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ABOUT COVER

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ORIGINAL ARTICLE

Retrospective Study

Endoscopic ultrasound-guided gastroenterostomy for gastric outlet obstruction in Mexico

Massiel Madelin Rosario-Morel, Rodrigo Soto-Solis, Katia Picazo-Ferrera, Miriam Idalia Torres-Ruiz, José Alberto Estradas-Trujillo, Mario Alberto Gallardo-Ramírez, Gerardo Akram Darwich-del Moral, Luis Ariel Waller-González

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Abstract

BACKGROUND

Endoscopic ultrasound-guided gastroenterostomy (EUS-GE) has recently emerged as an alternative treatment for gastric outlet obstruction (GOO) in selected patients.

AIM

To report the initial experience of EUS-GE in patients with GOO.

METHODS

This study was a retrospective, observational, multicenter study in which the data from 10 patients who underwent EUS-GE due to GOO between September 2021 and May 2023 were collected. We analyzed technical success, clinical success, adverse events, and survival. Technical success was defined as adequate positioning and deployment of the stent. Clinical success was defined as the patient's ability to tolerate oral intake without vomiting 7 d after the procedure. Post-procedural adverse events were recorded.

RESULTS
Eleven procedures in 10 patients with GOO were included. The mean age of the patients was 67.5 years (range: 56-77 years). Malignant GOO was present in 9 patients. Technical success was achieved in 9/11 procedures (82%). Among them, clinical success was achieved in 9 patients (100%). Adverse events occurred in 1 patient (9%). The median survival was 3 months (n = 7; range: 1-8 months).

CONCLUSION
EUS-GE is a feasible therapeutic option in the treatment of GOO.

Key Words: Endoscopic ultrasound-guided gastroenterostomy; Gastric outlet obstruction; Lumen apposing metal stent; Interventional endoscopic ultrasound; Gastrojejunostomy; Duodenal stenting

Core Tip: This study was a retrospective report of our initial experience with endoscopic ultrasound-guided gastroenterostomy in patients with gastric outlet obstruction from Mexico. We demonstrated that endoscopic ultrasound-guided gastroenterostomy was a feasible therapeutic alternative for gastric outlet obstruction. It was particularly useful in patients with malignancy.

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INTRODUCTION

Gastric outlet obstruction (GOO) is caused by benign and malignant diseases. It is associated with significant morbidity and a decreased quality of life[1,2]. Surgical gastrojejunostomy or enteral stenting are the standard therapeutic options. Endoscopic balloon dilation is useful for the treatment of certain benign conditions[3].

While surgery is associated with significant morbidity, mortality, and costs, enteral stenting is commonly complicated with stent migration or obstruction. Recently, endoscopic ultrasound-guided gastroenterostomy (EUS-GE) with lumen-apposing metal stent (LAMS) has been adopted as a novel, minimally invasive technique in the management of GOO[4,5]. This procedure involves the insertion of a LAMS from the stomach to the small bowel distal to the obstruction[6].

EUS-GE offers long-lasting luminal patency without the risk of tumor ingrowth and/or overgrowth, which minimizes the morbidity of surgical gastrojejunostomy[5,6]. The EUS-GE technique was developed through various clinical trials and animal experiments. Currently there are three main techniques: (1) Direct EUS-GE; (2) Device-assisted EUS-GE; and (3) EUS-guided double balloon-occluded gastrojejunostomy bypass[7].

Although clinical trials have been conducted proving the safety and efficacy of the EUS-GE technique, there is still a lack of real-world data for this new method[8]. The aim of this study was to report our initial experiences utilizing EUS-GE for the treatment of GOO in Mexico.

MATERIALS AND METHODS

Study design

This was a retrospective, observational, and multicenter study that collected data from three referral medical centers in Mexico City. Clinical data from charts of patients who underwent EUS-GE from September 2021 to May 2023 were collected. Inclusion criteria included patients with informed consent of the EUS-GE procedure and patients with symptoms and endoscopic documentation of GOO obstruction in which EUS-GE was performed. Patients with insufficient information in their chart were excluded.

We analyzed technical success, clinical success, adverse events, and survival. Technical success was defined as an adequate positioning of the stent assessed by endoscopy and fluoroscopy. Clinical success was defined as the patient's ability to tolerate oral intake without vomiting 7 d after the procedure. Post-procedural adverse events were recorded.

Procedural technique

EUS-GE was performed under intravenous sedation or general anesthesia. All procedures were performed by expert endoscopists at tertiary care centers with or without trainee involvement. The EUS-GE was performed using the direct technique or the device-assisted technique. The choice of the technique was at the discretion of the endoscopist.

