

## In pursuit of the right plan for airway management in gastrointestinal endoscopic procedures...the battle half won?

Submitted: 12-Oct-2022

Accepted: 12-Oct-2022

Published: 19-Oct-2022

Access this article online
Website: <a href="http://www.ijaweb.org">www.ijaweb.org</a>
DOI: 10.4103/ija.ija_846_22
Quick response code


**Upender Gowd, Sukhminder Jit Singh Bajwa<sup>1</sup>, Madhuri Kurd<sup>2</sup>, Gaurav Sindwani<sup>3</sup>**

Department of Anaesthesiology, Asian Institute of Gastroenterology, Gachibowli, Hyderabad, Telangana,

<sup>1</sup>Department of Anaesthesiology and Intensive Care, Gian Sagar Medical College and Hospital, Patiala,

Punjab, <sup>2</sup>Department of Anaesthesiology, Karnataka Institute of Medical Sciences (KIMS), Hubli, Karnataka,

<sup>3</sup>Department of Anaesthesiology, Institute of Liver and Biliary Sciences (ILBS), Delhi, India

**Address for correspondence:** Dr. Sukhminder Jit Singh Bajwa,

Department of Anaesthesia and Intensive Care, Gian Sagar Medical College and Hospital, Banur, Patiala, Punjab, India.

E-mail: [sukhminder\\_bajwa2001@yahoo.com](mailto:sukhminder_bajwa2001@yahoo.com)

A call for anaesthesia from the gastrointestinal (GI) endoscopy suite always stirs up anxiety even in the most experienced anesthesiologist. This is mainly due to the hassles of non-operating room anaesthesia (NORA) including the inadequacy of resuscitation and airway-related equipment, monitoring devices, drugs, trained personnel, unfamiliar surroundings and non-availability of immediate help.<sup>[1]</sup> Secondly, the presence of liver disease and its associated features like ascites, coagulopathy, bleeding disorders, hypoproteinaemia and anaemia can produce huge physiological disturbances of concern to the anaesthesiologist. Comorbidities such as diabetes mellitus, hypertension, conservatively treated ischaemic heart disease on medication, obesity and obstructive sleep apnoea are not uncommon in patients undergoing endoscope-guided intragastric balloon insertion. The anaesthesiologist also has to share the airway with the endoscopist, face the challenges of intubation with the gastroscope *in situ* and the risk of variceal bleeding in some patients. Nevertheless, nowadays, the number of patients presenting for upper GI endoscopic procedures is on the rise and there is a wide variety of procedures which range from minor procedures to major procedures such as endoscopic-retrograde cholangiopancreatography (ERCP), endoscopic ultrasound (EUS) and spyglass cholangioscopy.

### AN ASSORTMENT OF TECHNIQUES TO CHOOSE

Studies have shown that general anaesthesia (GA)

with endotracheal intubation is associated with both advantages and disadvantages. The advantages include a better safety profile, lower perforation rates and lesser risk of coughing. Nevertheless, most major GI endoscopic procedures are performed under deep sedation.<sup>[2-4]</sup> Deeper sedation, on the one hand, facilitates the endoscopist to perform difficult procedures with ease, improves patient comfort and decreases the chances of awareness; however, on the other hand, it increases the risk of airway complications.<sup>[5,6]</sup> Nonetheless, the popularity of propofol-mediated deep sedation is increasing, and deep sedation without intubation is most commonly used for upper GI endoscopy.<sup>[7]</sup>

In a randomised controlled trial, general endotracheal anaesthesia was found to be associated with a significantly lower incidence of sedation-related adverse events in patients at high risk for sedation-related adverse events undergoing ERCP.<sup>[4]</sup> In another study, it was found that for patients undergoing an ERCP requiring GA with intubation, the target-controlled infusion (TCI) technique when compared to the standard volatile anaesthesia technique allows better optimisation of GA with lesser peri-operative complications and shorter extubation time.<sup>[8]</sup>

### PATIENT POSITION DURING ORAL GASTRIC ENDOSCOPY: ADDING FUEL TO THE FIRE !

Procedures such as ERCP, EUS and spyglass

cholangioscopy require the semi-prone or prone position, adding to the anaesthesiologist's woes. These positions prevent airway collapse by exerting gravitational forces and the inserted gastroscope itself acts as a mechanical stent of the airway, thus preventing its collapse.

