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- 19 Healthcare delivery cost and anesthesiologists: Time to have a greater role and responsibility
Karim HMR

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Healthcare delivery cost and anesthesiologists: Time to have a greater role and responsibility

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Abstract

With the advancement of technology and health sciences, health care delivery costs are steadily increasing. This affects both households and governments. Unfortunately, the present truth is that health has become an essential but unaffordable commodity. This is very concerning. Quality, up-to-date, cost-effective health care delivery is one of the prime objectives, and focuses on administration and health care authority. As the per capita spent on health from public/government funds is very poor in developing countries, the responsibility of cost-effective health care delivery falls primarily on the shoulder of the treating physicians. Anesthesiologists are becoming an indispensable part of health care delivery, having a diverse role in the emergency, critical care, pain, and perioperative care of patients. As the population ages, the need for surgical care is also increasing. Therefore, the anesthesiologist can also play a more significant role in delivering cost-effective health care, and minimize the cost without affecting the quality. This brief narrative review analyzes the current practice of anesthesiologists in two prime areas in the context of cost-savings: Preoperative investigation and low/minimal flow anesthesia.

Key words: Health expenditures; Cost control; Anesthesiologists; Anesthesia

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Core tip: Health care costs are escalating worldwide, affecting both governments and households. The need for surgery and interventional procedures are also steadily increasing. This has led to the increased requirement of clinical services from anesthesiologists. Therefore, anesthesiologists can also play an important role in cost containment. Two of the significant areas where cost reduction is possible are preoperative tests and the use of low and minimal flow anesthesia. However, a few factors may act as a hindrance to clinical practice. This opinion review paper discusses these issues and the possible remedial steps for providing cost-effective, quality healthcare, especially in developing countries.



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INTRODUCTION

Rising health care cost is becoming a more significant obstacle in both advanced and developed countries like the United States^[1,2]. It affects both households and governments. Cost-effective health care delivery is not only the responsibility of the government, but also hospital administrations and health care providers. The responsibility of hospital administrations and health care providers takes a special position in developing and third world countries where the public sector expenditure to health is very minimal^[3,4]. The active role of anesthesiologists in health care delivery is increasing, and encroachment of more extensive areas is happening day by day. Perioperative care is one of the most important areas of such a duty. A total of 28%-32% of the global disease burden comes from surgical diseases^[5]. With an aging population, the requirement of surgical procedures has been predicted to increase by 14%-47%^[6]. These data clearly show the current increased need of anesthesia and surgery services, with ample opportunity to fulfill the responsibility.

One of the components of surgical care expenditures is investigations. Inappropriate or unnecessary tests and procedures recommended by physicians, as well as frequent requests from patients, leads to wasteful health care spending^[7]. Preoperative investigation, mainly routine preoperative investigation, is one such entity. The expenditure incurred by the government/administration or patient varies widely depending on the type of surgery and perioperative care. A study conducted in India has shown that the average expenditure by a patient for routine preoperative investigations, even in a subsidized, public sector hospital, is 1029 Indian rupees^[8]. Spending on preoperative testing for even cataract surgery in Canada is \$40 per surgery^[9]. As the lion's share of health care delivery is from the private sector where the charges are not subsidized, the prices are expected to be very high in these situations. Studies have shown that routine preoperative investigation has very little to no effect on patient outcome^[10,11], and there is a negative perception of routine investigations^[12,13].

Anesthesiologists actively decide the intraoperative management of anesthesia maintenance. Nevertheless, many of the cases can be, and are being safely performed under regional anesthesia; a good number of patients still require general anesthesia (GA) for conducting surgery or interventions. Balanced, inhalational anesthetic-based GA is the most commonly practiced GA technique, and in cases other than total intravenous anesthesia, the maintenance phase of GA is usually managed with volatile anesthetics^[14]. The consumption of volatile anesthetics directly depends on the fresh gas flow (FGF) used. It has been found that using low/minimal flow anesthesia reduces the cost of anesthesia^[15]. Therefore, the anesthesiologists' decision and practice affects the cost of care. Although anesthesiologists are involved in multiple aspects of the clinical practice, this brief narrative review analyzes the current practices of anesthesiologists in the context of preoperative investigation and low/minimal flow anesthesia.

CURRENT PRACTICE OF PREOPERATIVE TESTING AND EVIDENCE

The American Society of Anesthesiologists and the National Institute of Health and Clinical Excellence (NICE) recommends against the routine use of preoperative investigations^[12,13]. However, despite the current negative recommendations, the routine preoperative investigation practices are still very prevalent^[16,17]. A study analyzing the impact of abnormal test results from routine preoperative investigations found that the implications of abnormal test results in changing anesthetic management is very minimal^[8]. A similar study conducted in patients over 60 years old also found an insignificant impact in most of the cases^[18]. Another study evaluating the effect of preoperative routine blood investigations in elderly patients who underwent oncosurgical procedures found that it did not predict the postoperative complication rate and did not influence anesthetic management^[19].

Another study analyzing the usefulness of routine preoperative testing in developing countries found that abnormal tests were very much prevalent, but only 0-8.3% of the test results led to management changes^[20]. Analysis of routine preoperative tests from the National Surgical Quality databases found that the postoperative outcomes were not associated with either testing or abnormal results in patients undergoing low-risk ambulatory surgeries^[21]. A systematic review evaluating the effectiveness of non-cardiac preoperative testing in non-cardiac elective surgery did not find convincing evidence that preoperative testing was beneficial in healthy adults undergoing non-cardiac surgery^[22]. However, abnormal test results in co-morbid patients were significantly and more frequently changing the anesthetic management compared to non-co-morbid patients in some disease-specific tests^[23]. The systematic review also indicated that testing should be based on the specific pathology (co-morbidity / disease-specific).