Direct technique: A forward-viewing therapeutic gastroscope was inserted proximal to the obstruction. If feasible, the endoscope was advanced across the stenosis and approximately 500-1000 mL of fluid were infused through the working channel. Finally, methylene blue and iodinated contrast were added (approximately 20 mL). If the obstruction was not traversable with the endoscope, a catheter [*i.e.* a Soehendra biliary dilator (Cook Medical, Bloomington, IN, United States) or a sphincterotome] was used for fluid infusion. Fluoroscopic and EUS guidance were used to locate the small bowel loop adjacent to the stomach (near the ligament of Treitz). Finally, a LAMS with electrocautery (Hot Axios®; Boston Scientific Corp, Marlborough, MA, United States) was inserted directly across the gastric wall into the small bowel (free-hand technique). Stent deployment was performed in the usual way. Adequate position was corroborated by endoscopy (methylene blue through the stent) and fluoroscopy (iodinated contrast).

Nasobiliary drainage-assisted technique: A forward-viewing therapeutic gastroscope was used to locate the obstruction. Using an 8.5 Fr stent introducer, a 0.035-inch guidewire was placed into the jejunum under endoscopic and fluoroscopic guidance. The stent introducer and gastroscope were removed, keeping the guidewire in the small intestine. Under the fluoroscopic view, a 7 Fr nasobiliary drain catheter or an 8 Fr nasojejunal tube was inserted distal to the stricture. Approximately 500-1000 mL of water were instilled through the nasobiliary drain catheter or the nasojejunal tube. The linear echoendoscope was then inserted into the stomach, and an adequately distended small bowel loop was located, typically near the ligament of Treitz (fourth duodenum or proximal jejunum). Finally, methylene blue with iodinated contrast (~ 20 mL) were used to opacify the targeted segment. An electrocautery-assisted LAMS was deployed with the free-hand technique, corroborating adequate positioning by endoscopic and fluoroscopic views.

In both techniques, antiperistaltic drugs such as hyoscine were given as needed. Patients remained in the hospital after the procedure. A liquid diet was started the day after the procedure, and the diet was advanced as tolerated. Patients were discharged home when they demonstrated adequate tolerance to an oral diet. Subsequently, the participants were followed-up on a regular basis.

RESULTS

From September 2021 to May 2023, 11 EUS-GE procedures were performed in 10 patients. Table 1 describes the patient and procedural characteristics. The mean age of the patients was 67.5 years (range: 56-77 years), with 5 males (50%) and 5 females (50%). Malignant GOO was found in 9 patients (90%), whereas benign GOO was found in 1 patient (10%). Malignant disease included pancreatic cancer (77.8%, n = 7), ampullary cancer (11.1%, n = 1), and metastatic cancer (11.1%, n = 1). The patient with benign GOO was found to have refractory pyloric stenosis due to a peptic ulcer.

The main locations of the obstructions were the second portion of the duodenum in 5 patients (50%), followed by the duodenal bulb in 4 patients (40%) and the pylorus in 1 patient (10%). Three patients had been treated previously with a duodenal stent due to pancreatic cancer in 2 patients and benign pyloric stenosis in 1 patient. All experienced recurrent GOO.

Technical success

Technical success was achieved in 9 procedures (82%). The two failed procedures occurred due to misdeployment of the stent. One occurred during a direct EUS-GE. The other occurred during a device-assisted EUS-GE with a nasojejunal tube, and this procedure was repeated 7 d later with success.

The intestinal loop was located with the device-assisted method in 7 patients (70%). Three procedures were performed with a nasobiliary drain catheter, and four procedures were performed with a nasojejunal tube. The direct EUS-GE was used in 3 patients (30%). A 20 mm diameter LAMS was used in 8 patients. A 15 mm LAMS was utilized in 1 patient. In all cases the stomach was anastomosed to the proximal jejunum.

Clinical success

Clinical success was achieved in all 9 patients who underwent a successful EUS-GE (100%).

Adverse events

Adverse events occurred in 1 patient (9%), who developed peritonitis due misplacement of the LAMS. This patient died 57 d after the procedure with no indication that the cause of death was due to the procedure.

Survival

The median survival was 3 months, with a range of 1-8 months among the 7 total patients who died. Two patients were alive at the end of our analysis.

