is to further understand the pathogenic mechanism of above mentioned symptoms.

METHODS: We have studied the liquid gastric emptying in 20 normal volunteers and 50 patients with cirrhosis or liver cancer by B mode ultrasonography and the promoting effect of single dose cisapride. All subjects drank 500 mL water.

RESULTS: The half gastric emptying time ($T_{1/2}$ was 13.90 ± 4.30 min in normal subjects and 39.36 ± 12.30 min in patients with cirrhosis, 40.50 ± 8.91 min in liver cancer patients. A significantly delayed gastric emptying was found in patients with cirrhosis or liver cancer than in control subjects ($P < 0.01$). The $T_{1/2}$ in patients can be shortened to 24.37 ± 11.37 min 30 min after administration of 10 mg cisapride ($P < 0.05$).

CONCLUSION: The severely delayed gastric emptying in patients with chronic liver diseases is one explanation on the digestive symptoms in the patients and cisapride is very useful for relieving symptoms.

Key words: Gastric motility; Cisapride; Liver diseases

Bai L, Zhang CN, Zhang WD. Disorder of gastric motility and promoting effect of cisapride in patients with liver diseases. *World J Gastroenterol* 1996; 2(Suppl1): 176 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/176.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.176

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ABSTRACT

Analysis of 24-h esophageal pH monitoring in cardiac cancer before and after cardiectomy

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Abstract

AIM: Today, a 24-h esophageal pH monitoring is commonly recognized as the best quantitative study and widely used in the clinical practice. The aim is to investigate the changes of conditions in esophagus of cardiac cancer patients.

METHODS: 11 cardiac cancer patients, 24-h pH monitoring was done before and after cardiectomy. We studied with double electrode 24-h esophageal pH monitoring for one week before the operation and 2 wk after it.

RESULTS: There was a mild gastroesophageal acid reflux before the operation (total time pH < 4: 2.4% ± 1.8%). Though the value is in the physiological range, but it should be considered that the phenomenon is caused by the structure of cardiac destroyed and the time of diet prolongs, and thus the amount of secreting gastric acid increases. Some anti reflux operations have been practiced in the cardiectomy. But a severe gastroesophageal acid reflux also appears after the operation total time pH < 4: 20.9% ± 12.7%). So we think that the completion of structure of cardiac and abnormal esophagus plays important roles in the anti reflux function. In the condition of negative pressure in the chest cavity, extended remnant of stomach making gastric acid increase is the source of acid reflux.

CONCLUSION: Attention should be paid to the designed way of anti reflux operation in cardiectomy, the treatment of anti reflux drug and living of the patients after the operation.

Key words: 24-h esophageal; PH monitoring; Cardiac cancer

Shi NK, Fu GZ, Chen J. Analysis of 24-h esophageal pH monitoring in cardiac cancer before and after cardiectomy. *World J Gastroenterol* 1996; 2(Suppl1): 177 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/177.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.177

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ABSTRACT

Analysis of 24-h esophageal pH motiroring in esophageal and caridac cancer

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Abstract

AIM: Esophageal pH monitoring for 24-h is usually considered as gold standard which has been widely used in the clinical practice, for testing and diagnosing diseases of gastroesophageal reflux.

METHODS: The patients esophagus and cardia 24-h pH were recorded.

RESULTS: The group of cardiac cancer has a mild physiological gastroesophageal reflux, but the group of esophageal cancer has a severe pathological reflux. The differences have statistical meanings. We think that the results relate their prolonged diet time that is caused by swallowing difficulty, which increases the amount of secreting gastric acid relatively, destroys the integrated structure of esophagus, affects the normal peristalsis and clearing acid function of esophagus and the anti acid function of saliva because of relative decrease in the amount of saliva secreting.

CONCLUSION: A attention should be paid to phenomenon of esophageal acid reflux of esophageal and cardiac cancers and the treatment and living way of patients of 2 group should be depended on the conditions of 24-h esophageal pH monitoring, in order to improve the conditions of 24-h esophageal pH monitoring, in order to improve the integral treatment quality if the diseases.

Key words: 24h esophageal pH monitoring; Esophageal and cardiac cancer

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ABSTRACT

Diagnostic compatison of 18-FDG-PET with spiral volumetric computed tomography for the diagnosis of pancreatic cancer: A diagnostic dilemma

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Abstract

A pancreatic cancer, a killer with unknown etiology, still remains the fourth leading cause of cancer-related deaths in the United States, ranking second to colorectal carcinoma as a cause of death from gastrointestinal malignancy. Every year 112000 Americans die of gastrointestinal neoplasms, cancer of the pancreas accounts for 22 percent of these deaths. Pancreatic cancers are of two types, namely endocrine pancreatic tumors and non-endocrine tumor s (Adenocarcinomas). Adenocarcinoma, in fact, accounts for 95 percent of all pan-creatic cancers. A small number of patients (all males) suspected of having pan-creatic malignancies, based on history, physical examinations, and laboratory findings, were referred for evaluation with positron emission tomography with 18-Fluoro-Deixy-Glucose (18-FDG-PET) and spiral volumetric computed tomography (SVCT), who were scheduled for surgery. Patients were randomized into two groups of almost identical number: one group underwent PET scan and the other group underwent spiral CT scan. An equal number of patients with similar age- matched and with limited disease, who showed no evidence of pancreatic disease, served as control subjects. Written informed consents were obtained from all participants. All our patients were histopathologically proven to be adenocarcinomas. A histopathological diagnostic verification of a suspected abnormalities is warranted, since therapeutic interventions require information about pathological processes which cannot be confirmed by imaging techniques alone. The imaging is, however, necessary to appreciate the extent and course of the disease that can be monitored to determine whether and when aggressive intervention is necessary to avoid catastrophic clinical outcome. Dispite recent highly sophisticated and technical advancements, pancreatic carcinoma still continues to pose a diagnostic and therapeutic challenge. This retrospective study indicates the feasibility and clinical potential of FDG-PET for the detection and differ entiation of pancreatic malignancies. Technical aspects of both imaging modalities will be highlighted and results of this retrospective study, which is still under investigation, will be compared and discussed. The purpose of this presentation was to assess retrospectively the clinical utility of functional as well as the structural imaging methods, such as 18-FDG-PET and SVCT respectively, in the detection of suspected pancreatic neoplasms, and to compare the value of quantitative image interpretation of these two fairly newer advanced imaging techniques that are integrated in the medical imaging armamentarium.

Key words: Pancreatic cancer; Positron emission tomography; Spiral volumetric computed tomography

Datta S, DattaL R. Diagnostic compatison of 18-FDG-PET with spiral volumetric computed tomography for the diagnosis of pancreatic cancer: A diagnostic dilemma. *World J Gastroenterol* 1996; 2(Suppl1): 179 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/179.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.179

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ABSTRACT

24-h ambulatory esophageal pH monitoring of gastroesophageal reflux in children

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Abstract

AIM: Gastroesophageal reflux (GER) is common in both adults and infants. Although in most cases it is benign and transient, GER in infancy and childhood is occasionally associated with significant complications, such asunder development, severe esophagitis, aspiration syndromes and even mortality. The role of the upper gastrointestinal barium test has been questioned because of poor sensitivity and specificity. Over the last 10 years. 24-h lower esophageal pH monitoring has been increasingly established as the gold standard for documenting GER.

METHODS: To establish the diagnostic criterion for GER in children and to understand the usefulness of 24-h esophageal pH monitoring for assessing GER and to study the characteristic of GER in children. A 24-h lower esophageal pH monitoring was carried out in 64 children with suspected gastroesophageal reflux (GER) in ages ranging between 38 d to 13 years. Twenty asymptotic cases served as controls. The catheter (2.1 mm in diameter) containing one antimony pH sensor was positioned with the electrode 3 cm above the superior border of the manometrically determined LES and then connected to the recorder. Each period longer than 15 s with a pH < 4.0 is called a reflux episode.

RESULTS: The results showed 35 cases to be GER, and among them 12 cases to be hiatus hernia. Twelve cases (9 of 12 hiatus hernia) were reexamined after anti reflux treatment. 10 parameters of both simple GER and hiatus hernia differed significantly from controls except the number of reflux episodes and reflux index. In simple GER the duration of the longest episode and mean duration of reflux episode were higher in the supine position than in the upright position ($P < 0.05$). In hiatus hernia the duration of the longest episode; The total time of pH < 4, the percentage of pH < 4 in total period and mean duration of reflux episodes were higher in the supine position than in the upright position ($P < 0.05$). In the supine position the reflux index was lower in both simple GER and hiatus hernia. Specificity of all parameters was satisfactory. Sensitivity of Bois Ochoa score and the total percentage of pH < 4 was the highest among them and the number of reflux time reduced significantly after anti reflux treatment.

CONCLUSION: The diagnostic criterion for GER in children has been established, that is, Boix Ochoa score is higher than 11.6 and the total percentage of time with pH < 4 is more than 2.0%. Pathological GER in children is more serious in the supine position. Pathological GER in children is more serious in the supine position. The study indicated that 24-h esophageal pH monitoring is safe and acceptable for children and is valuable in diagnosing and investigating GER and evaluating the efficiency of management.

Key words: Gastroesophageal reflux; Esophageal pH monitoring

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ABSTRACT

Study on the shape and function of the orifice of common bile duct under flexible choledochoscopy

Xiang-Ling Meng, Shan-Cheng Gao, Yun Du

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Abstract

AIM: We performed a prospective study to observe the shape and function of the orifice of common bile duct under flexible choledochoscopy. The shape of common bile duct observed under choledochoscopy is divided into 4 types; The dot, the radiating (converging), the irregular and the fissure types. As the irregular and fissure types, the orifice has relatively dysfunction, the biliary ascariasis, cholangitis and recurrent biliary calculi are more likely to be found. An endoscopic manometric technique as used to measure the pressure of common bile duct and sphincter of Oddi.

RESULTS: The results demonstrated that the pressure of common bile duct and sphincter were lower in the irregular and fissure type and the pressure is higher in the stricture papillitis. The stricture papillitis is divided into 2 types, the functional and organic stenosis.

CONCLUSION: The functional stenosis may be cured by the drugs, the balloon dilator and sphincterotomy (papillotomy) and the organic stenosis may be cured by the balloon dilator, sphincterotomy or sphincteroplasty.

Key words: Shape and function; Common bile duct; Choledochoscopy

Meng XL, Gao SC, Du Y. Study on the shape and function of the orifice of common bile duct under flexible choledochoscopy. *World J Gastroenterol* 1996; 2(Suppl1): 181 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/181.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.181

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ABSTRACT

Effect of single herb of Li Dan Pai Shi Tang on motility of gallbladder in normal subjects

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Abstract

AIM: Li Dan Pai Shi Tang is composed of Herb Lysinachiae, Autemisiae Scopaniae, Curcumae. Aromaticae Citrus Aurantitum Saussurea Lappa and Rheum Palmatinum. It has good effects of promoting the secretion and discharge of bile and eliminating gallstones. These effects have been confirmed by clinical practice. But the effects of each herb on motility of gallbladder are unknown. This study is to investigate the effects of single herb of Li Dan Pai Shi Tang on motility of gallbladder and provide experimental basis for clinical differentiation of symptoms and treatment of gallbladder disorders.

METHODS: Healthy volunteers 60, male 30, female 30, age 20-60, mean 42.6 years old. They were randomly divided into 6 groups, each group had 5 males and 5 females, and took one herb. For all subjects, the history of biliary diseases had been ruled out. Real time ultrasonic examination showed that the size and morphology of gallbladder were normal. We took the fasting gallbladder volumes (FGVs) and water was double comparison, after each subject of one group took 200 mL decoction of same single herb respectively, the changes of size of gallbladder were observed by ultrasound in 30, 60, 90 min. Single blind ultrasonography was conducted by a same operator with Ultra mark 9 and GVs were measured and recorded. Each subject for two times, taking mean value for calculation. GVs = length × width × thickness × 0.52.

