12.00

Monitoraggio emodinamico per Non Operating Room Anesthesia (NORA)

A. De Gasperi

Conflitti di interesse

- Grants per letture e Advisory Boards

Propofol solo per anestesisti

- Aferetica
- Astellas
- Fresenius
- Edwards
- Gilead
- Grifols
- Kedrion
- MSD
- Novartis
- Pfizer
- Thermofisher

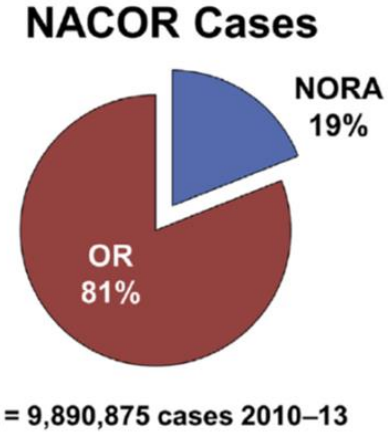
Curr Opin Anesthesiol 2015, 28:439–440

Anesthesia outside the operating room

Lynne R. Ferrari

Location
Gastrointestinal suite
Cardiology
Radiology
Lithotripsy
Total

As the practice of anesthesia continues to evolve, newer and safer drugs, more sophisticated monitoring, new techniques, and enhanced attention to safety and quality have led to an increased ability to provide anesthesia care outside of the operating room. As a testament to this, the practice has been given its own acronym: NORA or nonoperating room anesthesia. In a 2013 special edition of the American Society of Anesthesiologists (ASA) Newsletter, NORA was described as a practice that is 'Away From the O.R and Closer to the Patient' [1].



Pomerantz P. CEO report: away from the O.R. and closer to the patient. American Society of Anesthesiologists Newsletter 2013; 77:8–9.

The challenges of anaesthesia for the next decade

The Sir Robert Macintosh Lecture 2014

Eur J Anaesthesiol 2015; **32:**223–229

François Clergue

With regard to the type of procedures for which anaesthesia was required, it was clear that globally, most surgical activities had nearly doubled in 15 years, but some procedures, such as endoscopies, had exploded. This was seen in the French survey, in which anaesthesia for gastrointestinal endoscopies increased by 50-fold between 1980 and 1996. The same phenomenon was observed, progressively, in all countries. In Geneva University Hospitals, in the last 10 years, the number of procedures taking place outside the operating room has increased three times. Its growth now means that it represents 10 to 15% of total anaesthesia activity. In many hospitals, this figure approximates to the commitment to emergency anaesthesia.

Curr Opin Anesthesiol 2015, 28:439–440

CURRENT OPINION

Anesthesia outside the operating room

Figure 1 The anesthesiologist is providing care for a patient undergoing endoscopic retrograde cholangiopancreatography under monitored anesthesia care in an endoscopy suite outside of the operating room

Due to the configuration of the equipment in the room, he is totally surrounded by equipment. The anesthesia cart is out of view behind the anesthesia machine and is not readily accessible.

Location
Gastrointestinal suite
Cardiology
Radiology
Lithotripsy
Total

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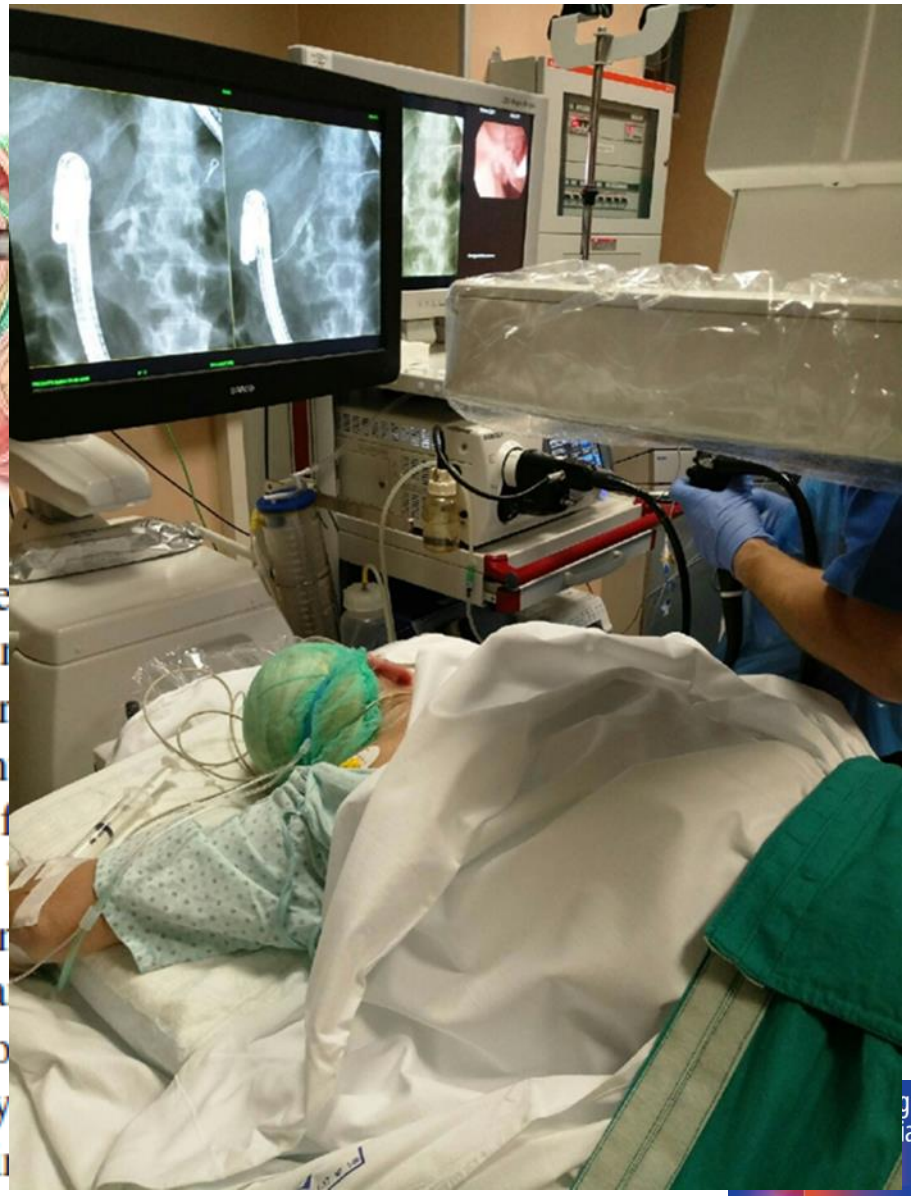
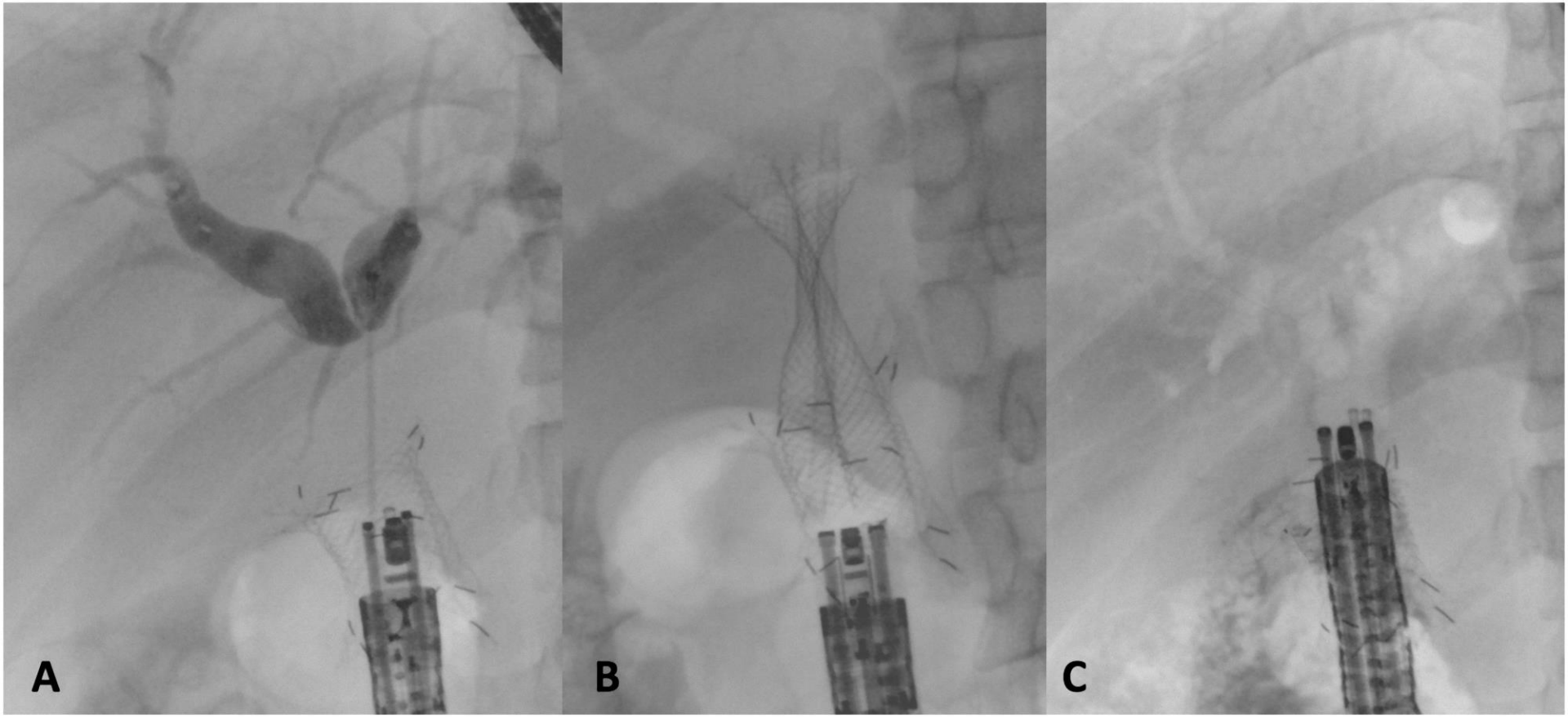
Chapter 9
Anesthesia for ERCP