Yet, studies have reported difficult mask ventilation in 9–20% of the patients in the semi-prone/lateral position.<sup>[9,10]</sup> Gentle insertion of a standard laryngoscope, too, becomes difficult in the lateral/semi-prone position due to distortion in the airway anatomy. Desaturation during upper GI endoscopy can occur, and during such times, simple manoeuvres such as neck extension, jaw thrust, chin lift, positive-pressure ventilation using continuous positive airway pressure (CPAP) and newer oxygenation devices such as a high-flow nasal cannula (HFNC) may also be used.<sup>[11,12]</sup> Face masks like the endoscopy mask, gastro-laryngeal tubes, bite blocks, Hague airways, safety guards, and nasopharyngeal airways are airway devices that have been tried in relieving airway obstruction and maintaining the airway during upper GI endoscopy.<sup>[7]</sup>

Emergency intubation in the prone position may be required many a time, especially during spine surgery/endoscopy, and at such times, many techniques have been tried. Fibre-optic bronchoscopy has been used for this purpose in the lateral position in a child with temporomandibular joint ankylosis.<sup>[10]</sup> Gastroscope-guided bougie insertion into the trachea followed by endotracheal intubation has also been described in the semi-prone/lateral position.<sup>[13]</sup>

In an observational study, blind intubation through i-gel was found to have a success rate of 36% and not clinically acceptable.<sup>[14]</sup> In a randomised crossover mannequin study that compared the airway rescue performance in the prone position of three airway devices, the success rates with the proseal laryngeal mask airway (100%) and Pentax AWS videolaryngoscope (100%) were significantly greater than that with a McGrath video-laryngoscope (71.4%).<sup>[15]</sup>

In a randomised controlled study published in this issue of the Indian Journal of Anaesthesia (IJA), 88 patients with no predicted difficulty in intubation and who were undergoing ERCP were intubated in the supine or the semi-prone position. The authors found the success rate of endotracheal intubation in the left

semi-prone position (97.7%) to be comparable with that in the supine position (95.5%).<sup>[16]</sup>

## **LARYNGEAL MASK AIRWAY (LMA) GASTRO: THE NEW AIRWAY ANTHEM FOR UPPER GI ENDOSCOPY?**

LMA®Gastro™, a second-generation magnetic resonance imaging (MRI) safe supraglottic device, is now making its mark in anaesthesia and sedation for upper GI endoscopy. It has independent channels for both standard endoscope insertion and for oxygenation.<sup>[17]</sup>

Few prospective observational and retrospective studies have reported a high success rate for ERCP completion (98%) along with a high insertion success rate (99%) for this device.<sup>[18,19]</sup> Some studies have reported excellent feasibility of the LMA®Gastro™ airway for advanced endoscopies in high risk patients, an endoscopist satisfaction of 90%, and the occurrence of only minor intraoperative complications with the use of this device.<sup>[20,21]</sup>

In contrast, Paul Zilberman and colleagues encountered difficulty in passing the gastroscope through the gastro-channel of the LMA®Gastro™ airway due to negligible size difference between the internal and outer diameter of the LMA and endoscope, respectively.<sup>[22]</sup> They suggested making a U-shaped cut on the gastric channel of the endoscope to resolve this issue. However, this arrangement has been questioned in an article in a previous issue of the IJA, wherein the authors have suggested design modifications of the device such as a wider gastro-channel, reinforcement of the distal end of the LMA®Gastro™ airway to reduce compression by the inflated cuff and making the distal tip more oblong.<sup>[23]</sup>

In a recently conducted prospective observational study, the researchers found that LMA Gastro had a higher oropharyngeal leak pressure than the gastro-laryngeal tube; however, endoscopist satisfaction was better with the gastro-laryngeal tube.<sup>[24]</sup>

## **A FERTILE AREA FOR INNOVATION AND RESEARCH**

Patient safety during GI endoscopy is of utmost importance, and hence, improvement in respiratory monitoring during upper GI endoscopy and ERCP is another long-felt clinical need. Nonetheless, in an attempt to find a technique superior to pulse oximetry, non-invasive techniques such as EtCO<sub>2</sub> monitoring, impedance monitoring for breathing patterns, infrared

thermography for respiratory rate, oxygen reserve index and acoustic respiratory monitoring have been tried and researched.<sup>[7,25,26]</sup>

The steady upcoming of newer airway and monitoring devices entails that the journey in search of a reliable and safe airway device for optimum airway management during upper GI endoscopy and ERCP still continues. Will the LMA Gastro become the new airway mantra (formula) for upper GI endoscopy? Will propofol sedation continue to remain the favourite of anaesthesiologists and endoscopists for ERCP? Only time can decide this; nonetheless, clinical trials including randomised controlled trials on this topic are currently being conducted in different parts of the world.