RESULTS: 30 min after taking Herba Lusimachiae, Saussurea Lappa, and Curcumae Aromaticae, the GVs were markedly smaller than FGVs ($P < 0.01$). Herb Lysimachiae had the most obvious effect, it reduced GVs by 38.6%.30 min after taking Artemisiae Scopaniae, the GVs were markedly larger than FGVs ($P < 0.01$). 30 min after taking Rheum Palmatium, the GVs became smaller ($P < 0.05$), but in 60-90 min, the gallbladder gradually enlarged and finally exceeded FGVs ($P < 0.05$). 30-90 min after taking Citrus Aurantitum, the GVs had no change compared with FGVs.

CONCLUSION: Different herbs in the recipe have different effects on motility of gallbladder but its leading role is to contract the gallbladder.

Key words: Li Dan Pai Shi Tang; Gallbladder; Contract

Zheng CQ, Li YQ, Zhao SY. Effect of single herb of Li Dan Pai Shi Tang on motility of gallbladder in normal subjects. *World J Gastroenterol* 1996; 2(Suppl1): 182 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/182.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.182

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ABSTRACT

Discussion about traditional Chinese differentiation and treatment of cholecystitis

You-Wen Yang, Yan-Bin Wang, Xue-Wei Zhang

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Abstract

AIM: To investigate the traditional Chinese differentiation and treatment of cholecystitis.

METHODS: Cholecystitis is a common disease of the digestive system. Cholecystitis is marked by stagnation of the liver qi, blood stasis accumulation, dampness and heat in the liver and gallbladder, deficiency of the liver yin and so on. Each symptom may produce blood stasis. From our clinical treatment of the cholecystitis, we conclude: (1) blood activating and stasis liminating drugs such as safflower, peach kernel, burred tuber, zedoary, Chinese angelia root, *etc*., should be used. (2) If treated properly, the prognosis is favorable. (3) Do not overuse medicines for regulating the flow of Qi, otherwise, it may consume the blood yin. (4) Pleasant feeling and stable spirit of patient is important. (5) Psychotherapy should be put on to relieve stagnation of liver qi. (6) Following the conception of wholism and pathogenesis to regulate the function of the viscera and keep the balance between Qi and blood as well as Yin and Yang.

Key words: Cholecystitis; Qi and blood; Yin and Yang

Yang YW, Wang YB, Zhang XW. Discussion about traditional Chinese differentiation and treatment of cholecystitis. *World J Gastroenterol* 1996; 2(Suppl1): 183 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/183.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.183

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ABSTRACT

Diagnosis and treatment for the chronic intestinal pseudo obstruction: A report of 7 cases

Xiu-Cai Fang, Mei-Yun Ke, Xiu-Lan Zhang

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Chronic intestinal pseudo-obstruction (CIPO) is an uncommon disorder in the adults. Seven cases with severe CIPO diagnosed in our hospital from 1978 to 1996 were analyzed in this literature.

General data There 2 male and 5 female with ages ranging from 16 to 67 years (mean 36.7 years). The duration of the illness ranged from 3 mo to 21 years. Etiology: two cases had history of achalasia, one female was diagnosed with CTD, suspected to be SLE, another case had DM, HBsAg was positive in 4 of 7 patients.

Clinical manifestations The main symptoms and signs were as follows: abdominal pain (6/7) and distention (5/7), vomiting (5/7), diarrhea (5/7), constipation (2/7) and abdominal mass (1/7). Five cases developed the secondary malabsorption and bacterial overgrowth in the small intestine.

Radiographic findings The air fluid levels were found in the plain abdominal films in 5 of 6 cases, those were multiple and the sites were variable in different films. The repeated barium contrast studies of the GI tract did not find the signs of mechanical obstruction of small intestine and ileocecal valve, the dilation of small intestine, weak even absent contractions were noted in 5 of all patients, and megacolon was showed on the colonic series in 3 cases, in which, the colonic mucous was normal on the colonoscopy.

Motility examinations GITT were measured in 4 cases, two of whom with small intestineal involvements showed prolonged transit time from mouth to cecum. Colonic manometry in one case with megacolon recorded hypocontractility in colon.

Treatments Two cases were treated with metoclopramide, 1 with domperidone, 2 with cisapride (10-30 mg, Tid), 1 with erythromycin (62.5-125 mg, Tid), cisapride and erythromycin showed some improvement for the symptoms. Broad-spectrum antibiotics and TPN are useful for the patients with bacterial overgrowth and malabsorption ileorectostomy was performed in one patient with colonic pseudo-obstruction after failing to medical treatments, the constipation was cured.

The diagnosis for CIPO is very difficult in clinical because of un-specificity of the clinical manifestations. For the suspected patients, if the plain films show the multiple and variable sites of air fluid levels, the barium contrast studies of entire GI tractor and barium enema should be done in order to exclude the mechanical obstruction and confirm the sites of involvements of pseudo-obstruction. Motor manometry, GITT are helpful for evaluating the dysfunction of involved intestines. Systemic and nervous illness should be sought in the diagnosis. The relationship between CIPO and HBV infection remains to be determined. There are no curative drugs for CIPO, comprehensive managements including traditional medicines and acupuncture maybe effective for some patients.

Fang XC, Ke MY, Zhang XL. Diagnosis and treatment for the chronic intestinal pseudo obstruction: A report of 7 cases. *World J Gastroenterol* 1996; 2(Suppl1): 184 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/184.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.184

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ABSTRACT

Characters of esophageal motor disturbance of 102 patients with achalasia in China

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Abstract

AIM: To investigate characters of both clinical manifestation and esophageal motor disturbance in Achalsis.

METHODS: One hundred and forty seven cases of diagnosed achalasia were investigated on clinical manifestation and esophageal motor function. A pneumohydrolic capillary perfusion system with an 8 lumen Dent sleeve catheter was used to record esophageal manometry through polygraph after overnight fasting. Subjects received 10 swallows with 5 mL of water during recording.

RESULTS: (1) General data (n = 147): 64 male, 83 female (M:F 1:1.2), the mean age was 36.5 years (range: 13 to 77). Eighty five percent was among 20 to 50 years. The mean course of history was 2 years, ranging from 1 mo to 21 years. Clinical manifestation was as follows: dysphagia (100%), regurgitation (82.9%), nocturnal regurgitation (56.5%), chest pain (52.0%), cough or productive cough (27.8%). (2) Esophageal manometry (n = 102): LESP in 78% of cases was < 40 mmHg, 20% between 41-60 mmHg, only 2% was over 60 mmHg. The maximal LESP was 85 mmHg. LES Relaxation rate (LESRR): < 40% in 47.1% of cases, 41%-60% in 49%, > 60% in 3.9%. Transient LES relaxation (TLESR) appeared in 36.3% of cases. One TLESP occured in 20.6% of cases, 2 TLESRs in 10.8%, 3 TLESRs in 3.9%, and 4 TLESRs in 2.9% during esophageal manometry. The mean duration of TLESR was 13.7 s (12-48 s). Thirty six cases (35.2%) showed LES contraction after TLESR, mean amplitude was 83.6 mmHg (35-150 mmHg). Motor pattern of esophageal body included 3 types: that is, hypomotor type (amplitude of contraction < 10 mmHg, 27.5%), potent type (amplitude of contraction > 60 mmHg, 10.8%), disturbed type (irregular contraction, amplitude < 60 mmHg, 61.7%). No abnormality of UES was detected.

CONCLUSION: Our study showed characters from 102 Chinese Achalasia, that is, (1) considerable cases did not have very high LESP, (2) TLESR could occur in 36.3% of patients, and (3) there were 3 types of motor pattern of esophageal body. These data will be helpful for understanding on pathophysiology, involved level, severity, which will help for further therapy. More investigations on TLESR need to be explored.

Key words: Achalasia; Esophageal manometry

Zhang XL, Ke MY, Wang ZF. Characters of esophageal motor disturbance of 102 patients with achalasia in China. *World J Gastroenterol* 1996; 2(Suppl1): 185 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/185.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.185

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ABSTRACT

Effects of cisaprid and losec on gastroesophageal reflux disease

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Abstract

AIM: To observe the effects of cisapride and losec (omeprazole) on gastroesophageal reflux disease (GERD).

METHODS: Seventeen patients with reflux symptoms and excessive gastroesophageal reflux confirmed by esophageal pH monitoring participated in this study. Nigh male and 8 female, with mean age 46.9 ± 3.6 years. Cisapride (CIS) or cisapride plus losec (CIS + LOS) was given by double blind style. In LOS group, subjects administered losec, 20 mg per day. In CIS + LOS group, subjects took cisapride 10 mg, qid and losec 20 mg per day. Duration of treatment was 10 d. Symptoms score and radionuclide gastroesophageal reflux test (300 μci ^{99m}Tc) with r camera were performed before and after 10 d of administration of medications.

RESULTS: (1) Data on sex, age, symptom score and DeMeester Score of esophageal pH monitoring in both groups were comparable. (2) Following 10 d of treatment, symptom score of heartburn, acid regurgitation and chest pain were significantly improved, 6.40 ± 0.20 *vs* 0.09 ± 0.03 ($P < 0.001$), 4.55 ± 0.15 *vs* 2.91 ± 0.22 ($P < 0.01$), 2.91 ± 0.22 *vs* 0 ($P < 0.01$) in LOS group, and 5.56 ± 0.08 *vs* 0.04 ± 0.15 ($P < 0.001$), 4.98 ± 0.22 *vs* 0.33 ± 0.11 ($P < 0.05$), 1.33 ± 0.24 *vs* 0.89 ± 0.01 ($P < 0.05$) in CIS plus LOS group, respectively. CIS plus LOS rather LOS alone showed improvement of food regurgitation and short breath.

CONCLUSION: Both losec or losec plus cisapride improved heartburn, acid regurgitation, chest pain in patients with GERD. However, cisapride plus losec rather omeprazole alone improved not only food regurgitation and short breath, also reduced gastroesophageal reflux objectively, suggesting that it is necessary to combine acid inhibitory agent with prokinetic agent when severe gastroesophageal reflux.

Key words: Cisapride; Losec; Gastroesophageal reflux disease

Zheng Y, Ke MY, Wang ZF. Effects of cisaprid and losec on gastroesophageal reflux disease. *World J Gastroenterol* 1996; 2(Suppl1): 186 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/186.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.186

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ABSTRACT

Clinical analysis of 526 cases with nonulcer dyspepsia

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Abstract

AIM: In this article 526 cases with nonulcer dyspepsia (NUD) affirmed by diagnostic criteria are retrospectively analyzed.

METHODS: Patient's average age 48.4 years range 15-70, male 365, female 161, its mean duration 40.3 mo.

RESULTS: Males are liable to be affected. In chief complains, upper abdominal pain, flatulence were predominant, lesser predominant were regurgitation with gastric acid, nausea, belching, hiccup and vomiting. They were divided into different categories. Among them dynamic disturbance and ulcer like category were more common. Endoscopic biopsy revealed 100% chronic gastritis, 34% of them had duodenal bulbitis simultaneously. *Helicobacter pylori* were primarily discussed in this paper.

CONCLUSION: NUD is associated with gastritis and/or duodenal bulbitis, *Helicobacter pylori* infection, and abnormal gastric motility.

Key words: Non-ulcer dyspepsia; Chronic gastritis; *Helicobacter pylori*

Qian SL. Clinical analysis of 526 cases with nonulcer dyspepsia. *World J Gastroenterol* 1996; 2(Suppl1): 187 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/187.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.187

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ABSTRACT

Clinical observation on the treatment of IBS by "Jiechang Kang"

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Abstract

AIM: The author used Jiechang Kang (composed of 11 Chinese herbs) to treat IBS and observe the clinical effect.

METHODS: The patients were divided into 2 groups. The treated group consisted of 53 male and 47 female patients. They were from 0 to 74 years old. The duration of the illness was from half year to 10 years. The control group consisted of 16 male and 14 female patients. They were from 16 to 63 years old. The duration of the illness was from half a year to 5 years.

RESULTS: Of the treated group, 60 cases had complete remission, 35 cases had partial remission, only 5 cases had no efficacy. The total effective rate was 95%. But of the control group, 4 cases had complete remission, 5 cases had partial remission, 21 cases had no efficacy. The total effective rate was 30%.