Rajiv R. Doshi and Mary Ann Vann

- Endoscopic retrograde cholangiopancre
  invasive endoscopic procedure requiri
  instrumentation combined with live fluor
- ERCP has been integral in the treatmen
  tree, sometimes supplanting to the need f
- While diagnostic ERCP has primarily
  radiologic imaging, therapeutic ERCP i
  ber. Additionally, with better training a
  therapeutic procedures can be offered to
  complex anatomy. Patients with biliary
  ERCP to relieve obstructions and drain i

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Unlike routine endoscopic procedures, endoscopic retrograde cholangiopancreatography (ERCP) combines several unique challenges. Despite defined indications, the complexity and length of each procedure are often difficult to predict because of unforeseen challenges with cannulation and subsequent therapy. Patients are usually in the prone position to maintain a stable, short endoscope position. In addition, the prone position and overlying fluoroscopy unit make airway monitoring and interventions difficult, particularly with an acute decline in the patient's respiratory status. Furthermore, many indications for ERCP are associated with a functional or mechanical gastric outlet obstruction, increasing the risk for periprocedural aspiration. Finally, the obesity epidemic and the rising prevalence of overt and subclinical obstructive sleep apnea (OSA) result in a high-risk patient population for sedation-related adverse events (AEs).

Am J Gastroenterol 2017; 112:303–305;

Endoscopic Sedation: Who, Which, When?

John M. Inadomi, MD[1]

There is no doubt that anesthesia-administered sedation is an essential component of a successful endoscopic program. In particular, advanced procedures such as ERCP that are longer in duration, and require greater precision are safer and more effective when sedation is provided by anesthesia professionals.

The challenges of anaesthesia for the next decade

The Sir Robert Macintosh Lecture 2014

Eur J Anaesthesiol 2015; **32:**223–229

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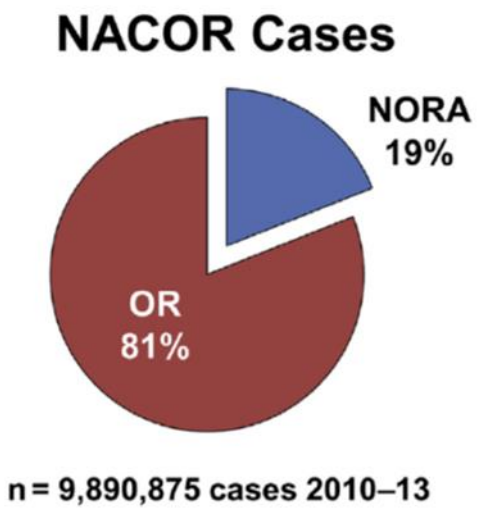
With regard to the type of procedures for which anaesthesia was required, it was clear that globally, most surgical activities had nearly doubled in 15 years, but some procedures, such as endoscopies, had exploded. This was seen in the French survey, in which anaesthesia for gastrointestinal endoscopies increased by 50-fold between 1980 and 1996. The same phenomenon was observed, progressively, in all countries. In Geneva University Hospitals, in the last 10 years, the number of procedures taking place outside the operating room has increased three times. Its growth now means that it represents 10 to 15% of total anaesthesia activity. In many hospitals, this figure approximates to the commitment to emergency anaesthesia.



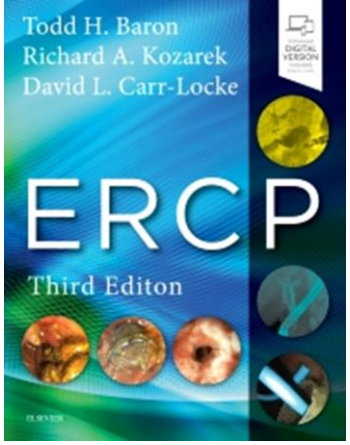
Endoscopia digestiva complessa con anestesista

3 sedute /settimana di

7 ore

2 sedute / settimana

11 ore



6

Sedation in ERCP

Catherine D. Tobin and Gregory A. Coté

Anesthesiologists may choose between general anesthesia with endotracheal intubation at the onset of the procedure and general anesthesia with use of a nasal cannula and having the patient breathe spontaneously during the procedure. In the latter scenario, patients are typically sedated using a propofol-based regimen, with a goal of achieving deep sedation or general anesthesia. Endoscopists increasingly prefer anesthesia-administered sedation for all endoscopic procedures. The growing role of propofol in endoscopic practice is reflected in epidemiologic data demonstrating a consistent increase in anesthesia-administered sedation.[7,8]

Guidelines for sedation and anesthesia in GI endoscopy

Prepared by: ASGE STANDARDS OF PRACTICE COMMITTEE

Dayna S. Early, MD, FASGE, Jenifer R. Lightdale, MD, MPH, FASGE, John J. Vargo, II, MD, MPH, FASGE (invited content expert, ad hoc member), Ruben D. Acosta, MD, Vinay Chandrasekhara, MD, Krishnavel V. Chathadi, MD, John A. Evans, MD, Deborah A. Fisher, MD, MHS, FASGE, Lisa Fonkalsrud, BSN, RN, CGRN, Joo Ha Hwang, MD, PhD, FASGE, Mouen A. Khashab, MD, V. Raman Muthusamy, MD, FASGE, Shabana F. Pasha, MD, FASGE, John R. Saltzman, MD, FASGE, Amandeep K. Shergill, MD, Brooks D. Cash, MD, FASGE, Previous Committee Chair, John M. DeWitt, MD, FASGE, Committee Chair