DISCUSSION

Relieving GOO symptoms is crucial for maintaining adequate nutritional status and improving quality of life[9]. Palliative duodenal self-expandable metal stent (SEMS) placement for malignant GOO is an effective and safe alternative, but it has limited long-term efficacy. There is a significant rate of stent malfunction (5.4%-42.5%), and endoscopic reinter-

Table 1 Patient and procedural characteristics

Patient	Age in yr/sex	Etiology of GOO	Location of obstruction	Prior duodenal stenting	EUS- GE technique	Technical success	Part of small bowel anastomosed to stomach	LAMS diameter	Adverse event	Clinical success	Survival in months
1	56/M	Pancreatic cancer	Duodenal bulb	No	Device-assisted	Yes	Proximal jejunum	20 mm × 10 mm	No	Yes	2
2	57/F	Ampullary cancer	Second duodenal portion	No	Device-assisted	Yes	Proximal jejunum	20 mm × 10 mm	No	Yes	3
3	64/M	Pancreatic cancer	Duodenal bulb	No	Device-assisted	Yes	Proximal jejunum	20 mm × 10 mm	No	Yes	7
4	74/F	Pancreatic cancer	Second duodenal portion	No	Direct	Yes	Proximal jejunum	20 mm × 10 mm	No	Yes	2
5	59/F	Metastatic ovarian cancer	Duodenal bulb	No	Direct	Yes	Proximal jejunum	20 mm × 10 mm	No	Yes	8
6	63/M	Pancreatic cancer	Second duodenal portion	Yes	Device-assisted	Yes	Proximal jejunum	15 mm × 10 mm	No	Yes	3
7	77/F	Benign pyloric stenosis	Pylorus	Yes	Direct	No	N/A	N/A	Peritonitis	N/A	N/A
8	75/M	Pancreatic cancer	Second duodenal portion	Yes	Device-assisted	Yes	Proximal jejunum	20 mm × 10 mm	No	Yes	1
9	75/M	Pancreatic cancer	Duodenal bulb	No	Device-assisted	Yes	Proximal jejunum	20 mm × 10 mm	No	Yes	Alive
10	75/F	Pancreatic cancer	Duodenal bulb	No	Device-assisted	No/Yes[1]	Proximal jejunum	20 mm × 10 mm	No	Yes	Alive

[1]In this case, the procedure was repeated 7 d later and was successful.

EUS-GE: Endoscopic ultrasound-guided gastroenterostomy; F: Female; GOO: Gastric outlet obstruction; LAMS: Lumen apposing metal stent; M: Male; N/A: Not available.

ventions are typically required[10] leading to additional costs. If a biliary intervention is required, then the presence of a duodenal stent reduces effective endoscopic treatment. Therefore, SEMS is only recommended for patients with a short life expectancy (< 6 months). Unfortunately, in this series we did not evaluate the patency of LAMS to be able to compare it with patients treated with duodenal stents[1,11].

EUS-GE is a relatively new therapeutic procedure for the management of GOO[9]. It is a feasible option with less adverse events than surgical bypass and with a longer efficacy than enteral SEMS[12]. In this study, we analyzed outcomes of 10 patients with GOO that were treated with EUS-GE in Mexico. Technical success was achieved in 82% of the procedures, and clinical success was achieved in all patients with a successful EUS-GE. For 1 patient the initial EUS-GE was unsuccessful due to type I misdeployment. However, the repeat procedure was performed successfully 7 d later [13].

Adverse events due to this procedure range from 0%-33% and include incorrect stent deployment, bleeding, pneumoperitoneum, peritonitis, abdominal pain, and gastrocolic fistula[5,14]. One patient (9%) in our series developed peritonitis due to type II LAMS misdeployment. She had refractory pyloric obstruction and several associated comorbidities (aortic stenosis, pulmonary hypertension, severe osteoporosis with associated spine disease, and chronic pain). She was evaluated as a poor surgical candidate by Cardiology and represented the only patient in our series with a benign etiology of GOO. She died 57 d after the procedure by causes unrelated to the procedure. Despite the unsuccessful result in this case, EUS-GE is increasingly utilized for the treatment of GOO due to benign etiologies[15,16].

Large-volume ascites is a contraindication for EUS-GE in most patients[5]. Even though no patients in our series presented with massive ascites, large volume paracentesis before the procedure can be performed to make this procedure possible.

