



# Perspectives on anesthetic management for endoscopic retrograde cholangiopancreatography and interventional gastrointestinal endoscopy procedures: The case for the natural airway



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## ABSTRACT

The current trend for the relocation of complex patients undergoing complex procedures outside the traditional operating room (OR) suite is exemplified by the breadth and growth of advanced interventional endoscopy procedures available within the modern gastrointestinal (GI) endoscopy suite. A new anesthesia subspecialty, non-OR anesthesia has been born in response to the increasing demands for anesthesia and sedation services in GI suites, interventional radiology, and cardiology. Accordingly, a new multidisciplinary medical society has been founded—Society of Non-OR Interventionalists and Anesthesiologists. The mindset of anesthesiologists entering the GI suite may be at odds with the established practice of gastroenterologists and endoscopically oriented nurses who have successfully treated healthier patients with mild-to-moderate sedation for procedures that were more straightforward, diagnostic, and of short duration. This article presents a perspective in favor of propofol monotherapy, the administration of deep sedation with a natural airway for the vast majority of advanced endoscopic treatments, and the critical requirement that end-tidal carbon dioxide monitoring (or an equivalent independent measure of effective ventilation) be used at all times.

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## 1. Introduction

Approaches to providing safe anesthesia for advanced endoscopy within the endoscopy suite start with the critical question: do I intubate the patient, or do I allow this patient to have a natural airway? There are both personal and institutional answers to this. In some centers, every advanced endoscopic procedure is performed with the intent of general anesthesia. If the day's schedule lists 5 endoscopic retrograde cholangiopancreatography (ERCP) procedures, there would be 5 endotracheal tubes (ETT) placed by day's end. At other centers the opposite is true, and an ETT, whether for ERCP or endoscopic ultrasound (EUS), is extremely rare. Adherents to either camp can be devout in their belief as to which is the best way, the only logical way, or the safest way. Positive or negative personal prior experience and the level of comfort derived from working in an environment that might be very familiar or conversely an infrequent clinical assignment can heavily influence personal bias in this regard. There are also community, regional, and national influences on practice standards.

By example, it is much more common to see sedation without endotracheal intubation using endoscopist-directed propofol outside of North America [1]. Conversely, in the United States and Canada, anesthesia specialists primarily perform propofol administration within the gastrointestinal (GI) suite, be they physician anesthesiologists, nurse anesthetists, or anesthesiologist assistants. As endotracheal intubation is a hallmark of general anesthesia, only those centers that have trained anesthesia providers on staff can offer general endotracheal anesthesia (GETA). Consequently some US endoscopy centers choose to restrict their practice to low-risk patients, and deliver nurse-administered, endoscopist-directed sedation that excludes propofol and any question of an ETT. Now that the USA's Centers for Medicare and Medicaid Services has enacted new rules from January 2015 to reimburse separately for anesthesiology-provided sedation for screening colonoscopies [2], there may be more incentive for endoscopy centers to have in residence anesthesiologists that can provide anesthesia services for patients, including those requiring ERCPs, EUS, and other advanced endoscopic procedures.

The perspective of this author is strongly in favor of the natural airway for the vast majority of GI endoscopy cases requiring anesthesiology oversight, including ERCP and EUS. When asked to defend this strong preference against the automatic selection of an ETT for all advanced endoscopies, and when challenged with the argument that the ETT allows the highest margin of safety for

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anesthetic management of the patient, the following counter arguments are offered.

### 1.1. When appropriate but not every time

At the outset, it is important to concede that there are conditions that warrant a definitive protected airway. These include morbid obesity with a history of difficult ventilation; full stomach or functional gastric outlet obstruction or both; pseudocyst drainage, and to consider such for a planned double-balloon small bowel enteroscopy and procedures requiring long durations (>2 hours) where patient immobility is critical. Under such circumstances it is incumbent to select an endotracheal tube and a general anesthetic. There are certain situations where the conservative airway approach is to be embraced, even when presented with strong anecdotal evidence of the patient series with no apparent sequelae after anesthesia with a

natural airway. At our advanced endoscopy unit, which is university hospital based, approximately 25%-30% of our patients are intubated with general anesthesia. The remainder are anesthetized with a natural airway. For specific highly advanced endoscopic surgeries (eg, per oral endoscopic myomectomy [3]; per oral endoscopic tunneling for restoration of the esophagus), or for clinical patient indications listed in the Figure, we always plan on GETA. We run 4 endoscopy rooms daily: 2 general rooms (routine esophagogastroduodenoscopy and colonoscopies) and 2 advanced endoscopy rooms. We employ the anesthesia care team, with 1 anesthesia attending and 4 anesthesia providers (Certified Registered Nurse Anesthetists, Anesthesiologist Assistants, or senior anesthesia residents on a senior year residency rotation called "Transition to Practice"). Our patient population has a high percentage of American Society of Anesthesiologists (ASA) Class III and Class IV patients (>60%), with a variable volume of inpatients (up to 30%) that are often added onto the daily

## RECOMMENDED APPROACH TO ANESTHESIA FOR GI ENDOSCOPY

### SELECTING AN INTRAVENOUS ANESTHETIC AGENT:

**EF>40%:** Propofol infusion (start "loading dose rate" @ 300 mcg/kg/min, **attentively titrate down to maintenance range** before apnea, or if scope is in and tolerated by patient)

-avoid bolus propofol doses to lessen the chance of apneic episodes.

**EF< 30% ; Severe Aortic Stenosis (valve area < 1.0 cm<sup>2</sup>):**

**Etomidate** (load with 0.1-0.15 mg/kg, start infusion @ 20-40 mcg/kg/min)

-Or- **Ketamine** (load with 0.25-0.5 mg/kg) **followed with Propofol infusion** (suggested infusion range 75-150 mcg/kg/min as tolerated)

### INDICATIONS TO INTUBATE:

-SPIRUS enteroscopy and double-balloon enteroscopy cases

-POEM, POETRE cases

-high aspiration risk (e.g. Zenker's diverticulum, suspected gastric outlet obstruction, pancreatic pseudocyst > or = 6 cm)

-high BMI +/- difficult airway anatomy (e.g. Mallampati Class IV, prior neck surgery +/- XRT)

### RELATIVE INDICATION TO INTUBATE:

-EGD for esophageal dilatation and revision of esophageal stent (assess potential for laryngospasm +/- mechanical obstruction of trachea by stent)

### SELECTING A NEUROMUSCULAR RELAXANT:

-maintain full nmb relaxation for POEM/POETRE (prefer atracurium or vecuronium)

### GLYCOPYRROLATE:

-give 30 minutes before all cases with ketamine.

-give to all patients with baseline HR< or = 50

### NARCOTICS and MIDAZOLAM:

-reserve narcotics for **POST-procedure**, unless chronic pain patient, or heavy smoker with active cough. Avoid midazolam unless patient benzodiazepine-dependent.

### CHRONIC PAIN PATIENTS, +/- HEAVY SMOKING HX:

-consider low dose ketamine for chronic pain patients, limiting ketamine total dose to 0.5 mg/kg (bolus dose or : add ketamine to propofol infusion, 20 mg ketamine in 20 ml propofol, run the pump at the usual dose range setting for propofol infusion: beware rare possible incompatibility of ketamine with some propofol preparations -smokers: prn bolus doses of Fentanyl 12.5-25 mcg (or Alfentanil 125-250 mcg)

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