TABLE 2. Levels of sedation and anesthesia

	Minimal sedation (anxiolysis)	Moderate sedation (conscious sedation)	Deep sedation	General anesthesia
Responsiveness	Normal response to verbal stimulation	Purposeful response to verbal or tactile stimulation	Purposeful response after repeated or painful stimulation	Unarousable even with painful stimulus
Airway	Unaffected	No intervention required	Intervention may be required	Intervention often required
Spontaneous ventilation	Unaffected	Adequate	May be inadequate	Frequently inadequate
Cardiovascular function	Unaffected	Usually maintained	Usually maintained	May be impaired

Am J Gastroenterol 2017; 112:303–305;

Endoscopic Sedation: Who, Which, When?

John M. Inadomi, MD[1]

There is no doubt that anesthesia-administered sedat is an essential component of a successful endoscopic progra In particular, advanced procedures such as ERCP that are lon in duration, and require greater precision are safer and more ef ive when sedation is provided by anesthesia professionals. However, it is also apparent that the addition of anesthesia-administered sedation for low-risk patients undergoing routine endoscopy is not necessary and adds tremendous costs to an already highly burdened health-care system.

Anesthetist-Directed Sedation Favors Success of Advanced Endoscopic Procedures

Am J Gastroenterol 2017; 112:290–296;

James Buxbaum, MD[1], Nitzan Roth, MD, PhD[1], Nima Motamedi, MD[1], Terrance Lee, MD[1], Paul Leonor, MD[1], Mark Salem, MD[1], Dolores Gibbs, CRNA[1] and John Vargo, MD[1]

RESULTS: During the 3-year study period, 60% of the 1,171 procedures were carried out with GDS and 40% were carried out with ADS. Failed procedures occurred in 13.0% of GDS cases compared with 8.9% of ADS procedures (multivariate odds ratio (OR): 2.4 (95% confidence interval (CI): 1.5–3.6)).This was driven by a higher rate of sedation failures in the GDS group, 7.0%, than in the ADS group, 1.3% (multivariate OR: 7.8 (95% CI: 3.3–18.8)). There was no difference in technical success between the GDS and ADS groups (multivariate OR: 1.2 (95% CI: 0.7–1.9)). We were able to match 417 GDS cases to 417 ADS cases based on procedure type, indication, and propensity score. Analysis of the propensity score-matched patients confirmed our findings of increased sedation failure (multivariate OR: 8.9 (95% CI: 2.5–32.1)) but not technical failure (multivariate OR: 1.2 (0.7–2.2)) in GDS compared with ADS procedures. Adverse events of sedation were rare in both groups. Failed ERCP in the GDS group resulted in a total of 93 additional days of hospitalization. We estimate that $67,891 would have been saved if ADS had been used for all ERCP procedures. No statistically significant difference in EUS success was identified, although this sub-analysis was limited by sample size.

CONCLUSION: ADS improves the success of advanced endoscopic procedures. Its routine use may increase the quality and efficiency of these services.

Guidelines for sedation and anesthesia in GI endoscopy

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TABLE 4. Guideline for anesthesia provider assistance during GI endoscopy

Anesthesia provider assistance should be considered in the following situations:
Prolonged or therapeutic endoscopic procedures requiring deep sedation
Anticipated intolerance to standard sedatives
Increased risk for adverse event because of severe comorbidity (ASA class IV or V)
Increased risk for airway obstruction because of anatomic variant

Frontline Gastroenterology 2019;**10**:141–147.

Deep sedation and anaesthesia in complex gastrointestinal endoscopy: a joint position statement endorsed by the British Society of Gastroenterology (BSG), Joint Advisory Group (JAG) and Royal College of Anaesthetists (RCoA)

Reena Sidhu,[1] David Turnbull,[2] Mary Newton,[3] Siwan Thomas-Gibson,[4] David S Sanders,[1] Srisha Hebbar,[5] Rehan J Haidry,[6,7] Geoff Smith,[8] George Webster[6]

- The availability of anaesthetist-led deep sedation and anaesthesia in the UK for complex endoscopy needs to be expanded.
- Adequate preassessment and patient triage is key prior to consideration of deep sedation and anaesthesia.
- Current guidelines dictate that delivery of propofol sedation in the UK must be provided by a qualified anaesthetist supported by a qualified assistant (Operating Department Practitioner or Anaesthetic Nurse).
- A local standard operating procedure needs to be in place to ensure that minimum standards of environment, staffing and delivery of all types of deep sedation and anaesthesia are maintained.

Guidelines for sedation and anesthesia in GI endoscopy

Prepared by: ASGE STANDARDS OF PRACTICE COMMITTEE

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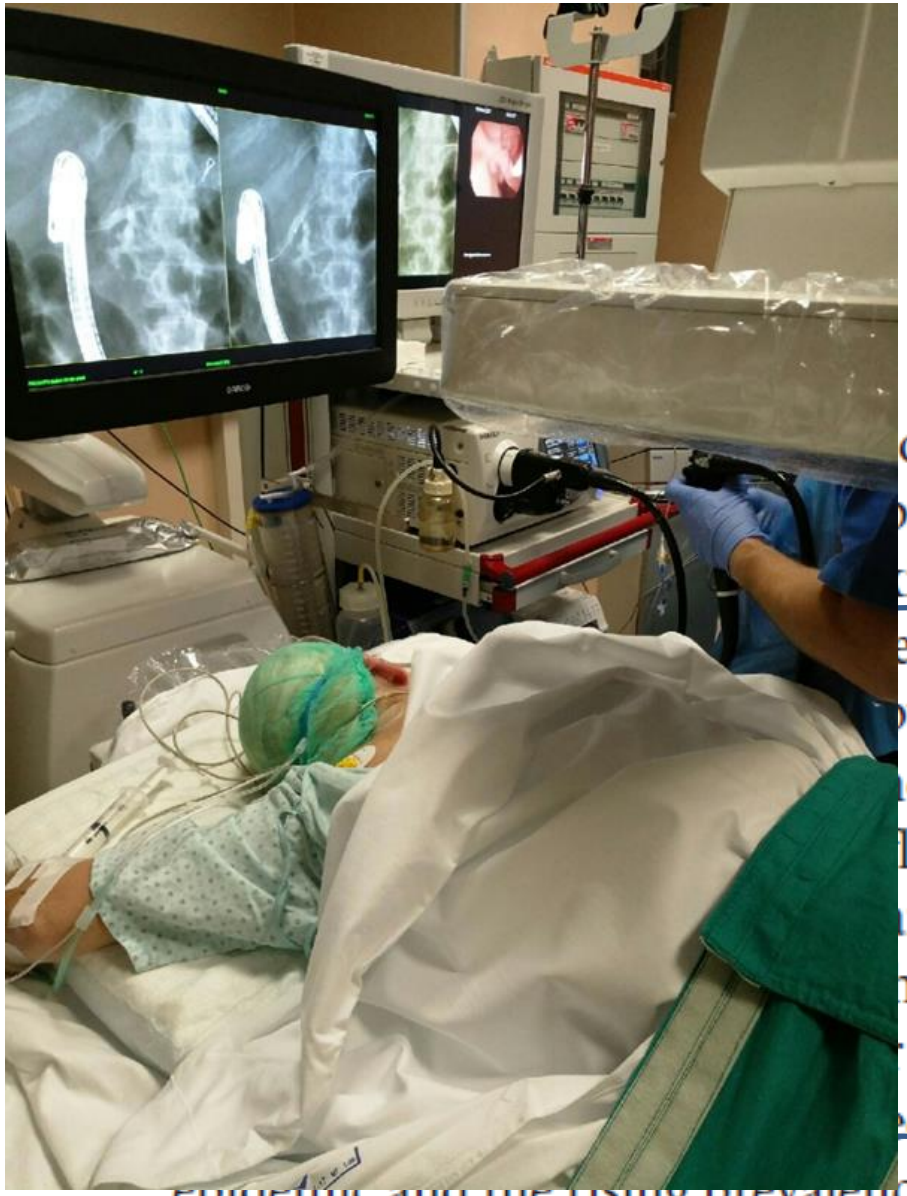
TABLE 5. Recommendations for propofol use during endoscopy