CONCLUSION: The herbs in Jiechang Kang can adjust bowel movement and secretion, relieve abdominal pain and distention, improve digestion and transportation of food. Therefore, it is an effective herbal preparation to cure IBS.

Key words: Jiechang Kang; Herb; IBS

Zhong RZ. Clinical observation on the treatment of IBS by "Jiechang Kang". *World J Gastroenterol* 1996; 2(Suppl1): 188 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/188.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.188

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ABSTRACT

Clinical observation of cisapride in the treatment of 54 cases of gastroptosis

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Abstract

AIM: Cisapride is a new gastro prokinetic agonist which can stimulate the $5HT_4$ receptor of the motive neuron in the muscular neuroplexus. It can stimulate the release of acetylcholine, strengthen the peristaltic contraction of the esophagus and stomach and increase the speed of emptying the stomach. We began to use cisapride with WEI-SU pulvis in 1994 in our hospital. Since then we have treated 54 cases of gastroptosis. The total effective rate was 100% ($P < 0.01$). It does not pass through the blood brain barrier and it is safe. The clinical practice showed that cisapride with WEI-SU pulvis is effective in the treatment of gastroptosis. The medicine is worth spreading and using in the clinic.

Key words: Cisapride; WEI-SU pulvis; Gastroptosis

Wen JZ, Wang SY, Wu AF. Clinical observation of cisapride in the treatment of 54 cases of gastroptosis. *World J Gastroenterol* 1996; 2(Suppl1): 189 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/189.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.189

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ABSTRACT

Observation of therapy with prepulsid for the functional dyspepsia

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Abstract

AIM: To observe the therapy effect of prepulsid on functional dyspepsia.

METHODS: 120 patients with functional dyspepsia was treated with prepusid.

RESULTS: The results showed that the early fullness, abdominal distention, upper abdominal pain and nausea were reduced. The total effective rate was 91.7%; The gastric emptying time was evaluated in 68 patients. We found that the gastric emptying time was delayed in 47.1% of the patients. After treatment with prepusid, the gastric emptying of most patients was accelerated.

CONCLUSION: The study indicated that prepulsid is a safe and effective prokinetic drug of stomach.

Key words: Prepulsid; Dyspepsia; Gastric emptying

Jiang XJ. Observation of therapy with prepulsid for the functional dyspepsia. *World J Gastroenterol* 1996; 2(Suppl1): 190 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/190.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.190

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ABSTRACT

Study on fasting gastric electrical activity among patients with portal hypertension

Xiao-Hua Jiang, Yun-Lin Wu, Jia-Yu Xu

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Abstract

AIM: To study the fasting gastric electrical activity in patients with portal hypertension.

METHODS: Fasting gastric electrical activity was recorded and measured in 35 cases of cirrhotic with portal hypertension and compared with that in 20 healthy individuals using EGG. Measurements included: predominant frequency (PF), zero frequency (ZF) and percentage of gastric electrical arrhythmia.

RESULTS: Percentage of gastric electrical disturbance was much higher in cirrhotics than that of normals. The values of PF were 57% and 49%, that of ZF were 40% and 57%. The percentage of this abnormality was significantly higher among those patients with symptoms of gastric motility disturbance. The values of PF were 68% and 64% versus 38% and 23%, that of ZF were 45% and 59% versus 31% and 46%. In accordance with childs classification, the respective percentage of gastric electrical disturbance recorded from gastric antrum in Child A were 33% and 17% in Child B were 53% and 35%, all Child C patients had this abnormality.

CONCLUSION: The present study suggested that the percentage of gastric electrical disturbance was much higher in cirrhotics than that of normals. This abnormality might explain the dyspeptic symptoms of the cirrhotics Furthermore, gastric electrical disturbances were also related to liver dysfunction as illustrated in this study.

Key words: Liver dysfunction; Cirrhosis; Gastric electrical disturbance

Jiang XH, Wu YL, Xu JY. Study on fasting gastric electrical activity among patients with portal hypertension. *World J Gastroenterol* 1996; 2(Suppl1): 191 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/191.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.191

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ABSTRACT

Gastric motility study on nonulcer dyspepsia among children

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Abstract

AIM: To ascertain the rule of gastric motility in nonulcer dyspepsia (NUD) among children, we studied 26 cases of NUD with age range of 3.5-10 years old and 25 normal children of comparable age.

METHODS: We measured the gastric emptying of orange solutions and gastric motility using realtime ultrasonography by the method of Marzio.

RESULTS: The gastric emptying was delayed 61.53% in NUD children, the complete gastric emptying time (T) and half emptying time (T1/2) of control group were 43.42 ± 7.32 min and 16.4 ± 3.57 min; And those of NUD group were 54.95 ± 11.16 min, and 27.08 ± 2.43 min, respectively. Gastric contraction dimensions and frequency were 59.01 ± 9.86 mm and 4.08 ± 0.55 time/min in control; And those of NUD group were 43.7 ± 9.73 mm ($P < 0.01$) and 3.76 ± 0.01 time/min ($P < 0.05$). Furthermore, in 28 children (NUD 18, normal 10), we observed domperidone effect on gastric emptying domperidone 0.5 mg/kg/dose). Time of gastric emptying before administration of domperidone was 53.57 ± 13.28 min (T) and 22.14 ± 7.41 min (T1/2), and after administration of the drug was 12.74 ± 4.61 min and 39.00 ± 8.79 min, respectively. The difference were all significant.

CONCLUSIONS: (1) Gastric motility dysfunction may be one of the causes of NUD in children. (2) Real time ultrasonography is a useful convenient way to assess gastric motility in children.

Key words: Children; Non-peptic dyspepsia

Xu CD, Wang P, Xu JY. Gastric motility study on nonulcer dyspepsia among children. *World J Gastroenterol* 1996; 2(Suppl1): 192 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/192.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.192

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ABSTRACT

Approach to quantitation of duodenogastric reflux by ultrasonography

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Abstract

AIM: Duodenogastric reflux (DGR) would damage gastric mucosa and cause symptoms such as epigastric pain, nausea and vomiting. Obtaining an exact measurement of DGR in human still presents a problem. Previous methods were either invasive or radioactive. The criteria for evaluation were not well standardized. In order to search for a simple and applicable method for DGR, we developed a Doppler imaging contrast and investigated DGR in participants by means of color Doppler ultrasonography.

METHODS: Normal saline, meat soup and lipovenose were tested *in vitro* to select a suitable contrast. 10 healthy subjects and 16 patients with peptic ulcer or erosive gastritis were measured. After ingesting Lipovenose 20 g, the probe with 3.5 MHz transducer was positioned at the level of transpyloric plane. Measurements were performed by replaying videotape. Reflux frequency was defined as the number of episodes of DGR detected during 5 min observation. Reflux index was expressed as the multiplication of the frequency of DGR and mean distance of color signal from pylorus.

RESULTS: Color signal were clearly detected with Lipovenose but not with normal saline and meat soup in the vitro test color signals with meat soup was not clear because of the difficulty of an available oil concentration while no color signal with saline appeared. Detection of transpyloric flow by color Doppler was found in 25 of 26 participants. The mean level of reflux frequency and reflux index is 1.7 ± 0.5 and 4.6 ± 1.7 in 10 healthy subjects, but 8.7 ± 1.5 and 23.4 ± 4.5 in 16 patients as compared with healthy subjects.

CONCLUSION: Our result demonstrated that Lipovenose is a proper contrast for observing fluid reflux. Ultrosonography with color Doppler could be used to measure DGR noninvasing and quantitatively.

Key words: Duodenogastric reflux; Ultrasonography; Quantitative

Wu BY, Wang MW, Wang J. Approach to quantitation of duodenogastric reflux by ultrasonography. *World J Gastroenterol* 1996; 2(Suppl1): 193 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/193.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.193

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ABSTRACT

Rreseatch on the treatment of diabetic gastroparesis by erythromycin

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Abstract

AIM: It has been discovered in animal experiment that erythromycin may promote contraction of interdigestive period, accelerate the postprandial contraction of gastric antrum, coordinate the locomotion of stomach and duodenum when it is at a dose lower than the anti infectious dose. The patients with diabetic gastroparesis often have symptoms of gastric emptying dysfunction such as abdominal distention, nausea, vomits, eructation.

METHODS: 19 patients with non insulin dependent diabetes were observed. There were 8 men, 11 women. Their average age was 40.5 ± 10.68 years. All patients had more than 2 symptoms of upper digestive tract. 16 persons who had no symptom were observed as control group. There were 10 men and 6 women. Their average age was 35.7 ± 11.8 years. All of them have no medical history of dyspepsia or peptic ulcer. Erythromycin 125 mg, 2 times a day for 4 wk as a course of treatment. All persons in therapy group had undergone gastric emptying examination. After fasted more than 12 h, EUB-40 type ultrasonographic was used to measure the longest anterotransverse diameter (LAD) between gastric antrum and corpus ventriculi. After a 400 mL fat meal, including 13 g fat, 14 g protein, 45 g carbohydrate. LAD was measured immediately, and every 10 min, until 120 min. The results showed that symptoms score before therapy was 10.8 ± 4.1, and after therapy 4.62 ± 1.71. There was notable difference before and after treatment ($P < 0.01$). This indicated that erythromycin may cure diabetic gastroparesis, relieve symptoms of upper digestive tract and improve gastric emptying function.

Key words: Diabetic gastroparesis; Erythromycin

Wang WM, Lu GX. Reseatch on the treatment of diabetic gastroparesis by erythromycin. *World J Gastroenterol* 1996; 2(Suppl1): 194 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/194.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.194

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ABSTRACT

Studies on rectosigmoid motility in patients with irritable bowel syndrome

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Abstract

AIM: A prospective study of rectosigmoid motility has been undertaken in 29 patients with irritable bowel syndrome (IBS) male 11, female 18 average age 42.3. They were divided into 3 groups: diarrhea predominant IBS (n = 20), constipation predominant IBS (n = 4), and alternating diarrhea and constipation IBS (n = 5).15 healthy volunteers served as controls.

METHODS: Objective laboratory tests, including the recording of rectosigmoid pressure with inflating balloon in rectum for investigating the compliance and sensation of rectum and the rectosigmoid motility.

RESULTS: There was no significant difference in the rectosigmoid motility between IBS and normal controls before meal. After meal the rectosigmoid motility in diarrhea predominant IBS was significantly increased. There was an abnormality of the pattern of rectosigmoid contractions, which was the increment of non synchronous contractions. The compliance of rectum was lower in IBS and decreased in constipation predominant IBS. The distension of the balloon in the rectum did not induce contractions of rectosigmoid.

CONCLUSION: The rectosigmoid motility in patients with irritable bowel syndrome is abnormal.

Key words: Rectosigmoid motility; Irritable bowel syndrome

Zhang Y, Wang ZH. Studies on rectosigmoid motility in patients with irritable bowel syndrome. *World J Gastroenterol* 1996; 2(Suppl1): 195 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/195.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.195

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ABSTRACT

Analysis of 80 cases of radionuclide measurements of gastric liqiud emptying

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Abstract

AIM: Radionuclide measurement was accepted as the gold standard of gastric emptying. This examination was performed in 80 patients with dyspeptic symptoms in our hospital from 1993 to 1995. The aim was to study the changes of gastric emptying in patients with peptic ulcer of functional dyspepsia.

METHODS: The study included 36 patients with duodenal ulcer, 7 with gastric ulcer, and 37 with functional dyspepsia confirmed by endoscopy and pathological examination. Patients with pyloric stricture, cancerous change, and active gastritis were excluded. The patients were fasted for 12 h before the examination. 37 MBq ^{99m}Tc-DTPA was diluted with 500 mL 5% type SPECT after the intake of the tracer. One graph was taken per 2 min. The patient was examined for 30 min. The graphs were transformed into time radioactivity curve by the computer with gastric emptying program. The gastric emptying time 1/2 (GET 1/2) was able to be obtained. The normal GET 1/2 was 12 ± 3 min.