In our series, direct puncture was employed in 3 cases and device-assisted in 8. The decision for type of procedure was made at the discretion of the endoscopist. A slight modification to the direct technique using an 8 Fr nasojejunal tube was made. One of the challenges of EUS-GE is adequately visualizing the intestinal target loop under EUS[17]. We found that the assisted-device technique provided a more controlled approach in the small bowel near the ligament of Treitz because electrocautery-enhanced LAMS allows the procedure to be simpler, faster, and safer. We prefer using a 20-mm stent (as done in 8 of 9 of our patients), and some series have shown a higher clinical success rate (100% *vs* 88%) and a shorter

hospital stay (4 d *vs* 5 d) with the larger diameter[18].

Limitations of this study included its retrospective design, the sample size, and the lack of an analysis with other standard surgical or endoscopic therapies.

CONCLUSION

Previous studies have demonstrated the safety and efficacy of EUS-GE. The current study has provided additional evidence that EUS-GE is a feasible option for GOO treatment.

FOOTNOTES

Author contributions: Rosario-Morel MM, Soto-Solis R, Picazo-Ferrera K, Torres-Ruiz MI, Estradas-Trujillo JA, Gallardo-Ramírez MA, and Darwich-del Moral GA contributed to the study conception and design, the literature review, and the manuscript drafting; Rosario-Morel MM acquired the data and figures; Soto-Solis R and Waller-González LA revised the manuscript for important intellectual content; All authors read and approved the final version of the manuscript.

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REFERENCES

1 **Tringali A**, Didden P, Repici A, Spaander M, Bourke MJ, Williams SJ, Spicak J, Drastich P, Mutignani M, Perri V, Roy A, Johnston K, Costamagna G. Endoscopic treatment of malignant gastric and duodenal strictures: a prospective, multicenter study. *Gastrointest Endosc* 2014; **79**: 66-75 [PMID: 23932009 DOI: 10.1016/j.gie.2013.06.032]

2 **Espinel J**, Vivas S, Muñoz F, Jorquera F, Olcoz JL. Palliative treatment of malignant obstruction of gastric outlet using an endoscopically placed enteral Wallstent. *Dig Dis Sci* 2001; **46**: 2322-2324 [PMID: 11713929 DOI: 10.1023/a:1012378509762]

3 **Adler DG**. Should Patients With Malignant Gastric Outlet Obstruction Receive Stents or Surgery? *Clin Gastroenterol Hepatol* 2019; **17**: 1242-1244 [PMID: 30503965 DOI: 10.1016/j.cgh.2018.11.049]

4 **Binmoeller KF**, Shah JN. Endoscopic ultrasound-guided gastroenterostomy using novel tools designed for transluminal therapy: a porcine study. *Endoscopy* 2012; **44**: 499-503 [PMID: 22531985 DOI: 10.1055/s-0032-1309382]

5 **Itoi T**, Baron TH, Khashab MA, Tsuchiya T, Irani S, Dhir V, Bun Teoh AY. Technical review of endoscopic ultrasonography-guided gastroenterostomy in 2017. *Dig Endosc* 2017; **29**: 495-502 [PMID: 28032663 DOI: 10.1111/den.12794]

6 **Khashab MA**, Baron TH, Binmoeller KF, Itoi T. EUS-guided gastroenterostomy: a new promising technique in evolution. *Gastrointest Endosc* 2015; **81**: 1234-1236 [PMID: 25864896 DOI: 10.1016/j.gie.2014.12.053]

7 **Itoi T**, Ishii K, Tanaka R, Umeda J, Tonozuka R. Current status and perspective of endoscopic ultrasonography-guided gastrojejunostomy: endoscopic ultrasonography-guided double-balloon-occluded gastrojejunostomy (with videos). *J Hepatobiliary Pancreat Sci* 2015; **22**: 3-11 [PMID: 25155270 DOI: 10.1002/jhbp.148]

8 **Ribas PHBV**, De Moura DTH, Proença IM, Do Monte Júnior ES, Yvamoto EY, Hemerly MC, De Oliveira VL, Ribeiro IB, Sánchez-Luna SA, Bernardo WM, De Moura EGH. Endoscopic Ultrasound-Guided Gastroenterostomy for the Palliation of Gastric Outlet Obstruction (GOO): A Systematic Review and Meta-analysis of the Different Techniques. *Cureus* 2022; **14**: e31526 [PMID: 36540454 DOI: 10.7759/cureus.31526]

9 **Schmidt C**, Gerdes H, Hawkins W, Zucker E, Zhou Q, Riedel E, Jaques D, Markowitz A, Coit D, Schattner M. A prospective observational

study examining quality of life in patients with malignant gastric outlet obstruction. *Am J Surg* 2009; **198**: 92-99 [PMID: 19482259 DOI: 10.1016/j.amjsurg.2008.09.030]