A sedation team with appropriate education and training. At least 1 person who is qualified in advanced life support skills (ie, airway management, defibrillation, and the use of resuscitative medications).
Trained personnel dedicated to the uninterrupted monitoring of the patient's clinical and physiologic parameters throughout the procedure should be available.
Physiologic monitoring must include pulse oximetry, electrocardiography, and intermittent blood pressure measurement.
Monitoring oxygenation by pulse oximetry Capnography should be considered becaus Continuous monitoring will allow recognitic
Personnel should have the ability to rescue respiratory or cardiovascular function.
Age-appropriate equipment for airway man
A physician should be present throughout

advantages to the use of anesthesia provider–administered sedation for routine colonoscopy and upper endoscopy may include improved patient satisfaction, decreased distractions for the endoscopist, and increased throughput through the endoscopy unit because of shorter sedation and recovery times, although there are no published studies confirming these. In addition, patients with medical comorbidities may require MAC that typically involves administration of propofol with or without adjunctive sedatives to achieve moderate sedation, deep sedation, or general anesthesia.[65,66] Governance to determine who can administer MAC is dictated by state and institutional regulations.

Catherine D. Tobin and Gregory A. Coté



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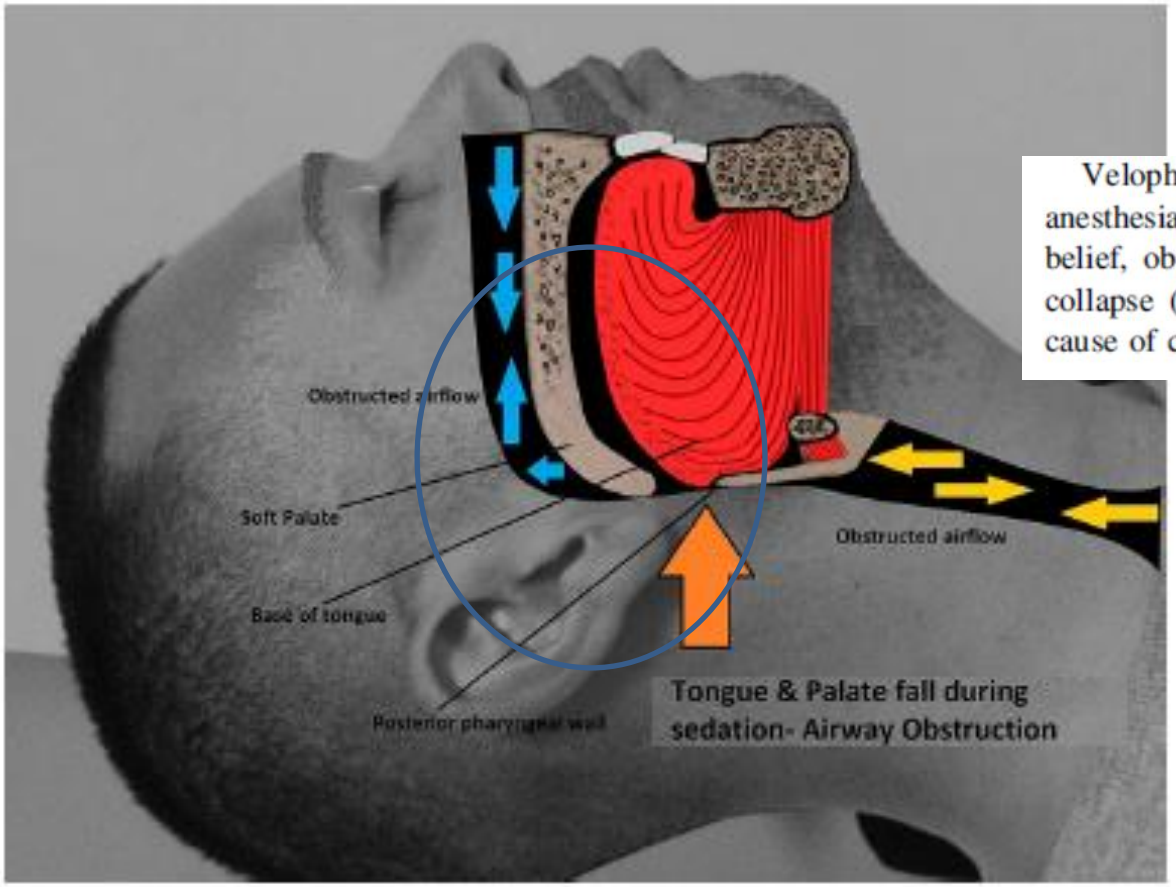
Airway Management During Upper GI Endoscopic Procedures: State of the Art Review

Basavana Goudra[1] · Preet Mohinder Singh[2]

Dig Dis Sci (2017) 62:45–53



Velopharynx is the most common site of collapse during anesthesia, as during natural sleep. Contrary to previous belief, obstruction of the oropharynx due to retrolingual collapse (tongue falling back) is the second commonest cause of collapse [8] (Fig. 2).

Fig. 2 Figure demonstrating relevant airway anatomy along with situation of airway obstruction. The figure also demonstrates common site of airway collapse in a sedated spontaneously breathing patient

Airway Management During Upper GI Endoscopic Procedures: State of the Art Review

Dig Dis Sci (

Maneuver Chin Lift, Jaw Thrust, and Neck Extension

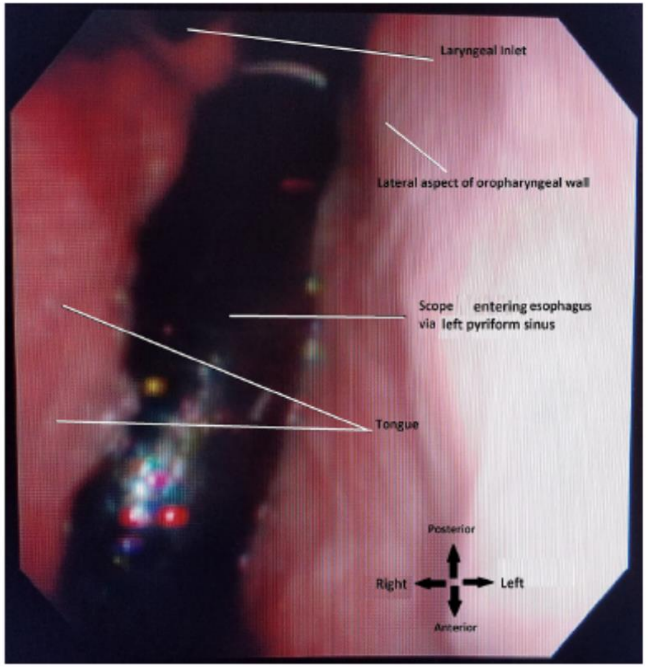
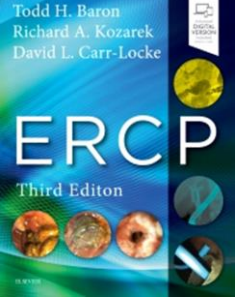


Fig. 3 Mechanism of an endoscope stenting the airway open. The endoscope prevents the collapse of the airway at the pharyngeal level despite negative pressure in the pharynx during spontaneous breathing

enhance patient safety, continuous oxygen supplementation (preferably via a nasopharyngeal airway) must always be used. Simple manipulations such as assisting ventilation (after turning the patients head or the patient himself to the side) and a firm chin lift could be lifesaving. It goes without saying that it is important to remain vigilant and intervene for any airway compromise with bag-mask ventilation or emergency endotracheal intubation. The airway complication rates are proportional to length of the procedures and constant vigilance is the key.