RESULTS: Gastric emptying in 57 cases were abnormal, and in 55 cases were slower than in normal. The abnormal gastric emptying in patients with duodenal ulcer, gastric ulcer, and functional dyspepsia was 26 cases (26/36), 7(7/7), 22 (22/37) respectively. The results showed that there was abnormal gastric emptying in peptic ulcer disease and functional dyspepsia. There are many measurement methods in gastrointestinal motility. But it is expensive, it is not a route and follow up examination. The gastric emptying in the majority of the patients with duodenal ulcer was slower than in normal. The reason is that all the patient we selected had dyspepsia. The gastric emptying in all the patients with gastric ulcer was slower than in normal. But the number of the patients with gastric ulcer was small, further study was needed. In our study, all the patients with functional dyspepsia were clinically diagnosed as dysmotility like dyspepsia. But it did not coincide with emptying were improved by prokinetics. These drugs had no effects on the healing of peptic ulcer.

Key words: Prokinetics; Peptic ulcer; Dyspepsia

Si YL, Guo YH, Wu XW, Liu GX. Analysis of 80 cases of radionuclide measurements of gastric liqiud emptying. *World J Gastroenterol* 1996; 2(Suppl1): 196 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/196.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.196

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ABSTRACT

Contrast analysis of outcome in 31 IBS cases

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Abstract

AIM: It has been shown by some research works that the bases of pathologic physiology of IBS (irritable bowel syndrome), which is the common chronic disease that attacks repeatedly, is abnormal primary gastrointestinal movement. Its clinical manifestation shows that IBS is associated closely with colon, especially with dysfunction of intestinal smooth muscle contraction.

METHODS: In order to evaluate and compare the outcome of different medicines for IBS, the author used smooth muscle relaxant, Nifedipine and 654-2, to treat IBS. The research classified 31 IBS cases at random into 2 groups which was comparable in sex and age from special digestive clinic one was 19 cases treated with Nifedipine, and another was 12 control cases group treated with 654.2.

RESULTS: It suggests that the short term effect of Nifedipine for IBS is not superior to 654-2 in control group. The total effectiveness of clinical symptom improvement has no distinct difference between 2 groups ($P > 0.05$), but both the general effectiveness and higher effectiveness after one week's treatment with Nifedipine is significant different from the control group ($P < 0.01$). This indicated that the effect of Nifedipine is associated with the course of treatment. Nifedipine is much better in relief of abdominal pain and abdominal distention than 654-2 ($P < 0.05$), and has an outstanding effect in spastic abdominal pain. 2 groups, however, have side effects in different degree.

CONCLUSION: The effect of Nifedipine may not be the first medication to treat IBS in the first time. But it can be chosen to use in those male patients over middle age with poor therapeutic result and side effects may occur to 654-2, whether Nifedipine can prevent IBS from relapse or not is a problem deserving of being studied further.

Key words: Irritable bowel syndrome; Nifedipine; 654-2

Wang Q. Contrast analysis of outcome in 31 IBS cases. *World J Gastroenterol* 1996; 2(Suppl1): 197 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/197.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.197

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ABSTRACT

Relationship between psychological factors and nonulcer dyspepsia in Chinese

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Abstract

AIM: Non ulcer dyspepsia is an extremely common gastroenterologic disease. Quite a few factors are involved in its pathogenesis.

METHODS: In order to understand the role of psychological factors in the pathogenesis of nonulcer dyspepsia (NUD) in Chinese, we investigated 40 cases of NUD and 21 healthy controls with the Minnesota Multiphasic Personality Inventory (MMPI).

RESULTS: It showed 72.5% subjects of NUD with abnormal MMPI, compared with 4.8% in controls ($P < 0.001$). Even though all clinical scale scores were significantly higher in NUD group than those in controls except the hypomania scale score were more evident. The curve of MMPI chart was elevated in NUD group and demonstrated 1, 3 pattern.

CONCLUSION: It supports the assumption that the psychological disturbance may play an important role in the explanation and consultation. And psychological treatment may be necessary in some cases.

Key words: Non-ulcer pepsia; Psychological disturbance

Dou YL, Fan YH, Pan GZ. Relationship between psychological factors and nonulcer dyspepsia in Chinese. *World J Gastroenterol* 1996; 2(Suppl1): 198 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/198.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.198

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ABSTRACT

Clinical laboratory research on stomach dynamic of patients with liver cirrhosis

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Abstract

AIM: To understand the stomach motility of patients with liver cirrhosis.

METHODS: 20 cases of liver cirrhosis (no active hepatitis, no ascites and other complications) were investigated by the method of standard trial meal solid small baric strip X-ray of abdomen. The kinetogenesis of prepulsid was also researched meanwhile. Before examination, the patients were fasted for 10 h, then the standard trial meal (STM) was eaten within 10 min after that, ten grains of solid small baric strip (SSBS) were also eaten. Three X-ray films of abdomen were taken at the fourth, sixth, seventh hour after STM. Finally, the ejection rate of SSBS in the stomach was calculated. Prepulsid 5 mg was taken three times daily after beginning of examination.

RESULTS: The ejection rate of SSBS in stomach at the 4th, 6th and 7th hour in patients were significantly lower than that in normal subjects. It is suggested that stomach motility was abnormal in patients with liver cirrhosis. It recovered to normal after prepulsid treatment for a week. Moreover, the symptoms of liver cirrhosis such as satiety, abdominal distention, nausea, vomiting, anorexia were eliminated too.

CONCLUSION: It showed that the symptoms of liver cirrhosis are caused by abnormal stomach motility. Prepulsid is an effective prokinetic drug for stomach.

Key words: Liver cirrhosis; Stomach dynamia; Prepulsid

Jin JJ, Qin L, Sun JB. Clinical laboratory research on stomach dynamic of patients with liver cirrhosis. *World J Gastroenterol* 1996; 2(Suppl1): 199 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/199.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.199

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ABSTRACT

Dysmotility of remains of stomach in patients after proximal gastrectomy

Xu-Dong Zhang, Hai-Hang Zhu, Xi-Zhi Chen, Deng-Luan Li

Xu-Dong Zhang, Hai-Hang Zhu, Xi-Zhi Chen, Deng-Luan Li, North Jiangsu Hospital, Yangzhou Medical College, Yangzhou 225001, Jiangsu Province, China

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Abstract

AIM: In order to explain improvement of dyspeptic symptoms in patients with proximal gastrectomy, the gastric emptying, electrogastrography (EGG) and effect of cisapride were studied in 16 cases with radiopaque markers.

RESULTS: The findings showed that the early post operation gastric emptying in patients was the same as that in controls, but later post operation gastric emptying was significantly delayed ($P < 0.01$). It is suggested that the loss of fundus storage function and the decrease of gastric peristalsis after proximal gastrectomy may affect the gastric emptying. EGG showed that 13 cases (81.2%) were gastric dysrhythmias. Further studies showed that there was no one to one correlation between the EGG and gastric emptying. A normal EGG recording may not guarantee normal gastric emptying. We found that cisapride significantly increased the rate of gastric emptying ($P < 0.05$) but did not reach the normal levels, and improved the gastric dysrhythmias and dyspeptic symptom in a great number of patients with proximal gastrectomy.

Key words: Gastrectomy; Gastric emptying; Electrogastrography; Cisapride

Zhang XD, Zhu HH, Chen XZ, Li DL. Dysmotility of remains of stomach in patients after proximal gastrectomy. *World J Gastroenterol* 1996; 2(Suppl1): 200 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/200.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.200

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ABSTRACT

Gastric motor in non-ulcer dyspepsia and clinical observation on treatment with domperidone

Fen-Ying Hou, Biao Li, Hong-Kuan Zhong, Chun-Sheng Tian, Li-Hong Wang, Zhong-Yu Cui, Zhi-Xian Shao

Fen-Ying Hou, Biao Li, Hong-Kuan Zhong, Chun-Sheng Tian, Li-Hong Wang, Zhong-Yu Cui, Zhi-Xian Shao, Chaoyang Second Hospital, Chaoyang 122000, Liaoning Province, China

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Abstract

AIM: It is difficult to treat non-ulcer dyspepsia (NUD), which is a common disease in clinic, since its pathogenesis is unclear so far. The purpose of this study was to investigate whether NUD patients had impaired gastric emptying.

METHODS: Sixty-four patients with NUD were studied premeditatedly by the method of radiopaque markers and treated with domperidone.

RESULTS: 59.4% of NUD patients had impaired gastric emptying and domperidone could relieve symptoms in the NUD patients.

Key words: Non-ulcer dyspepsia; Gastric emptying; Domperidone

Hou FY, Li B, Zhong HK, Tian CS, Wang LH, Cui ZY, Shao ZX. Gastric motor in non-ulcer dyspepsia and clinical observation on treatment with domperidone. *World J Gastroenterol* 1996; 2(Suppl1): 201 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/201.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.201

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ABSTRACT

Therapeutic effects of acupuncture on abnormal gastric contractile activity investigated by impedance gastrogram

Ri-Xin Chen, Ming-Fei Kang

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Abstract

AIM: Our previous studies have demonstrated that impedance gastrography is a reliable non invasive technique for measuring human gastric contractile activity. In the present study, the therapeutic effects of acupuncture on abnormal gastric contractile activity in the patient with dyspepsia was investigated by impedance gastrogram.

METHODS: Altogether 34 cases of gastric dysrhythmias who without normal 3.0 cycle/min impedance gastrogram patterns (> 3.5 and < 2.5 cycle/min) were examined by impedance gastrogram. They were equally divided into 2 groups at random. A group as acupuncture group, B group as control group (sham acupuncture, without needing reaction and the propagated sensation along meridians). Impedance gastrograms before and after first treatment course were recorded respectively. The patients symptoms were scored. Acupuncture points Zusanli (S36). Neiguan (P6). Zhongwan (RM12). Weishu (B21) were selected. Ten days were defined as a treatment course. The impedance gastrogram signals was channeled to the A/D conversion board in computer where it was digitized at 4 Hz, the digitized signal was filtered to remove high frequency (> 9.0 cpm) and very low frequency (< 1.0 cpm) components. The time series was Fourier transformed. The spectral density estimates were calculated and graphed in a running spectral plot.

RESULTS: In a group there was a statistic significance ($P < 0.05$) between symptom scores (3.8 ± 2.7) after acupuncture treatment and those (15.5 ± 4.7) before acupuncture treatment. After acupuncture treatment, there was a statistic significance ($P < 0.05$) between symptom scores of 2 groups (3.8 ± 2.7) and (13.1 ± 4.4). In A group, improvement of abnormal impedance gastrogram (14 cases before normal) was more apparent between them than that of B group (1 case normal), there was a statistic significance ($P < 0.05$).

CONCLUSION: Our study indicated that acupuncture can decrease the upper gastrointestinal symptom scores and improve abnormal impedance gastrogram. The impedance gastrogram can evaluate acupuncture therapeutic effects objectively.

Key words: Therapeutic; Acupuncture; Impedance gastrogram

Chen RX, Kang MF. Therapeutic effects of acupuncture on abnormal gastric contractile activity investigated by impedance gastrogram. *World J Gastroenterol* 1996; 2(Suppl1): 202 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/202.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.202

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ABSTRACT

Clinical trail on cispride in treatment of constipation

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Abstract

AIM: This clinical trail studied on cisapride in treatment of constipation.

METHODS: 59 cases of constipation gastrointestinal disease with a mean age of 62 years old. Initial dose of cisapride: 5 mg 2 times daily; Maximal dose: 20 mg 2 times daily; Maintenance treatment of cisapride: 5 mg daily. The patients were followed up before treatment and after treatment. The symptoms and side effects were recorded.

RESULTS: The cisapride could significantly improve the symptoms of constipation. Total efficacy rate of cisapride as 93.2%. Side effects are mainly borborygmi, diarrhea and transient abdominal cramping, but most of patients could endure.

CONCLUSION: The clinical trail indicated that the cisapride is safe and effective in treatment of functional constipation.

Key words: Cisapride; Constipation

Huang HH. Clinical trail on cispride in treatment of constipation. *World J Gastroenterol* 1996; 2(Suppl1): 203 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/203.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.203

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ABSTRACT

Efficacy of cisapride for therapy of constipation in aged patients

Chang-Qing Zhang

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Abstract

AIM: To observe the effect of cisapride on constipation in aged patients.