Innovations and modifications in existing airway devices are taking place, and the battle is now only half won. Guidelines by national and international bodies on sedation during endoscopy have been published from time to time. The recently published clinical practice guidelines for endoscopic sedation have recommended (grade II recommendation) that the physician and the assisting healthcare staff who administer the sedation should be trained in basic life support to deal with fatal sedation-related adverse events. Other recommendations include equipping the endoscopy suite with drugs and equipment for emergency resuscitation, pre-procedure assessment of the patient's age, body mass index, Mallampati score, American Society of Anesthesiologists physical status score and a reduction of drug doses, both initial and later doses in the older patient.<sup>[27]</sup> However, Indian guidelines in this context are awaited. Also, there is a need to have separate guidelines for minor and major upper GI endoscopic procedures, including recommendations for airway management. That means that research on this topic and the search for the right airway device has to go on.

#### Financial support and sponsorship

Nil.

#### Conflicts of interest

There are no conflicts of interest.

#### REFERENCES

- Maddirala S, Theagrajan A. Non-operating room anaesthesia in children. *Indian J Anaesth* 2019;63:754-62.
- Parida S, Kundra P, Mohan VK, Mishra SK. Standards of care for procedural sedation: Focus on differing perceptions among societies. *Indian J Anaesth* 2018;62:493-6.
- Akhter A, Patel R, Nelsen E, Benson ME, Gopal DV, Soni A, *et al.* Prospective comparison of moderate conscious sedation and anesthesia assistance for the performance of endoscopic retrograde cholangiopancreatography (ERCP). *Can J Gastroenterol Hepatol* 2021;2021:8892085. doi: 10.1155/2021/8892085.
- Smith ZL, Mullady DK, Lang GD, Das KK, Hovis RM, Patel RS, *et al.* A randomized controlled trial evaluating general endotracheal anesthesia versus monitored anesthesia care and the incidence of sedation-related adverse events during ERCP in high-risk patients. *Gastrointest Endosc* 2019;89:855-62.
- Patro A, Priya V, Riaz R, Kannaujia A. Laparoscopic port as an integral component of endoscopy mask: A novel innovation! *Indian J Anaesth* 2016;60:439-41.
- Jaiswal SK, Sreevastava DK, Datta R, Lamba NS. Unusual occurrence of massive subcutaneous emphysema during ERCP under general anaesthesia. *Indian J Anaesth* 2013;57:615-7.
- Goudra B, Singh PM. Airway management during upper GI endoscopic procedures: State of the art review. *Dig Dis Sci* 2017;62:45-53.
- Motiaa Y, Bensghir M, Jaafari A, Meziane M, Ahtil R, Kamili ND. Anesthesia for endoscopic retrograde cholangiopancreatography: target-controlled infusion versus standard volatile anesthesia. *Ann Gastroenterol* 2016;29:530-35.
- Nagappa S, Sridhara RB, Kalappa S. Comparing the ease of mask ventilation, laryngoscopy, and intubation in supine and lateral position in infants with meningomyelocele. *Anesth Essays Res* 2019;13:204-8.
- Thangavel AR, Panneerselvam S, Rudingwa P, Sivakumar RK. Fiberoptic bronchoscopy in lateral position as a rescue airway management technique in a child with temporomandibular joint ankylosis. *Indian J Anaesth* 2019;63:862-3.
- Nay MA, Fromont L, Eugene A, Marcueyz JL, Mfam WS, Baert O, *et al.* High-flow nasal oxygenation or standard oxygenation for gastrointestinal endoscopy with sedation in patients at risk of hypoxaemia: A multicentre randomised controlled trial (ODEPHI trial). *Br J Anaesth* 2021;127:133-42.
- Cha B, Lee MJ, Park JS, Jeong S, Lee DH, Park TG. Clinical efficacy of high-flow nasal oxygen in patients undergoing ERCP under sedation. *Sci Rep* 2021;11:350. doi: 10.1038/s41598-020-79798-7.
- Sindwani G, Suri A, Shamim R. Oral gastroscope-guided bougie insertion and endotracheal intubation. *Indian J Anaesth* 2018;62:478-9.
- Van Dijck M, Houweling B M, Koning MV. Blind intubation through an i-gel® in the prone position: A prospective cohort study. *Anaesth Intensive Care* 2020;48:439-43.
- Oshika H, Koyama Y, Taguri M, Maruyama K, Hirabayashi G, Yamada SM, *et al.* Supraglottic airway device versus a channelled or non-channelled blade-type videolaryngoscope for accidental extubation in the prone position: A randomized crossover manikin study. *Medicine (Baltimore)* 2018;97:e11190.
- Apinyachon W, Thamnoranart M, Lavanrattanakul P, Sangasilpa I, Suragul W. Endotracheal intubation of patients in left semi-prone position before endoscopic retrograde cholangiopancreatography: A randomised controlled study. *Indian J Anaesth* 2022;66:700-6.
- Gupta A, Parida R, Subramaniam R, Kumar KR. LMA gastro for gastro-intestinal endoscopic procedures: Pearls, pitfalls, and troubleshoots of its usage. *Indian J Anaesth* 2022;66:S333-6.
- Terblanche NCS, Middleton C, Choi-Lundberg DL, Skinner M. Efficacy of a new dual channel laryngeal mask airway, the LMA®Gastro™ Airway, for upper gastrointestinal endoscopy: A prospective observational study. *Br J Anaesth* 2018;120:353-60.
- Tran A, Thiruvankatarajan V, Wahba M, Currie J, Rajbhoj A, van Wijk R, *et al.* LMA®Gastro™ Airway for endoscopic retrograde cholangiopancreatography: A retrospective observational analysis. *BMC Anesthesiol* 2020;20:113. doi: 10.1186/s12871-020-01019-5.