10 **van Halsema EE**, Rauws EA, Fockens P, van Hooft JE. Self-expandable metal stents for malignant gastric outlet obstruction: A pooled analysis of prospective literature. *World J Gastroenterol* 2015; **21**: 12468-12481 [PMID: 26604654 DOI: 10.3748/wjg.v21.i43.12468]

11 **Sánchez-Aldehuelo R**, Subtil Iñigo JC, Martínez Moreno B, Gornals J, Guarner-Argente C, Repiso Ortega A, Peralta Herce S, Aparicio JR, Rodríguez de Santiago E, Bazaga S, Juzgado D, González-Panizo F, Albillos A, Vázquez-Sequeiros E. EUS-guided gastroenterostomy versus duodenal self-expandable metal stent for malignant gastric outlet obstruction: results from a nationwide multicenter retrospective study (with video). *Gastrointest Endosc* 2022; **96**: 1012-1020.e3 [PMID: 35870508 DOI: 10.1016/j.gie.2022.07.018]

12 **Phillips MS**, Gosain S, Bonatti H, Friel CM, Ellen K, Northup PG, Kahaleh M. Enteral stents for malignancy: a report of 46 consecutive cases over 10 years, with critical review of complications. *J Gastrointest Surg* 2008; **12**: 2045-2050 [PMID: 18648893 DOI: 10.1007/s11605-008-0598-4]

13 **Ghandour B**, Bejjani M, Irani SS, Sharaiha RZ, Kowalski TE, Pleskow DK, Do-Cong Pham K, Anderloni AA, Martinez-Moreno B, Khara HS, D'Souza LS, Lajin M, Paranandi B, Subtil JC, Fabbri C, Weber T, Barthet M, Khashab MA; EUS-GE Study Group. Classification, outcomes, and management of misdeployed stents during EUS-guided gastroenterostomy. *Gastrointest Endosc* 2022; **95**: 80-89 [PMID: 34352256 DOI: 10.1016/j.gie.2021.07.023]

14 **Tonozuka R**, Tsuchiya T, Mukai S, Nagakawa Y, Itoi T. Endoscopic Ultrasonography-Guided Gastroenterostomy Techniques for Treatment of Malignant Gastric Outlet Obstruction. *Clin Endosc* 2020; **53**: 510-518 [PMID: 32962331 DOI: 10.5946/ce.2020.151]

15 **Chen YI**, James TW, Agarwal A, Baron TH, Itoi T, Kunda R, Nieto J, Bukhari M, Gutierrez OB, Sanaei O, Moran R, Fayad L, Khashab MA. EUS-guided gastroenterostomy in management of benign gastric outlet obstruction. *Endosc Int Open* 2018; **6**: E363-E368 [PMID: 29527559 DOI: 10.1055/s-0043-123468]

16 **Kahaleh M**, Tyberg A, Sameera S, Sarkar A, Shahid HM, Abdelqader A, Gjeorgjievski M, Gaidhane M, Muniraj T, Jamidar PA, Aslanian HR, Abraham M, Lajin M, Kedia P, Nieto J, Parsa N, Andalib I, Bashir M, Kowalski TE, Loren DE, Kumar A, Schlachterman A, Chiang A, Holmes I, Mendoza Ladd AH, Oleas R, Zolotarevsky E, Robles-Medranda C, Barthet M. EUS-guided Gastroenterostomy: A Multicenter International Study Comparing Benign and Malignant Diseases. *J Clin Gastroenterol* 2023 [PMID: 37646532 DOI: 10.1097/MCG.0000000000001903]

17 **Stefanovic S**, Draganov PV, Yang D. Endoscopic ultrasound guided gastrojejunostomy for gastric outlet obstruction. *World J Gastrointest Surg* 2021; **13**: 620-632 [PMID: 34354796 DOI: 10.4240/wjgs.v13.i7.620]

18 **Bronswijk M**, Vanella G, van Malenstein H, Laleman W, Jaekers J, Topal B, Daams F, Besselink MG, Arcidiacono PG, Voermans RP, Fockens P, Larghi A, van Wanrooij RLJ, Van der Merwe SW. Laparoscopic versus EUS-guided gastroenterostomy for gastric outlet obstruction: an international multicenter propensity score-matched comparison (with video). *Gastrointest Endosc* 2021; **94**: 526-536.e2 [PMID: 33852900 DOI: 10.1016/j.gie.2021.04.006]

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