METHODS: 48 patients with constipation in aged were randomly assigned to 2 groups: 28 patients (M 18, F 10, age 72 ± 6) were treated with cisapride 10 mg po tid and 20 patients (M 13, F 7, age 73 ± 5) received placebo 2 tablets po tid. Both groups were treated for 8 wk.

RESULTS: The total effective rate was 75% in cisapride group and 30% in the placebo group, $P < 0.01$. Cisapride had no marked side effects.

CONCLUSION: Cisapride is a safe and effective drug for treatment of constipation in aged patients.

Key words: Constipation; Cisapride

Zhang CQ. Efficacy of cisapride for therapy of constipation in aged patients. *World J Gastroenterol* 1996; 2(Suppl1): 204 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/204.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.204

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ABSTRACT

Observation on esophageal motility function in 25 elderly subjects

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Abstract

AIM: To investigate the characteristics of esophageal motility function in the elderly.

METHODS: Triple lead, air conduction slow pull through method.

RESULTS: The aged people tend to have reduced pressure in lower esophageal sphincter, increase in multiple contraction waves in the body of esophagus, diminished conduction function and reduced pressure in the upper sphincter too. In the group with esophageal hernia the pressure of lower esophagus was lower than that of the control group but had no statistical significance.

CONCLUSION: It is necessary to conduct esophageal motility function testing in the aged people with acid reflux symptoms after manometry, lower esophageal sphincter pressures, hiatus hernia.

Key words: Esophageal; Motility; Function

Zhang LP, Sha ZF, Zhang TC. Observation on esophageal motility function in 25 elderly subjects. *World J Gastroenterol* 1996; 2(Suppl1): 205 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/205.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.205

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ABSTRACT

Clinical evaluation of fasting plasma motilin levels in patients with gastric esophageal diseases

Guo-Jian Xie, Qing-Ming Wu, Kai-Sen Yu

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Abstract

AIM: It is the primary physiological function of motilin (MTL) to regulate gastrointestinal movement of interdigestive period, but the relationship between MTL and digestive diseases is unknown. The aim of this study was to survey fasting plasma MTL levels in patients with digestive diseases and make clinical evaluation.

METHODS: (1) Patients: chronic superficial gastritis 44, duodenal ulcer 55, gastric ulcer 19, gastric carcinoma 24, esophageal carcinoma 18, bile reflux gastritis 12. The control group is 46 healthy volunteers. (2) Measurement of plasma MTL levels: fasting blood is collected. MTL levels were measured by radioimmunoassay. (3) Examination of Helicobacter pylori infection: biopsies are taken from the antrum for a CLO test and Starry silver stain to inspect *Hp* infection. (4) Analysis of data: results are expressed by means ± SD. The significance of the differences is verified by unpaired *t* test.

RESULTS: (1) Fasting plasma MTL levels: the level of each disease group was 340 ± 128.4, 659.6 ± 267.3, 619.7 ± 274.5, 859.0 ± 233.8, 923.5 ± 286.7 and 575.8 ± 147.6 pg/mL, respectively. Comparing with the control (333.8 ± 75.3 pg/mL), differences were significant ($P < 0.001$) expect CSG group. The levels in groups of cancer were higher significant than those in non cancer groups were 52%, 84%, 68%, 58%, and 44%, respectively. The MTL levels of patients with positive and negative *Hp* had no significant different in each group. (2) Distribution in 87% cancer patients plasma MTL levels obviously higher than the control, but in CSG group, 84% of them are normal.

CONCLUSIONS: (1) Because most CSG patients MTL levels were normal, we have speculated that CSG itself hardly results in disturbance of gastrointestinal motion. (2) Enhancement of the MTL levels in DU patients might be related to the high outputs of gastric acid. The disorder of gastrointestinal movement with high plasma MTL level might be one of the pathogenic mechanisms of DU. High levels in patients with GU are thought to be originated from the delay of gastric emptying. (3) It is the reason why the levels in patients with Gca and Eca have risen significantly that the tumor tissues could create and secret MTL. So dynamic inspection of MTL levels in those patients should be an effective criterion of treatment. (4) Over 50% of patients with bile reflux gastritis, the MTL levels were higher than normal. This increases the pathologic duodenal gastric reflux because of disturbed gastrointestinal motion. (5) *Hp* infection does not affect the generation and release of MTL, so we have speculated that *Hp* infection does not influence gastrointestinal movement.

Key words: Motilin; *Helicobacter pylori*; Gastric emptying

Xie GJ, Wu QM, Yu KS. Clinical evaluation of fasting plasma motilin levels in patients with gastric esophageal diseases. *World J Gastroenterol* 1996; 2(Suppl1): 206 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/206.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.206

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ABSTRACT

Relationship of clonorchiasis and nonulcer dyspepsia analysis of 186 cases

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Abstract

AIM: To study relationship of clonorchiasis and nonulcer dyspepsia.

METHODS: To assay clonorchiasis sinensis eggs in stool and antibody in serum, observe pyloric function by stomach endoscopy.

RESULTS: The eggs positive rate was 23.12%, antibody positive rate was 33.33% in 186 patients. Assay of serum antibody is more sensitive than stool eggs test ($P < 0.01$). Its two clinical types of NUD, reflux like dyspepsia and dysmotility like dyspepsia that had higher infected rate of clonorchiasis sinensis than others ($P < 0.01$). Either infected or uninfected patient revealed proportion of abnormal pyloric function ($P > 0.05$).

CONCLUSION: Clonorchiasis is one of causes of NUD, specially reflux like dyspepsia and dysmotility like dyspepsia in delta of pearl liver.

Key words: Clonorchiasis; Non-ulcer dyspepsia

Jia LP, Lin HX. Relationship of clonorchiasis and nonulcer dyspepsia-analysis of 186 cases. *World J Gastroenterol* 1996; 2(Suppl1): 207 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/207.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.207

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ABSTRACT

Analysis of therapeutic effects of soothing the liver and regulating the stomach on 80 cases of functional dyspepsia

Bao-Tai Yao, Xiu-Rong Sun, Lei Wang

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Abstract

AIM: Functional dyspepsia is commonly seen in clinic, however, its cause is not clear. In order to search for a new effective means of TM for the treatment of the disease, the authors treated 80 cases of FD with the TCM methods of soothing the liver and regulating the function of stomach which showed a satisfactory effect and no side effects, compared with 76 cases of the same disease in the control group.

METHODS: From January 1992 to October 1995, 156 in or out patients of FD in our hospital were randomly divided into 2 groups: 80 cases in the Chinese drug group and 76 cases in the control group (treated with Domperidone). The sex, age and course of the disease were basically comparable between the 2 groups. According to TCM, all the cases in the Chinese drug group were divided into 3 types: the type of disharmony of the liver and stomach. Patients of this type were given the basic recipe with ingredients as follows: Radix Bupleuri 12 g, Fructus Aurantii 12 g, Radix Paeniae Alba 18 g, Radix Curcumae 12 g, Radix Auckalndiae 10 g, Pericarpium Citri Reticulatae 10 g, Rhizoma Cyprei 10 g, Caulis Peillae 9 g, Pericarpium Arecae 18 g. Poria 15 g, Rhizoma Atracylodis Macrocephalate 12 g, Rhixoma Pinclliae 12 g and Radix Glxcyrrhizae 6 g.

Key words: Liver; Stomach; Functional dyspepsia

Yao BT, Sun XR, Wang L. Analysis of therapeutic effects of soothing the liver and regulating the stomach on 80 cases of functional dyspepsia. *World J Gastroenterol* 1996; 2(Suppl1): 208 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/208.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.208

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ABSTRACT

Cisapride in treatment of chronic functional constipation in 23 patients

Chang-Hua Wang, Ai-Xiu Ding, Xing-Jin Lu

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Abstract

AIM: The purpose of the study is to observe the efficacy and safety of cisapride in treatment of chronic functional constipation.

METHODS: 23 patients (male 14, female 9, age 58 ± 7 years) of chronic functional constipation were treated with cisapride in a dose of 10 mg tid po for 4 wk.

RESULTS: Interval time of defecation and time for defecation became shorter than those of before treatment ($P < 0.01$). The pronounced response rate and the total response rate were 52.2% and 82.6%, respectively. The side effects were mild.

CONCLUSION: Cisapride was safe and effective in treatment of chronic functional constipation.

Key words: Cisapride; Constipation

Wang CH, Ding AX, Lu XJ. Cisapride in treatment of chronic functional constipation in 23 patients. *World J Gastroenterol* 1996; 2(Suppl1): 209 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/209.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.209

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ABSTRACT

Cisapride in treatment of functional dyspepsia in 71 patients

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Author contributions: All authors contributed equally to the work.

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Abstract

AIM: To observe the efficacy and safety of cisapride in treatment of functional dyspepsia.

METHODS: 71 patients (M 32, F 39; Age 41.3 ± 10.7 years) of functional dyspepsia were treated with cisapride in a dose of 5 mg tid po for 4 wk.

RESULTS: The results showed that cisapride could significantly improve the symptoms including early satiety. Abdominal distention, epigastric pain, nausea, vomiting and anoxia. The pronounced response rate and the total response rate were 67.6% and 91.5%, respectively. The side effects were mild.

CONCLUSION: The above results indicated that the cisapride was safe and effective in treatment of functional dyspepsia.

Key words: Cisapride; Functional dyspepsia

Wang CH, Ding AX, Lu XJ. Cisapride in treatment of functional dyspepsia in 71 patients. *World J Gastroenterol* 1996; 2(Suppl1): 210 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/210.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.210

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ABSTRACT

Study of the spontaneous nocturnal alkalization of stomach in subjects with and without duodenal ulcer disease

Bang-Mao Wang, Nai-Xia Huang, Lin Wu, Xin-Yan Yang, Wen-Tian Liu

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Abstract

AIM: Intragastric 24-h pH recordings of 57 subjects were analyzed to evaluated the spontaneous nocturnal alkalization of stomach.

METHODS: Among them there were 23 active duodenal ulcer (DU) patients and 34 non-ulcer (NU) subjects that included 6 healthy controls, 12 chronic superficial gastritis and 16 gastroesophageal reflux disease subjects.

RESULTS: (1) Spontaneous nocturnal alkalization of the stomach began in the latter part of the night. (2) The mean alkalization times (11 pm - 7 am) in duodenal ulcer patients were significantly lower than those of nonulcer subjects (pH < 3: 12.92 ± 14.1 min *vs* 117 ± 103 min, $P < 0.001$; PH > 4; 8.04 ± 10.13 min *vs* 86 ± 82 min, $P < 0.001$). (3) The nocturnal alkalization areas of the duodenal ulcer patients were significantly lower than those of nonulcer subjects (pH > 3: 36 ± 41 pH × min *vs* 300 ± 296 pH × min, $P < 0.001$; PH > 4; 24.6 ± 30.45 pH × min *vs* 213 ± 211 pH × min, $P < 0.001$). (4) The number of alkalization episodes of pH greater than 3 and longer than 5 min in duodenal ulcer patients was significantly lower than that of NU subjects (0.30 ± 0.71 *vs* 2.087 ± 2.12, $P < 0.001$), and the longest alkalization episodes of pH greater than 3 in DU patients was significantly shorter than that of NU subjects (6.95 ± 14.12 min *vs* 66.53 ± 66.21 min, $P < 0.001$). And (5) The raw profiles of 24-h recordings in 88.2 percent of nonulcer subjects showed the presence of spontaneous nocturnal alkalization, which was absent in 82.6 percent of duodenal ulcer patients.

CONCLUSION: Our results showed that the times and numbers of alkalization episode in DU patients were significantly lower than those of NU subjects, and almost all DU patients lacked the spontaneous nocturnal alkalization of stomach, which might be one of the pathogenesis of duodenal ulcer diseases, and could be a more sensitive sign for diagnosing duodenal ulcer disease.