Fewer studies track the frequency of airway rescue maneuvers, such as a chin lift, nasal trumpet insertion, and transient positive pressure (i.e., bag-mask) ventilation.[15] These may be performed as a preventive maneuver in anticipation of hypoxemia or apnea and reflect the importance of having a sedation provider experienced in airway rescue.

Maneuver Chin Lift, Jaw Thrust, and Neck Extension

Anesthesia-administered sedation for endoscopic retrograde cholangiopancreatography: monitored anesthesia care or general endotracheal anesthesia?

Curr Opin Anesthesiol 2019, 32:531–537

Zachary L. Smith[a], *Koushik K. Das*[b], *and Vladimir M. Kushnir*[b]

Recent findings

Several studies have consistently identified patients at high risk for sedation-related adverse events during ERCP. This group includes those with higher American Society of Anesthesiologists class and (BMI). ERCP is commonly performed in the prone position, which can make the placement of an emergent advanced airway challenging. Although this may be alleviated by performing ERCP in the supine position, this technique is more technically cumbersome for the endoscopist. Data regarding the impact of routine GEA on endoscopy unit efficiency remain controversial.

Summary

Pursuing MAC or GEA for patients undergoing ERCP is best-approached on an individual basis. Patients at high risk for sedation-related adverse events likely benefit from GEA. Larger, multicenter randomized controlled trials will aid significantly in better delineating which sedation approach is best for an individual patient.

Anesthesia for Routine and Advanced Upper Gastrointestinal Endoscopic Procedures

Christopher D. Sharp, MD, MS[a], Ezekiel Tayler, DO[b], Gregory G. Ginsberg, MD[c,*]

Anesthesiology Clin 35 (2017) 669–677

Box 1
Gastrointestinal suite intubation algorithm

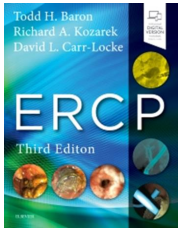
1. Body Mass Index
   - Less than 25 = 0
   - 25 to 35 = 1
   - Greater than 35 = 2
2. Status of procedure and Time of Day Done
   - Elective/urgent = 0
   - Emergent due to Upper GI bleeding = 4
   - Emergent due to Lower GI Bleeding = 2
   - Start time after 1800 = 1
3. Gastrointestinal Status
   - NPO = 0
   - No/controlled gastroesophageal reflux disease (GERD) = 0
   - Active GERD = 1
   - History of aspiration = 1
   - NG tube in place = 1
4. Pulmonary/Hemodynamic/Cardiac Status
   - Stable = 1
   - Unstable = 2
   - Pulmonary hypertension = 1
   - Requires supplemental oxygen = 1
5. Airway
   - Mallampati score less than or equal to 2 = 0
   - Mallampatis score greater than 3 = 1
   - Confirmed or suspected OSA = 1

and treated appropriately based on physician judgment and experience. To help with the decision of whether to protect the airway or not in the GI suite, the following algorithm in **Box 1** has been developed.

Any score of 4 or greater or any patient with full stomach or gastric outlet obstruction should warrant consideration of securing the airway. If GI status of the patient is not clear, then one should consult with the GI attending. There is no substitution, however, for the thoughtful evaluation and judgment of the anesthesia team.

The ERCP

Brian C. Brauer and Steven A. Ed



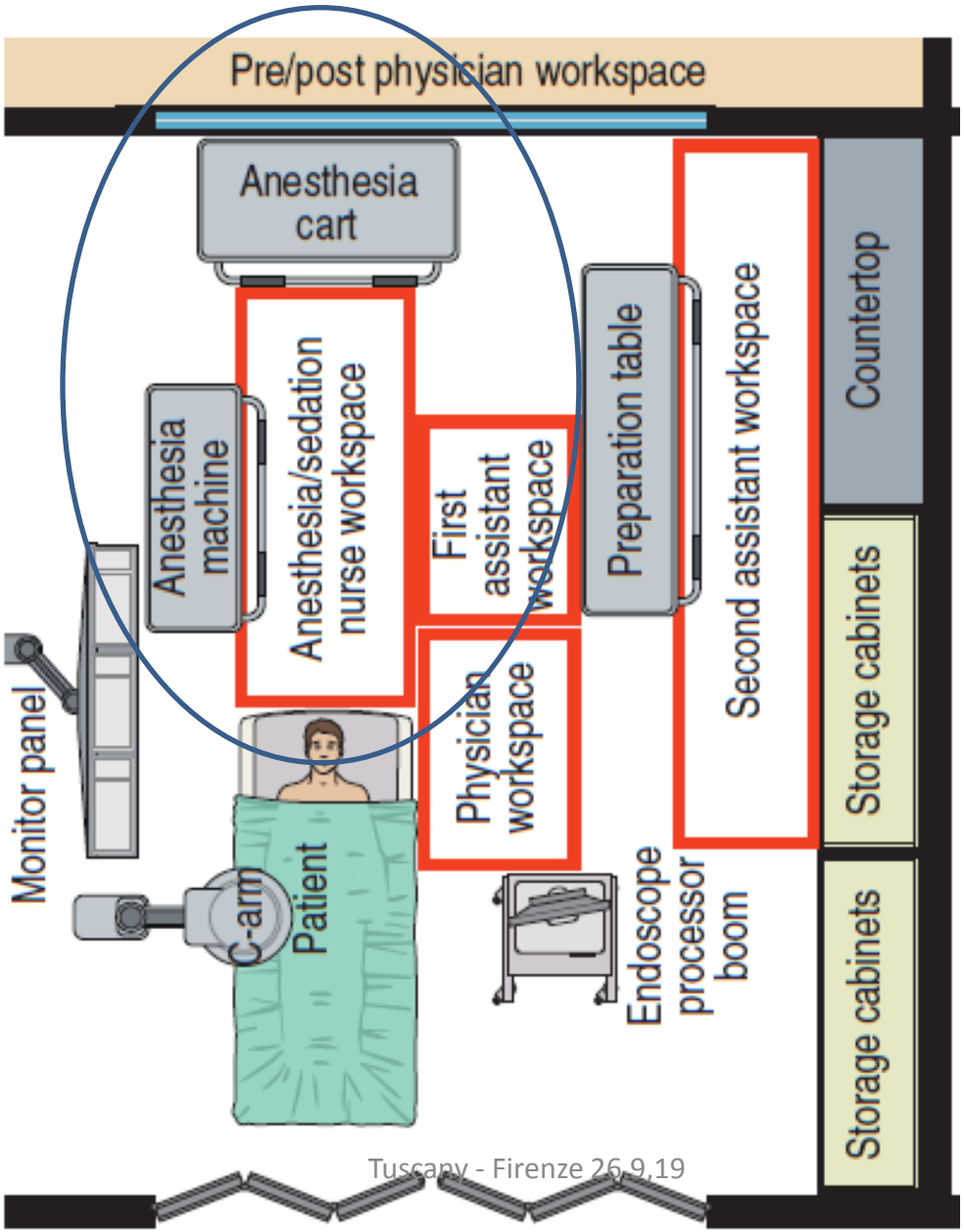
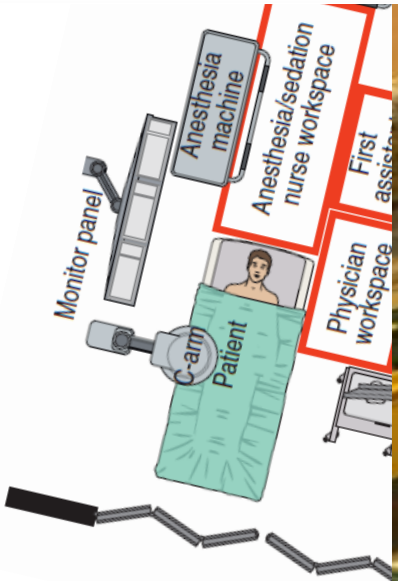
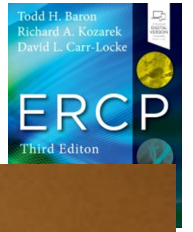