CURRENT PRACTICE OF LOW AND MINIMAL FLOW ANESTHESIA AND EVIDENCE

The use of low and minimal flow anesthesia has many advantages, including reduced volatile anesthetic agent consumption^[15]. With the advancement of anesthesia workstations and monitoring modalities, the precise management of carrier gases and volatile anesthetics has become a reality. The relatively new volatile anesthetic agents are costlier, yet their use becomes economically acceptable when used with lower FGF^[24]. A study has shown that desflurane-based anesthesia is costlier^[25]. However, a study has shown that the use of minimal flow anesthesia can even reduce the cost of desflurane-based anesthesia to a great extent, and can also be economically *via* for a long surgery duration^[26]. A recent study has shown that the cost incurred for minimal flow anesthesia (FGF 500 mL/min) using sevoflurane was lower than low flow anesthesia (FGF 1L/min) for 1 MAChour of anesthesia^[27]. The study also found that using sevoflurane for both induction and maintenance was more cost-effective^[27]. Another study found that automated control of end-tidal sevoflurane with 500 mL/min FGF was very cost-effective when compared with conventional flow technique^[28].

Similarly, real-time decision support that notified of excessive FGF was also found to be effective in delivering more cost-effective anesthesia^[29]. This indicates that the scope for economical use and practice of the newer volatile anesthetic agents are there. Unfortunately, the practice of low and minimal flow anesthesia is still not universal. Two recent surveys showed that the acceptance of low flow anesthesia is still sparse, and that minimal flow anesthesia or even an FGF < 600 mL/min is far less^[30,31]. Surveys also showed the lack of relatively advanced monitoring required for practicing low and minimal flow anesthesia^[30,32]. Low flow anesthesia until now has remained an under-utilized yet effective and sustainable anesthesia practice modality^[33].

LIMITATIONS FOR CLINICAL PRACTICES AND POSSIBLE REMEDIES

While anesthesia maintenance is in the hands of the anesthesiologist, preoperative investigations are not. Moreover, practicing minimal and low flow anesthesia usually requires advanced anesthesia workstations, agent monitoring, inspired and expired gas concentrations, *etc.*, The Association of Anaesthesiologists of Great Britain and Ireland recommends for the routine use of anesthesia gas monitoring when using volatile anesthetic-based anesthesia as a standard^[34]. However, the availability of such advanced and costly modalities are not universal, especially in developing and third world countries. A recent survey conducted in India has shown that a good number of practicing anesthesiologists are using Boyle's machine. Not having the minimum alveolar concentration monitoring facilities results in them mostly practicing conventional or high flow anesthesia^[30]. Similarly, guidelines and recommendations could not take out the apprehensions of medico-legal aspects, and harassment from the mind of practicing anesthesiologists. A survey has shown that even after acknowledging the negative recommendations and agreeing to abandon the routine preoperative testing, this was not possible, as many institutes have a protocol that is in favor of a battery of tests or so-called "routine testing"^[16].

Prospective studies have also shown that most patients attend the pre-anesthetic assessment clinic with all of the possible tests performed by the surgical team^[17]. Thus,

it is imperative to have an interchange of thoughts between surgeons and anesthesiologists regarding the indications of different preoperative tests, especially the need for patient and surgery-specific tests. This is important not only to optimize the utilization of preoperative tests by surgeons, but also to increase team efficiency towards the cost-effective health care delivery by reducing unnecessary preoperative laboratory tests. Therefore, communication with surgeons must be a priority for anesthesiologists as a means of reducing these expenditures.

Similarly, anesthesiologists should also take into account the cost of volatile anesthetic agent use. Although desflurane can be cost-effective for long-duration surgery, it may not be the right choice for short procedures, even with low or minimal flow anesthesia^[26]. This is because even low and minimal flow anesthesia needs high FGF in the initial phase of anesthesia. In such a situation, cheaper agents like Isoflurane are likely to be the right choice for cost reduction.

WHAT IS THEIR ROLE BEYOND CLINICAL PRACTICE?

By now, it is clear to us that the anesthesiologist does have a more significant role and responsibility to play in reducing the surgical care cost. However, their hands are bound to some extent by certain limitations like the administrative decision, equipment availability, and interdepartmental categories, especially anesthesia and surgical team co-cooperativeness. Therefore, only concentrating on the clinical practice aspect cannot provide most of the results in terms of cost-reduction. Anesthesiologists and anesthesia societies need to take a step towards formulating practice guidelines and protocols at the local hospital, regional, and national levels. They should approach the administration, convince them with concrete evidence, and discuss the pros and cons of having a better evidence-based protocol. An article welcoming the updated 2016 NICE preoperative test guideline suggested three-tier roles at the institute/hospital level, at the professional bodies/organization/societies level, and at the national health authority level, for maximum utilization of the recommendations^[35]. With the advancement of electronic health record management and information technology, anesthesiologists and surgeons can work jointly to increase the coordination, which is likely to reduce the prescription of unnecessary preoperative testing^[36]. However, an ongoing study will give us a better idea of this aspect in the future^[37].

CONCLUSION

The anesthesiologist can play a vital role in reducing the cost of health care delivery, especially in surgical care. This requires better and greater implementation of low and minimal flow anesthesia, while discarding routine preoperative testing and adopting patient and surgery-specific preoperative investigations. However, limitations in clinical practice and applications exist, so this involvement in protocol formation and administration are therefore very essential. Governments/administrations should also take on anesthesiologists and/or anesthesia societies, while formulating plans and protocols for the greater interests of the patient and national economy.

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