Key words: Gastric alkalization; Duodenal ulcer

Wang BM, Huang NX, Wu L, Yang XY, Liu WT. Study of the spontaneous nocturnal alkalization of stomach in subjects with and without duodenal ulcer disease. *World J Gastroenterol* 1996; 2(Suppl1): 211 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/211.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.211

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ABSTRACT

Clinical character and treatment in 70 cases with idiopathic gastroparesis

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Abstract

AIM: To investigate clinical character of idiopathic gastroparesis.

METHODS: 70 cases with idiopathic gastroparesis, male 23, female 47, made up 22.7% of the functional dyspepsia patients (70/309), age 14-67 and the course of disease was 1 to 12 years. All patients underwent gastroscopy and histological examination of gastric mucous membrane.

RESULTS: It was showed that antral motility decreased in 70 patients or disappeared in 40 patients and food was retarded in body and fundus of gastrum in 28 patients. The shape was normal but the closing and opening was reduced in pylorus. There were 66 simple mild gastritis and 4 atrophy gastritis. The 40 patients underwent gastrointestinal barium examination. It was showed that gastric motility decreased and gastric emptying postponed. The 30 patients underwent gastric ultrasound. It was showed that gastric antrum broadened and a liquid gastric emptying was more postponed than 28 health controls ($P < 0.05$). Electrogastrography permitted measurements of gastric electrical activity in 70 patients. It was showed that there were 14 patients with tachygastria, 38 patients with dysrhythmia, 10 patients with bradygastria and 8 patients with lower gastroelectrical amplitude. Treated with cisapride (30 mg/d) for 4 wk, the symptoms were improved in all patients and abnormal electrogastrography were corrected in 24 cases and improved in 13 cases. The symptoms recurred in 58 patients which must be treated with prokinetic for 8-12 wk. 6 patients have to be treated with prokinetic for a long time.

CONCLUSION: Idiopathic gastroparesis is not few in gastric ultrasound and electrogastrography have diagnostic value to idiopathic gastroparesis and provide basis for determining curative effect of the medical treatment.

Key words: Idiopathic gastroparesis; Clinical character; Treatment

Qiu XS. Clinical character and treatment in 70 cases with idiopathic gastroparesis. *World J Gastroenterol* 1996; 2(Suppl1): 212 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/212.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.212

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ABSTRACT

Omeprazole combined with prepulsid in the therapy of reflux oesophagitis with analysis of 84 cases

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Abstract

AIM: As a common disease, reflux oesophagitis (RO) earned a great attention not due to the disease itself but the metaplasia and Barrett esophagus following and correlated with esophagus neoplasms. And the looseness of cardiac sphincter often makes the reflux oesophagitis deteriorative and recurrent.

METHODS: Eighty four patients with RO were divided into two groups. In group 1, 44 patients treated with Omeprazole combined with prepulsid; In group 2, 40 patients treated with Omeprazole only. Patients in these two groups were observed under the gastroscopy.

RESULTS: There is no difference between these two groups in symptom relief during the four week observation. But the gastroscopy showed some difference in inflammation resolusion. In group 1, 28/44 got the goal, but in group 2, 15/40 ($P < 0.05$) did at the first two weeks. 41/44 in group 1 and 31/40 in group 2 did at four week observation.

CONCLUSION: Omeprazole combined with prepulsid can produce better results than just using Omeprazole. Enhancing the tense of cardiac sphincter and decreasing the reflux of the gastric juice may explain the reason.

Key words: Omeprazole; Prepulsid; Reflux oesophagitis

Cui LH, Yie JX, Fu L. Omeprazole combined with prepulsid in the therapy of reflux oesophagitis with analysis of 84 cases. *World J Gastroenterol* 1996; 2(Suppl1): 213 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/213.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.213

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ABSTRACT

Exploring the characteristics of electrogastrography in patients with chronic superficial gastritis by cluster analysis

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Abstract

AIM: Electrogastroenterography has been useful way to the study of gastroenteropathy, the aims are to explore the features of electrogastrograph (EGG) in patients with chronic superficial gastritis (CSG).

METHODS: Seventy patients with CSG diagnosed under endoscopy received EGG examination, 4 ways of EGG were collected for 400 s from the upper abdomen with 4 electrodes fixed respectively on the projective positions of the duodenal bulb the stomach body, the lesser and the greater curvatures and analyzed with computer for average amplitude and other 16 indexes. The systematic cluster analysis method was used in clustering indexes and Fishers cluster analysis method were used in clustering EGG samples.

RESULTS: In index clustering, there were 9 groups with coefficient of correlation being 0.5. Four pairs of indexes with coefficient of correlation more than 0.8 were clustered, and 13 atypical indexes were available in each way of EGG. The differences of each index among 6 groups were all significant ($P < 0.01$) in analysis of variance. The results of q test showed that 61.51% of the differences of indexes between groups were significant ($P < 0.05$). The indexes, frequency spectra and waves of EGG in each group showed normal or nearly normal EGG. Low frequent waves were often seen.

CONCLUSIONS: (1) Cluster analysis is a useful method for exploring the characteristics of EGG. (2) The CSG patients had nearly normal EGG, with low frequency more common, while high frequency rare.

Key words: Electrogastrography; Cluster analysis; Chronic superficial gastritis

Zhang KH, Zhu JQ, Wang CW. Exploring the characteristics of electrogastrography in patients with chronic superficial gastritis by cluster analysis. *World J Gastroenterol* 1996; 2(Suppl1): 214 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/214.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.214

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ABSTRACT

Initiative investigation on the level of plasma motilin in diarrhea and constipation

Qing-Ming Wu, Ming-Zi Mao, Zhen Rong, Kai-Sen Yu

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Abstract

AIM: Motilin is a brain gut peptide that revealed a more widespread distribution of the GI tract and central nervous system. Motilin is considered a major determinant of phase 3 activity of the migrating motor complex (MMC) in the stomach and upper small bowel, causing contraction of gastric and intestinal smooth muscle. In this paper, the effect of motilin on the colonic motility was studied.

METHODS: The levels of fast plasma motilin were detected for the reversal motility disorders types diarrhea and constipations, 50 cases respectively, and 30 health controls.

RESULTS: The concentrations of motilin in the diseases group was significantly increased in the group of diarrhea than in the group of constipation.

CONCLUSION: Motilin may play a role in the motility of colon.

Key words: Motilin; Colon transit

Wu QM, Mao MZ, Rong Z, Yu KS. Initiative investigation on the level of plasma motilin in diarrhea and constipation. *World J Gastroenterol* 1996; 2(Suppl1): 215 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/215.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.215

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ABSTRACT

Relationship between the clinical types of functional dyspepsia and gastric motility

Tong Dang, Yan-Dong Chen, Yan Zhang, Gan Lu, Jiao-Yang Kang

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Abstract

AIM: The functional dyspepsia (FD) was divided into different groups according to different clinic symptoms. In an attempt to explore other pathologic mechanism except of motility disorder, we studied the gastric motility change of these clinic symptom groups.

METHODS: 82 healthy subjects were studied as control, the half gastric emptying time ($T_{1/2}$) of all the patients and control subjects were measured by magnetogastrogram.

RESULTS: The $T_{1/2}$ ($\bar{x}$ ± SD) of FD patients was 88.6 ± 37.6 min, it showed a significant delay as compared with the controls that was 51.79 ± 21.46 min (P < 0.01). The gastric emptying delayed patients of FD patients accounted for 60.4%. This conclusion is same compared with the methods of other articles about FD. In 588 FD patients of this report, we present 24 cases of reflux type (4.1%), 355 cases of motion disorder type (60.4%), 144 cases of ulcer type (24.5%), 10 cases of swallow gas type (1.7%), 55 cases specific type (9.4%). The $T_{1/2}$ of all types were different: reflux type (105.2 ± 39.5), motion type (91.06 ± 38.5 min), ulcer symptoms type (81.7 ± 32.4 min), swallow gas type (96.2 ± 33.5 min), specific type (82.78 ± 38.9 min), the reflux type and motion type were compared with ulcer type separately, the results showed significant difference.

CONCLUSION: We suggest that maybe exist other cause and mechanism about pathologic mechanism of FD except of gastric emptying function abnormality of different level.

Key words: Functional dyspepsia; Gastric emptying; Magnetogastrogram

Dang T, Chen YD, Zhang Y, Lu G, Kang JY. Relationship between the clinical types of functional dyspepsia and gastric motility. *World J Gastroenterol* 1996; 2(Suppl1): 216 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/216.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.216

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ABSTRACT

Endoscopic measurement of intraluminal pressure of upper digestive tract in functional dyspepsia

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Abstract

AIM: The intraluminal pressure of various portions of the upper digestive tract was measured with transducer manometer in a group of 16 functional dyspepsia patients and a control group of 19 healthy volunteers to investigate their clinical significance. The types of FD cases were esophageal reflux type 6 cases, ulcer type 3 cases. Motility disorder type 5 cases, aerophagia type 1 cases and idiopathic type 1 case.

METHODS: The regime of observation consisted gastroendoscopy, pathological examination of gastric mucosa and *Hp* urease test. The intraluminal pressure of duodenal bulb, pyloric region, gastric cavity, cardial region and lower segment of esophagus were measured serially with SGY-3 transducer manometer during gastroendoscopy. The pressure value and pressure curve were recorded. The values of both groups were treated with *t* test.

RESULTS: The intraluminal pressure of duodenum and lower esophagus of FD group showed no significant difference statistically with that of control group. The intraluminal pressures of pyloric region, gastric cavity and cardial region were 1.82 ± 0.38 *vs* 2.48 ± 0.83; 1.872 ± 0.88 *vs* 2.32 ± 0.50; And 2.28 ± 0.50 *vs* 2.36 ± 0.42, respectively. FD group ($P < 0.05$) showed marked pressure lowering. The gastroscopic manifestations were mild and light inflammation of gastric mucosa. Positive rate of *Hp* was 63.1%.

CONCLUSION: Endoscopic measurement of intraluminal pressure with SGY-3 type transducer manometer has the merits of accurate localization, recording pressure curve stably and is helpful in diagnosing motility disorders of the GI tract. The depression of intraluminal pressure observed in this study may play an important role in influencing the formation and progression of FD. The depression of intraluminal pressure is considered to be correlated with *Hp* infection and gastric mucosa inflammation. Regulation of intraluminal pressure should be stressed in the treatment of FD.

Key words: Functional dyspepsia; Endoscopic examination; Gastrointestinal manometry

Zhong HM, Yao P. Endoscopic measurement of intraluminal pressure of upper digestive tract in functional dyspepsia. *World J Gastroenterol* 1996; 2(Suppl1): 217 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/217.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.217

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ABSTRACT

Comparative study on 24-h esophageal pH monitoring and endoscopy in the diagnosis of gastroesophageal reflux disease

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Abstract

AIM: To investigate the 24-h esophageal pH monitoring and endoscopy in the diagnosis of gastroesophageal reflux disease.

METHODS: 24-h esophageal pH monitoring and endoscopy were performed in 39 patients with classic reflux symptoms. Additionally, 16 healthy adults underwent 24-h esophageal pH monitoring.

RESULTS: There is a very significant difference between GER patients and healthy volunteers for each parameter of 24-h esophageal pH monitoring ($P < 0.001$). About 54% (21/39) GERD had normal endoscopic appearance, mild esophagitis patients were common, Grade 1 esophagitis accounted for nearly 90% (16/18), Grade 2 esophagitis for 10% (2/18). None for Grade 3 and 4 esophagitis. The total and supine percent time of pH less than four, episodes lasting for five minutes, and the longest reflux episodes were much more in esophagitis patients than those in patients with normal endoscopic appearance, but no significant difference in reflux episodes between the two groups ($P > 0.05$). The 24-h esophageal pH monitoring of 39 cases showed 34 were positive (87%), but that of control group showed only 1 was positive (93% negative). 24-h esophageal pH monitoring was positive in 17 of 18 patients with esophagitis. The positive rate was 94%. Conversely, 17 of 34 patients with positive 24-h esophageal pH monitoring had normal endoscopic appearance.

CONCLUSION: 24-h esophageal pH monitoring is an important method for detecting acid reflux, especially in patients with no endoscopic esophagitis. Endoscopy is useful in detecting esophagitis and its degree. Both of the two measures may play complementary roles. A combined approach using 24-h esophageal pH monitoring and endoscopy may further increase the diagnosing rates.