Figure 1 The anesthesiologist is providing care for a patient undergoing endoscopic retrograde cholangiopancreatography under monitored anesthesia care in an endoscopy suite outside of the operating room

Due to the configuration of the equipment in the room, he is totally surrounded by equipment. The anesthesia cart is out of view behind the anesthesia machine and is not readily accessible.





Anesthesia-administered sedation for endoscopic retrograde cholangiopancreatography: monitored anesthesia care or general endotracheal anesthesia?

Curr Opin Anesthesiol 2019, 32:531–537

Zachary L. Smith[a], Kaushik K. Deb[b] and Vladimir M. Kushnir[b]

Safety in the nonoperating room anesthesia suite is not an accident: lessons from the National Transportation Safety Board

Curr Opin Anesthesiol 2019, 32:504–510

Jason D. Walls[a], *William J. Bramble Jr*[b], *and Mark S. Weiss*[a]

traditional operating room. When evaluating the different venues of NORA individually (gastroenterology, cardiology and interventional radiology), there appears to be an increased risk of complications and higher mortality in patients undergoing NORA procedures in the cardiology and radiology suites [8▪]. Although there may be an overall lower rate of complications in patients undergoing NORA procedures as a whole, closed claims analysis suggests that these patients have a higher frequency of severe injury and death [10,11]. Although NORA patients may have fewer complications overall, those that do occur may be more serious and life threatening than complications in the traditional operating room.

Safety of Non–Operating Room Anesthesia

A Closed Claims Update

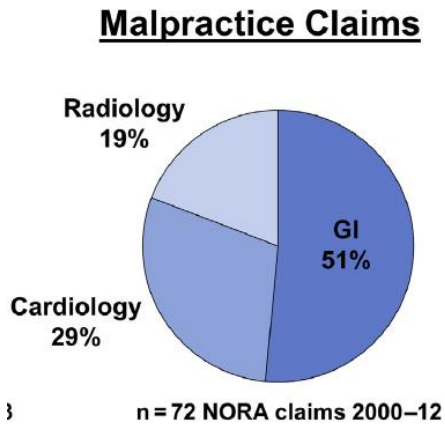
Anesthesiology Clin 35 (2017) 569–581

Zachary G. Woodward, MD[a],
Richard D. Urman, MD, MBA, FASA[a,b,*], Karen B. Domino, MD, MPH[c]

Table 3
Most common complications in NORA claims versus operating room claims

	NORA Claims (N = 72), n (%)	OR Claims (N = 1828), n (%)	*P* Value
Death	44 (61)	556 (30)	<.001
Permanent brain damage	10 (14)	208 (11)	.308
Aspiration pneumonitis	9 (13)	80 (4)	.005
Airway injury	3 (4)	151 (8)	.150
Eye injury	2 (3)	108 (6)	.200
Pain during surgery	2 (3)	14 (1)	.121
Nerve injury	1 (1)	333 (18)	<.001
Myocardial infarction	1 (1)	75 (4)	.206

N = 1900 claims.



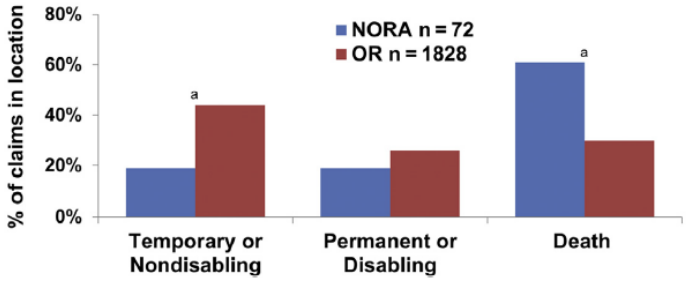


Fig. 1. Severity of injury in non–operating room anesthesia (NORA) claims compared with operating room (OR) claims. [a]*P*<.001.

Safety of Non–Operating Room Anesthesia

A Closed Claims Update

Anesthesiology Clin 35 (2017) 569–581

Zachary G. Woodward, MD[a],
Richard D. Urman, MD, MBA, FASA[a,b,*], Karen B. Domino, MD, MPH[c]

Table 4
Mechanisms of injury in NORA claims versus operating room claims

	NORA Claims (N = 72), n (%)	OR Claims (N = 1828), n (%)	*P* Value
Respiratory events	38 (53)	416 (23)	<.001
Inadequate oxygenation/ventilation	22 (31)	116 (6)	<.001
Cardiovascular events	10 (14)	269 (15)	.505
Equipment events	7 (10)	333 (18)	.039
Regional block events	0 (0)	192 (11)	<.001
Medication-related events	4 (6)	102 (6)	.626
Other events[a]	12 (17)	485 (27)	.037

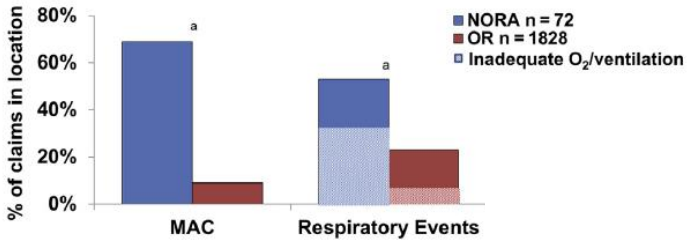


Fig. 2. Characteristics of malpractice claims in non–operating room anesthesia (NORA) locations compared with operating room (OR) locations. Hatched section of bars indicate proportion of inadequate oxygenation/ventilation as a subset of respiratory events. MAC, monitored anesthesia care; O_2, oxygenation. [a]*P*<.01.