20. Schmutz A, Loeffler T, Schmidt A, Goebel U. LMA Gastro™ airway is feasible during upper gastrointestinal interventional endoscopic procedures in high risk patients: A single-center observational study. *BMC Anesthesiol* 2020;20:40. doi: 10.1186/s12871-020-0938-9.
21. Hagan KB, Carlson R, Arnold B, Nguyen L, Lee J, Weston B, *et al.* Safety of the LMA®Gastro™ for endoscopic retrograde cholangiopancreatography. *Anesth Analg* 2020;131:1566-72.
22. Zilberman P, Davidovics Z, Benson AA. A bench test of a modified gastro LMA for the insertion of the duodenoscope. *Indian J Anaesth* 2022;66:159-60.
23. Gupta A, Gupta N. Comment on: A bench test of a modified gastro LMA for the insertion of the duodenoscope. *Indian J Anaesth* 2022;66:546.
24. Uysal H, Senturk H, Calim M, Daskala H, Guney IA, Karaaslan K. Comparison of LMA®Gastro™ airway and gastrolaryngeal tube in endoscopic retrograde cholangiopancreatography: A prospective randomized observational trial. *Minerva Anesthesiologica* 2021;87:987-96.
25. Sindwani G, Prakash K, Arora MK. An innovative way of monitoring end-tidal carbon dioxide during endoscopic retrograde cholangiopancreatography. *Saudi J Anaesth* 2018;12:650-1.
26. Ray S, Kulkarni KS, Dave NM, Chincholi I. The utility of the oxygen reserve index™ in a neonate undergoing re-exploration of a tracheoesophageal fistula. *Indian J Anaesth* 2018;62:233-4.
27. Park HJ, Kim BW, Lee JK, Park Y, Park JM, Bae JY, *et al.* Endoscopic Sedation Committee of Korean Society of Gastrointestinal Endoscopy. 2021 Korean Society of Gastrointestinal Endoscopy clinical practice guidelines for endoscopic sedation. *Clin Endosc* 2022;55:167-82.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**How to cite this article:** Gowd U, Bajwa SJ, Kurdi M, Sindwani G. In pursuit of the right plan for airway management in gastrointestinal endoscopic procedures...the battle half won? *Indian J Anaesth* 2022;66:683-6.

#### Announcement

#### Old Issues of IJA

Limited copies of old issues of IJA from 2013 are available in IJA office. Members interested can contact Immediate Past Editor In Chief (editorija@yahoo.in/ijadivatia@gmail.com / 98690 77435)