Key words: 24-h esophageal pH monitoring; Endoscopy; Diagnosis

Xiong Y. Comparative study on 24-h esophageal pH monitoring and endoscopy in the diagnosis of gastroesophageal reflux disease. *World J Gastroenterol* 1996; 2(Suppl1): 218 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/218.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.218

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ABSTRACT

Anorectal motility in the irritable bowel syndrome

Yong Xie, Yian Huan, Chong-Wen Wang

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Abstract

AIM: To investigate the change of rectoanal function in patients with irritable bowel syndrome (IBS), the rectoanal manometry and function of defecation in patients with IBS and normal subjects were studied.

METHODS: The rectoanal manometry was done in 30 patients with diarrhea predominant type IBS (Dp-IBS), 20 patients with constipation predominant type IBS (Cp-IBS) and 11 normal subjects using the HR PC Polygraph GI motility system with eight channel perfused catheter with balloon.

RESULTS: (1) The rectal resting pressure, the resting pressure and the maximum squeeze pressure of the anal sphincter were 10.66 ± 3.68 mmHg, 62.58 ± 17.51 mmHg, 108.11 ± 20.67 mmHg in the Dp-IBS, 9.63 ± 3.02 mmHg, 68.45 ± 17.58 mmHg, 109.48 ± 20.11 mmHg in the Cp-IBS and 9.52 ± 2.81 mmHg, 64.33 ± 21.83 mmHg, 112.73 ± 28.16 mmHg in the normal subjects respectively, and no significant differences among 3 groups ($P > 0.05$). (2) The lengths of high pressure zone in the Dp-IBS and Cp-IBS were 2.95 ± 0.46 cm and 3.10 ± 0.68 cm, respectively and significantly higher than normal subjects (2.64 ± 0.60 cm) ($P < 0.0005$). (3) The rectal sensitivity, maximum tolerance, compliance and the rectal capacity causing rectoanal inhibitory reflex were 57.67 ± 22.27 mL, 188.67 ± 83.78 mL, 4.43 ± 0.94 mL/mmHg, 76.17 ± 18.74 mL in the Dp-IBS and 81.82 ± 26.28 mL, 299.09 ± 60.08 mL, 6.21 ± 1.04 mL/mmHg, 105.45 ± 22.41 mL in normal subjects respectively and those in the Dp-IBS significantly lower than those in normal ($P < 0.005$); The anal sphincter relaxation rates were 77.17 ± 11.11% in the Dp-IBS and 75.03 ± 13.71% in normal subjects respectively, and no significant difference between them ($P > 0.05$). (4) The rectal sensitivity was 81.75 ± 34.02 mL in the Cp-IBS and nearly same as normal subjects ($P > 0.05$); The maximum tolerance and the rectal capacity causing rectoanal inhibitory reflex in the Cp-IBS were 348.11 ± 75.02 mL and 133.55 ± 47.81 mL, respectively, and significantly higher than those in normal subjects ($P < 0.05$); The rectal compliance and anal sphincter realization rate were 4.60 ± 0.98 mL/mmHg and 50.28 ± 10.84%, respectively and significantly lower than those in normal subjects ($P < 0.05$-0.0005).

CONCLUSIONS: (1) At resting state, the function of rectal and anal in patients with IBS were normal. (2) Rectal sensitivity in patients with Dp-IBS increased, but their tolerance and compliance reduced and rectal small amount distention-stimulated can caused defecation reflex, so sensation urgency and diarrhea occurred. (3) In patients with Cp-IBS the rectal sensitivity to distention- stimulated reduced and defecation reflex were disordered and enough amount of rectal distention stimulated can't cause rectoanal inhibitory reflex. So defecation difficulty and constipation occurred. (4) The pathogenesis and basis of pathophysiology were different between patients with Dp-IBS and Cp-IBS.

Key words: Ano-rectal motility; Irritable bowel syndrome

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ABSTRACT

Evaluation of therapeutic effectiveness of cisapride in functional dispepsia

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Abstract

AIM: Functional dyspepsia (FD) is a common clinical syndrome. In this study, the therapeutic effectiveness of cisapride in FD was evaluated with before after clinical trial design in the same patients.

METHODS: 36 functional dyspepsia cases were evaluated for the effectiveness and adverse reaction of cisapride, comparing with domperidone. The patients were treated with domperidone 10 mg tid in the first 4 wk, and followed by 4 wk washout period, then treated with cisapride 5 mg tid for another 4 wk. The ultrasound gastric emptying time was measured before and after each treatment.

RESULTS: At the end of 2 wk treatment, the symptoms in both groups were improved equally. The effective rate were 75% *vs* 66.44%. But at the end of 4 wk treatment, the effective rate became 86.11% *vs* 67.11%, implying better effects in cisapride group (P < 0.025). For patients with delayed gastric emptying time, both drugs were effective for shortening the emptying rate but significant in cases of cisapride but not the case in patients with normal gastric emptying time. Little side effects were found during the course of treatment. In domperidone group, only one complained fullness of breast and Lactorrhea. In cisapride group, only one had mild diarrhea and borborygmi.

CONCLUSION: It indicated that cisapride, as a new prokinetic agent, is the best choice for delayed gastric emptying cases of FD better than domperidone.

Key words: Cisapride; Functional dyspepsia

Qiu X, Ouyang Q, Yuan CX. Evaluation of therapeutic effectiveness of cisapride in functional dispepsia. *World J Gastroenterol* 1996; 2(Suppl1): 220 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/220.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.220

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ABSTRACT

Omeprazole treatment for severe gastroesophageal reflux disease

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Abstract

AIM: More than half a century, many patients suffering from the severe gastroesophageal reflux disease (GERD). In the past, the medical management was ineffective. In contrast, the proton pump inhibitor omeprazole has recently been shown to be effective and safe for treatment of severe reflux disease.

METHODS: 125 patients with GERD were treated by omeprazole 0.5-0.8 mg/kg/d, for 1/2 year.

RESULTS: After one week, 24-h intraesophageal pH returned steadly to normal. Half a year later, all patients had relief of symptoms. We also found, the long term treatment of omeprazole is necessary and heal severe GERD and prevent complications.

CONCLUSION: Omeprazole is very effective to heal GERD.

Key words: Gastroesophageal reflux disease; Omeprazole

Zhao Y, Hou F, Wang JY, Tian HW. Omeprazole treatment for severe gastroesophageal reflux disease. *World J Gastroenterol* 1996; 2(Suppl1): 221 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/221.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.221

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ABSTRACT

Clinical characteristics of reflux esophagitis in different ages

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Abstract

AIM: 68 patients with reflux esophagitis confirmed by endoscopy were divided naturally into 3 groups according to their ages: < 40 years group, 40-60 years group and > 60 years group. Clinical characteristics of the 3 groups were analyzed.

METHODS: Features of each group was compared with the others in reflux symptoms (heartburn, regurgitation and swallowing pain), throat symptom caused by abnormal throat feeling, hiatus hernia and esophagitis.

RESULTS: Along with age increased, the rate of heartburn occurrence decreased ($P < 0.05$), but its severity had no significant difference; The rate of hiatus hernia occurrence tended to raise; And the grade of esophagitis tended to raise too. Other symptoms had no significant difference.

CONCLUSION: The clinical characteristics are different in patients with reflux esophagitis in different ages.

Key words: Clinical characteristics; Reflux esophagitis

Wang JL, Wang HY. Clinical characteristics of reflux esophagitis in different ages. *World J Gastroenterol* 1996; 2(Suppl1): 222 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/222.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.222

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ABSTRACT

Effect of rubber band ligation of esophageal varices on gastroesophageal reflux

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Abstract

AIM: The esophageal varices bleeding is the most severe complication of portal hypertension. The main cause is portal hypertension. But the esophagitis may also be one of the most important factors. Our aims was to investigate the effect of rubber band ligation of esophageal varices on gastroesophageal reflux.

METHODS: We use 24-h esophageal pH monitoring to study 22 patients with esophageal varices before and 2-3 wk after operation.

RESULTS: (1) The incidence of gastroesophageal reflux are 68.1% before and 22.7% after operation ($P < 0.005$). (2) Number of reflux episodes longer than 5.0 min are 9.0 ± 8.81 and 3.2 ± 2.8 ($P < 0.05$). (3) Total times pH below 4.00 are 373.7 ± 185.7 and 190.8 ± 150.6 ($P < 0.01$). (4) The incidence of reflux are 42.8% (3/7) in moderate esophageal varices and 73.3% (11/17) in severe ($P > 0.10$). But the number of reflux episodes between the 2 groups has statistic difference ($P < 0.05$).

CONCLUSIONS: (1) There are gastroesophageal reflux in cirrhosis with esophageal varices. (2) The rubber band ligation of esophageal varices can decrease gastroesophageal reflux and it is an effective method. (3) Esophageal varices may affect the function of the esophagus and cause gastroesophageal reflux.

Key words: Rubber band ligation; Esophageal varices; Gastroesophageal reflux

Wu JC, Yang L, Wang YP, Li CY. Effect of rubber band ligation of esophageal varices on gastroesophageal reflux. *World J Gastroenterol* 1996; 2(Suppl1): 223 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/223.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.223

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ABSTRACT

Clinical analysis of 34 patients with esophageal motility disorders

Xiao-Feng Yu, Jun Xia, Gen-Sheng Wang, Tong-Jin Gu, Zan-Shun Wang

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Abstract

AIM: Thirty-four patients with esophageal chest pain and intermittent dysphagia were studied by esophageal manometry.

METHODS: The ratio to male to female was 4.67:1. Among 34 patients, gastroscopic abnormality was 26.47%. X-ray abnormality was 17.65%.

RESULTS: The pressure patterns of lower esophageal sphincter (LESP) were hypertensive type 8.82%, hypotensive type 52.94%, and normal type 38.23%. The esophageal motility disorders were hyperkinesia 2.94%, hypokinesia 38.24%, dyskinesia 58.82%.

CONCLUSION: It suggests that LES abnormality and esophageal motility disorders are the contributing factors of esophageal chest pain and intermittent dysphagia. Clinical symptoms can be relieved by antacid and gastrointestinal prokinetic drugs.

Key words: Esophageal; Motility disorders; Prokinetic, antacid

Yu XF, Xia J, Wang GS, Gu TJ, Wang ZS. Clinical analysis of 34 patients with esophageal motility disorders. *World J Gastroenterol* 1996; 2(Suppl1): 224 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/224.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.224

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ABSTRACT

Disorder of gastric liqiud emptying in the patients with liver cirrhosis

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Abstract

AIM: To study gastric liquid emptying and its effects in patients with liver cirrhosis.

METHODS: Gastric liquid emptying of 26 patients with cirrhosis and 14 health control was assessed by antrum square determination with real time ultrasonography, and fasting blood motilin and gastrin were measured by radioimmunoassay.

RESULTS: In the group of cirrhosis, half time for gastric emptying (GET1/2) was 34.53 ± 8.23 min, when compared with that of control group (28.06 ± 4.11 min), which was significantly delayed (P < 0.01). It verified that gastric liquid emptying of cirrhotic patients was impaired. GET1/2 was positively correlated with scores for upper gastrointestinal symptoms in cirrhotic patients (r = 0.426, P < 0.05). In patients with cirrhosis, GET 1/2 was in positively correlation with the degree of hepatic dysfunction. The concentrations of plasma motilin and serum gastrin were 418.54 ± 54.63 ng/L and 87.73 ± 24.37 ng/L, respectively, both of which were increased when compared to normal control (P < 0.01, all).

CONCLUSION: Gastric liquid emptying was delayed in patients with liver cirrhosis. Gastric motility disorder was an important cause of the upper gastrointestinal symptoms in patients with cirrhosis. We believe that in patients with cirrhosis, gastric liquid emptying disorder may be involved in hepatic dysfunction and the abnormal metabolism of gastrointestinal hormone.