Safety of Non–Operating Room Anesthesia

A Closed Claims Update

Anesthesiology Clin 35 (2017) 569–581

Zachary G. Woodward, MD[a],
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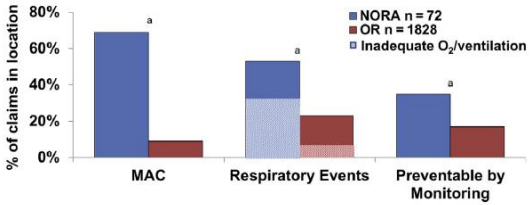
Table 5
Characteristics of NORA claims associated with oversedation (n = 20)

Characteristic	n (%)
Age > 70 y (n = 20)	3 (15)
ASA physical status 3–5 (n = 20)	14 (70)
Obese (n = 18)	12 (67)
Location (n = 20)	
Gastrointestinal suite	13 (65)
Radiology	3 (15)
Cardiology	3 (15)
Lithotripsy	1 (5)
Sedative agents (n = 18)	
Propofol plus benzodiazepines/opioids/ketamine/lidocaine	12 (67)
Propofol alone	4 (22)
Others (no propofol): benzodiazepine, opioid, ketamine	2 (11)
Preventable by better monitoring (n = 19)	
Probably	13 (68)
Would not prevent	6 (32)
Death or permanent brain damage (n = 20)	20 (100)
Substandard care (n = 17)	15 (88)
Payment to plaintiff (n = 20)	
Payment made	19 (95)
Median (interquartile range) of payments (2016$)	$609,039
25% Quartile	$298,700
75% Quartile	$1,328,700



Characteristics of malpractice claims in non–operating room anesthesia (NORA) loca- compared with operating room (OR) locations. Hatched section of bars indicate pro- ɪn of inadequate oxygenation/ventilation as a subset of respiratory events. MAC, ored anesthesia care; O_2, oxygenation. [a]$P<.01$.

EJA

Eur J Anaesthesiol 2018; **35**:6–24

GUIDELINES

European Society of Anaesthesiology and European Board of Anaesthesiology guidelines for procedural sedation and analgesia in adults

Jochen Hinkelbein, Massimo Lamperti, Jonas Akeson, Joao Santos, Joao Costa, Edoardo De Robertis, Dan Longrois, Vesna Novak-Jankovic, Flavia Petrini, Michel M.R.F. Struys, Francis Veyckemans, Thomas Fuchs-Buder* and Robert Fitzgerald†

Standard monitoring parameters [non-invasive BP (NIBP), pulse oximetry, ECG and capnography] are analysed separately in this section but their use during PSA should be considered mandatory. Given the rapid changes caused by the administration of sedative medications combined with analgesic drugs, it is important to have a continuous assessment of the levels of sedation that can vary during the procedure. This requires a

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2k. ii and iii. Non-invasive blood pressure and ECG: intermittent non-invasive measurements of blood pressure and continuous ECG monitoring are considered mandatory in all patients undergoing procedural sedation (very good consensus: level of evidence B: grade of recommendation strong)

Intermittent frequent measurements of NIBP at least every 5 min although such monitoring could interfere with the procedure[180] and continuous ECG monitoring are both considered mandatory during anaesthetic procedures including PSA. This statement is supported by

2k. iv. Pulse oximetry: the most important device for clinical bedside monitoring: should be used in all patients undergoing procedural sedation (very good consensus: level of evidence B: grade of recommendation strong)

As already mentioned above, continuous clinical observation of the patient should be the basic level of clinical monitoring in any patient subjected to PSA. Pulse oximetry, providing transcutaneous values of haemoglobin oxygenation (SpO_2), should be used as a minimum standard for continuous monitoring of all patients undergoing procedural sedation. Not using pulse oximetry during PSA cannot be considered ethically acceptable. Continuous supply of oxygen and monitoring with pulse oximetry are mandatory to minimise the risk of, and rapidly manage, hypoxaemia.[184,185] Today, pulse oximetry is the standard for monitoring of severely ill or injured patients

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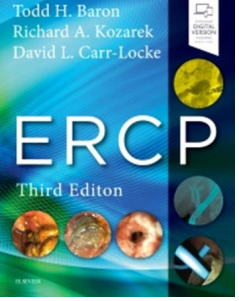
2k. v. Capnography: by facilitating early detection of ventilation problems: should be used in all patients undergoing procedural sedation (very good consensus: level of evidence A: grade of recommendation strong)

In addition to continuous monitoring by visual observation, NIBP, ECG and pulse oximetry, capnography should be used for continuous evaluation of ventilation.[184] It monitors the end-tidal concentration of carbon dioxide, which is in theory more sensitive to alveolar hypoventilation than SpO_2 and is standard monitoring for endotracheal intubation and ventilation in general anaesthesia.[184,192] Sidestream capnography can be measured with special nasal cannulae. Capnography has also been shown to provide earlier indications of apnoea than pulse oximetry.[184,193] Other studies have shown inter-



Capnography represents end-tidal carbon dioxide ($ETCO_2$) and is a real-time monitor of every inhalation and exhalation. Normal $ETCO_2$ is 35 to 45 mm Hg, and watching the curve is more important than the number when it is used to monitor sedation. If apnea or airway obstruction develops, $ETCO_2$ will drop immediately, yet pulse oximetry may take minutes to reflect hypoxemia caused by apnea/hypopnea. Therefore, when using capnography, one can react faster to address the etiology of airway problems before they have permanent and dangerous outcomes. A meta-analysis of five studies that included a variety of procedures, including endoscopy, found that the use of capnography increased the detection rate of respiratory depression.[40] Capnography reduces the incidence of severe hypoxemia or apnea in patients using a propofol-based regimen or a standard combination of benzodiazepine

data suggest that it may be cost-effective.[43] Given the complexities of sedation specific to ERCP, universal use of capnography should be strongly considered.

How we do it….
ERCP in sedazione profonda e ventilazione spontanea

posizione prona, sedazione profonda e ventilazione spontanea

- **Anamnesi / EO**
  - stesso giorno salvo casi particolari
  - Allergie
  - METs
  - Farmaci
  - Digiuno
  - Vie aeree / Mallampati / protesi mobili
  - ECG / esami quando disponibili
- CONSENSO

RegioneLombardia
LA GIUNTA

DELIBERAZIONE N° X / 3993 Seduta del 04/08/2015

Per questi motivi si richiama la necessità che la **sedo-analgesia** effettuata in NORA segua i consueti protocolli di sicurezza del paziente, con particolare riferimento a:

- effettuazione di visita pre-anestesiologica;
- valutazioni rischio-beneficio;
- raccolta di consenso informato del paziente;
- somministrazione dell'anestesia da parte di personale anestesista-rianimatore, con le eccezioni previste per le prestazioni in anestesia locale e per la chirurgia odontoiatrica in anestesia loco-regionale, tronculare o inalatoria a mezzo protossido d'azoto (effettuabile dagli odontoiatri o dagli operatori medici abilitati all'esercizio dell'odontoiatria);
- monitoraggio dei parametri vitali del paziente (frequenza cardiaca, pressione arteriosa, frequenza respiratoria, saturazione in ossigeno), valutazione seriale (ogni 5') del livello di coscienza e di risposta agli stimoli (vedi Tab. 3) e verifica del dosaggio dei farmaci utilizzati;
- compilazione, a cura del medico anestesista, della cartella anestesiologica, completa della relativa scheda anestesiologica;
- presenza nell'area di assistenza dei presidi utilizzabili per la rianimazione;
- monitoraggio post-procedura (mantenimento dei parametri vitali, autonomia ecc.).

on: considerations outside of

Curr Opin Anesthesiol 2015, 28:441–445

Elizabeth A.M. Frost[b]

Timing of the preprocedural evaluation will depend on the complexity of the procedure. Patients who are scheduled for high-risk procedures should be evaluated well in advance.

WHAT TESTS ARE INDICATED?