Key words: Gastric liquid emptying; Liver cirrhosis

Wu Y, Wang JL. Disorder of gastric liqiud emptying in the patients with liver cirrhosis. *World J Gastroenterol* 1996; 2(Suppl1): 225 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/225.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.225

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ABSTRACT

Endoscopic manometry in the diagnosis of sphincter of Oddi dysfunction

Duo-Wu Zou, Guo-Ming Xu, Zhen-Xin Sun, Zhao-Shen Li, Ning Yin

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Abstract

AIM: To evaluate endoscopic manometry in the diagnosis of postcholecystectomy patients with recurring biliary colic pain and how frequently the manometric abnormalities are recorded.

METHODS: The study group consisted of 60 postcholecystectomy patients with recurring biliary colic pain, including 23 men and 37 women, age 45.25 ± 10.23. According to the clinical classification recommended by Geenen Hogan, there were 20 cases of type Ⅰ, 22 cases of type Ⅱ and 18 cases of type Ⅲ. 10 control subjects were all without bile duct and periampullary diseases. A triple lumen low compliance system was used to record the basal pressure, phasic contraction frequency, amplitude, direction of wave propagation of sphincter of Oddi and common bile duct pressure.

RESULTS: Compared with control group, there was no difference on common bile duct pressure in study group, but the basal pressure, phasic contraction frequency and amplitude of sphincter of Oddi were greatly higher ($P < 0.01$), and the proportion of negative wave propagation was also increased ($P < 0.05$). According to the normal anometry of sphincter of Oddi recommended by Guerruc, the prevalence of manometric abnormalities was 46.7% in study group. The prevalence in type Ⅰ which was higher than that in type Ⅱ or type Ⅲ ($P < 0.01$) was 90%, including 89% with stenosis of sphincter of Oddi and 10% with sphincter of Oddi dyskinesia. The prevalence in type Ⅱ was 31.8%, including 13.7% with stenosis of sphincter and 18.1% with dyskinesia of sphincter of Oddi. While the prevalence in type Ⅲ was 6.7%, all were dyskinesia of sphincter of Oddi.

CONCLUSION: Manometry of sphincter of Oddi has great value in the diagnosis of SOD, especially in type Ⅱ patients, which can differentiate stenosis from dyskinesia of sphincter of Oddi. That is most valuable in selecting therapy.

Key words: Endoscopic manometry; Sphincter; Oddi dysfunction

Zou DW, Xu GM, Sun ZX, Li ZS, Yin N. Endoscopic manometry in the diagnosis of sphincter of Oddi dysfunction. *World J Gastroenterol* 1996; 2(Suppl1): 226 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/226.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.226

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ABSTRACT

Esophageal pH monitoring and the effect of prepulsid in premature infants with gastroesophageal reflux

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Abstract

AIM: To investigate the incidence and clinical manifestations of gastroesophageal reflux (GER) in premature infants and the therapeutic effects of prepulsid on GER.

METHODS: The esophageal pH were monitored continuously for 24 ± 3 h in 8 premature infants who were born in our hospital. Morever, GER positive cases were treated with prepulsid. Of 8 patients (4 male, 4 female), mean gestational age was 33.1 ± 2.8 wk and mean birth weight was 1535.63 ± 577.19 g. The clinical manifestation included vomiting, difficulty to feed, retardation of weight, apnea. The patients whose percent of time of esophageal pH < 4 in 24-h were higher than the normal value in same age would be considered GER positive and be treated with prepulsid (0.2-0.5 mg/kg, bid) and be reexamined 10 d later.

RESULTS: Five of 8 premature infant showed GER positive. The symptoms disappeared after treated for 2-3 d, the increasing of body weight of one patient increased from 10 g/d to 30 g/d from the second day of treatment. The percent of time of esophageal pH < 4 in 24-h were significant difference before and after treated (37.66 ± 13.83 and 7.26 ± 5.80, t = 4.531, $P < 0.01$).

CONCLUSION: The effect of prepulsid on GER in premature infants was remarkable and no side effects were seen. The monitoring of continuously esophageal pH for 24-h was better mean for determing GER in premature infants, which can done easily and with the advantage of brief and safe.

Key words: Esophageal pH monitoring; Prepulsid; Premature infant; GER

Dong M, Wang ZF, Ke MY. Esophageal pH monitoring and the effect of prepulsid in premature infants with gastroesophageal reflux. *World J Gastroenterol* 1996; 2(Suppl1): 227 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/227.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.227

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ABSTRACT

Controled clinical trial on cisapride in treatment of chronic cholecystitis

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Abstract

AIM: A controlled clinical trial was conducted for evaluating the efficacy of cisapride in the treatment of chronic cholecystitis and for providing the clinical evidence that disturbed gastrointestinal motility may play roles in the development of gallbladder diseases.

METHODS: Totally 150 cases of chronic cholecystitis (60 male, 90 female, mean age 54 years) participated in the study. Cisapride was given 5 mg three times daily for 3 wk. Placebo was used for the control group (n = 95).

RESULTS: The results showed cisapride significantly improved the symptoms including abdominal fullness (P < 0.001), epigastric pain (P < 0.001), nausea (P < 0.001), early satiety (P < 0.001), anorexia (P < 0.05) and heartburn (P < 0.05). Total efficacy rate of cisapride and placebo were 95.69% and 20.01% respectively (χ^2 = 196.02, P < 0.001). The results suggested that disturbed gastrointestinal motility may have closed relationship with chronic cholecystitis and cisapride was effective in treatment of chronic cholecystitis.

Key words: Cisapride; Chronic cholecystitis

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ABSTRACT

IBS a motility and sensitive disorder: Beneficial effect of a gastrointestinal; selective calcium antagonist

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Author contributions: All authors contributed equally to the work.

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Functional gastrointestinal disorders, such as Irritable Bowel Syndrome (IBS) characterized by abdominal pain, transit disturbances and intestinal discomfort, are very common in the world population. IBS is widely regarded as a disorder of intestinal motor activity and it is known to also affect other regions of the gastrointestinal (GI) tract. Nowadays, hypothesis concerning the mechanisms implicated in these disorders brings to the role of visceral afferents mediating hypersensitivity of the gut in addition to GI hypermotility generally evoked. Patients with IBS respond to stimulation with exaggerated intestinal motor responses accompanied by abdominal symptoms. Stimuli implicated in this regard are GI mediators such as cholecystokinin (CCK), gastrin, substance P *etc*. Calcium antagonists, which are known to act when the cell membrane is depolarized following electrical stimulation, have recently been demonstrated to be effective when digestive hormones or mediators are involved[1]. Pinaverium bromide (PB) Dicetel, a GI selective calcium antagonist, that acts by interfering with the (-1 subunit of the intestinal L -Type calcium channel, has been intensively investigated[2]. Its effect on the stimulation of colonic motility induced by a meal, involving CCK and by a CCK injection, was evidenced in rats chronically fitted with intraparietal electrodes on the proximal colon and previously treated or not by capsaicin. The inhibition of postprandial colonic motility by PB given orally, occurring from the very low dose of 2 mg/kg, involves a CCK-dependent pathway which needs the integrity of sensitive afferents[3]. These data confirm prove us results showing that PB has a marked inhibitory effect on GI contractile activity both in the postprandial and in the interdigestive phase[4]. This also supports the *in vitro* findings obtained in isolated single intestinal smooth muscle cells contracted by GI hormones or mediators[1]. In human, a pharmacology study performed by means of an intraluminal electromyographic probe recording long spike burst activity (LSB), in IBS patients, after a meal stimulation, showed that PB significantly inhibited LSB induced-increase *vs* placebo, illustrating its effect on colonic motor response to eating. Several other studies, measuring intraluminal pressure following a test meal, in dicate that PB reduces overall motility in the sigmoid region and colon in human without adversely affecting normal propulsive activity. In conclusion, since the two main characteristics of the Irritable Bowel Syndrome are abnormal colonic motility and hypersensitivity of the gut, an inhibitory action of pinaverium bromide, a GI selective calcium antagonist, on postprandial motility through a mechanism involving sensory afferent neurons could explain the efficacy of this compound in the Irritable Bowel Syndrome, *via* its action both on motility and hypersensitivity of the gut.

Christen MO. IBS a motility and sensitive disorder: Beneficial effect of a gastrointestinal; selective calcium antagonist. *World J Gastroenterol* 1996; 2(Suppl1): 229 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/229.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.229

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ABSTRACT

Effects of nifedipine combined with doxepine on IBS

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Abstract

AIM: We tried combination therapies of nifedipine (N) and doxepine (D) for irritable bowel syndromes (IBS).

METHODS: 73 cases were randomly divided into 3 groups: 26 patients in group N (N 10 mg tid × 14 d), 22 patients in group D (D 25 mg tid × 14 d), 25 patients in group N + D (N 10 mg + D 25 mg tid × 14 d).

RESULTS: (1) The complete disappearance of abdominal pain in group N, group D and group N + D were 38.46%, 19.05%, and 70.83%, respectively. The effectiveness of group N + D was significantly higher than that of group N and group D ($P < 0.05$ and $P < 0.01$). (2) The obvious alleviation of diarrhea in group N, group D and group N + D were 44%, 22.73% and 76% respectively. The effectiveness of group N + D was significantly higher than that of group N and group D ($P < 0.05$ and $P < 0.01$). (3) The disappearance of symptoms of the mental and nervous systems in group N, group D and group N + D and group D were significantly better than group N ($P < 0.01$ and $P < 0.05$), there was group N + D was not different from group D.

CONCLUSION: Enhanced and complemented effectiveness can be achieved by combined treatment with nifedipine and doxepine. It is especially suitable for the patients with chronic abdominal pain and diarrhea or with mental and nervous systems symptoms.

Key words: Nifedipine; Doxepine; Irritable bowel syndromes

Gu ZH. Effects of nifedipine combined with doxepine on IBS. *World J Gastroenterol* 1996; 2(Suppl1): 230 Available from: URL: http://www.wjgnet.com/1007-9327/full/v2/iSuppl1/230.htm DOI: http://dx.doi.org/10.3748/wjg.v2.iSuppl1.230

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Investigation of the treatment and clinical character about psychosomatic IBS

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ABSTRACT

Study on the functional of sympathic nerve in indigestion case

De-Yun Xia, Sui-Cheng Guo, Gui-Rong Ma, Jie Sun

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ABSTRACT

Clinical analysis of 13 cases of angina-like chest pain senile patienys

Ji-Ying Zhou, Xiao-Feng Kuang

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ABSTRACT

Functionship of electrogastrogram in the diagnosis of GI diseases in children

Zhi-Guo Yang, Lu-Yan Wei, Xue-Ping Chen

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ABSTRACT

Detection of pain perception threshould in patient with functional

Xiao-Ning Wu, Xiao-Hong He, Jian Sun

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Helicobacter pylori and bile reflux gastritis

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ABSTRACT

Randomized controlled study on the effect of prepulsid in the treatment of patients with functional dyspepsia

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ABSTRACT

Analysis of *Hp* infection in patients with chronic gastric disease in Yinchuan region

Hai-Mi Yan, Bin Sun, Pei-Qi Hu, Shu-Yun Jia, Hui-Ying Ma

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ABSTRACT

Observation and mechanism analysis of the effect curing 60 cases of gastroptosis by external counterpulsation and therapeutic exercise

Jing-Cai Li, Xu-Ming Wang, Jun Sun, Zhi-Yuan Bian

Jing-Cai Li, Xu-Ming Wang, Jun Sun, Zhi-Yuan Bian, Baiquan Cadre Sanatorium, Xinxiang 453644, Henan Province, China

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ABSTRACT

Clinical observation of cisapride on NUD

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ABSTRACT

Development and clinical application of multi-parameter of gastroesophageal diagnose decive

Li-Ping Zou, Bao-Ping Yu, He-Sheng Luo, Jie-Ping Yu

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ABSTRACT

Prepulsid treated functional constipation of aged

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ABSTRACT

Treatment of functional disturbance of emptying after gastric resection using prokinetic agent

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ABSTRACT

Usage of emotional therapy in irritable bowel syndrome

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ABSTRACT

Relationship between diabetis and ischemic disease of small intestine

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ABSTRACT

Clinical trial on cisapride preventing constipation of the old patients

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