Consensus from the ASA indicated the following [24]:

(1) ECG if the patient is above 50 years. The ECG is valid for 6 months provided no interval change. However, an ECG is less predictive than a history and physical examination and is costly.
(2) Chest radiograph is not mandatory at any age.
(3) Pregnancy test on the day of the procedure for women of child-bearing age who have not had a documented hysterectomy.
(4) Blood glucose check for all diabetic patients.
(5) Potassium check for patients with end stage renal disease.
(6) Complete blood count and electrolyte panel as indicated by history, and valid for 6 months.
(7) An indication should be made for all tests ordered.
(8) Tests already in the record are acceptable.
(9) Routine and aged-based tests are not reimbursed by the Centers for Medicare and Medicaid Services.

How we do it….
ERCP in sedazione profonda e ventilazione spontanea
posizione prona, sedazione profonda e ventilazione spontanea

- Anamnesi / EO
  - stesso giorno salvo casi particolari
    - Allergie
    - METs
    - Farmaci
    - Digiuno
    - Vie aeree / Mallampati / protesi mobili
    - ECG / esami quando disponibili
- CONSENSO

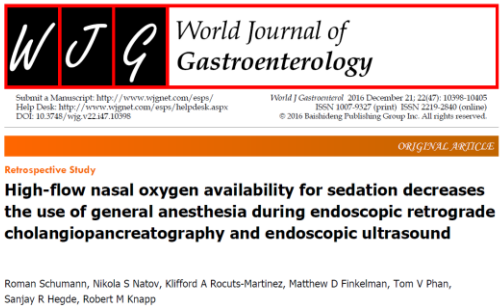
- Anestesia locale faringea

- (Midazolam 0.03 mg / kg ev)
- Meperidina 0.5 mg / kg oppure
- Fentanyl 0.5 – 1 gamma / kg
- Propofol 1 – 1.5 mg / kg induzione
- Propofol 3 - 5 mg / kg / h mantenimento
  - TCI 2 – 4 y/ ml

- Infusioni
  - Cristalloidi 3 - 4 ml / kg /h

- Monitoraggio
  - HR / ritmo
  - NIBP (ogni 5 min)
  - SaO_2 (suono udibile)
  - $EtCO_2$
  - Respiratory Rate
  - (BIS) (60 – 70) (profondità sedazione)

- Ventilatory supprt
  - O_2 4 – 5 litri / min
  - Disponibilità seconda fonte di O_2
  - HFNO (Optiflow)



Dexmedetomidine is safe and reduces the additional dose of midazolam for sedation during endoscopic retrograde cholangiopancreatography in very elderly patients

Osamu Inatomi[1*], Takayuki Imai[1], Takehide Fujimoto[1], Kenichiro Takahashi[1], Yo [illegible] Hiroshi Hasegawa[1], Atsushi Nishida[1], Shigeki Bamba[2], Mitsushige Sugimoto[3] and

Inatomi *et al. BMC Gastroenterology* (2018) 18:16

single intravenous injection of 2 mg of midazolam was repeated to maintain the sedation level at 4 according to the RSS, as in the DEX group (Fig. 1).

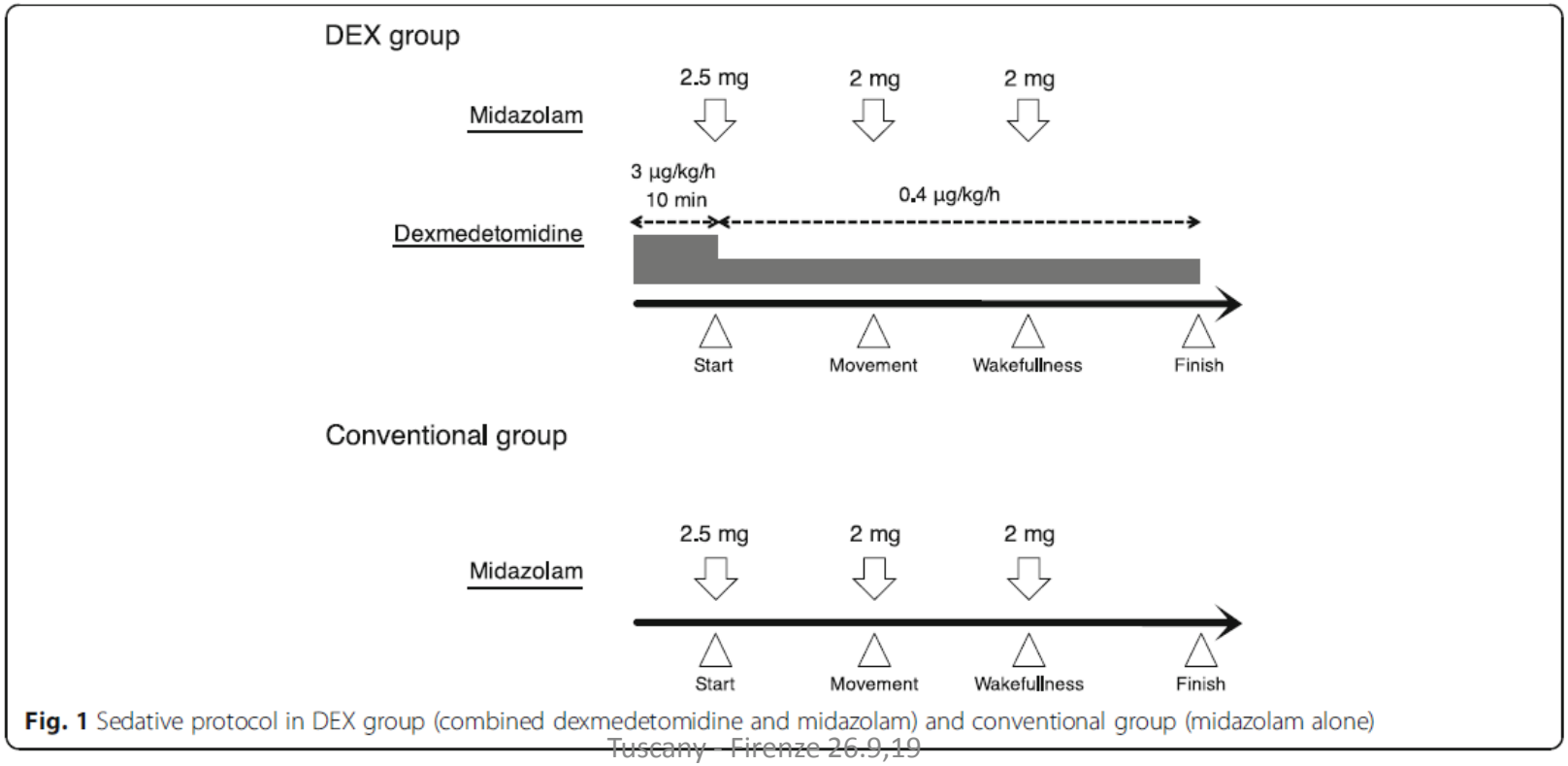


Fig. 1 Sedative protocol in DEX group (combined dexmedetomidine and midazolam) and conventional group (midazolam alone)

Dexmedetomidine is safe and reduces the additional dose of midazolam for sedation during endoscopic retrograde cholangiopancreatography in very elderly patients

Osamu Inatomi[1*], Takayuki Imai[1], Takehide Fujimoto[1], Kenichiro Takahashi[1], Yoshihiro Yokota[1], Noriaki Yamashita[1], Hiroshi Hasegawa[1], Atsushi Nishida[1], Shigeki Bamba[2], Mitsushige Sugimoto[3] and Akira Andoh[1]

Table 2 Sedation-related complications

	DEX group ($n = 62$)	Conventional group ($n = 87$)	*P*-value
Respiratory depression	0 (0%)	6 (6.9%)	0.04
Use atropine for bradycardia	2 (3.2%)	0 (0%)	0.34
Use vasopressor for hypotension	1 (1.6%)	0 (0%)	0.17

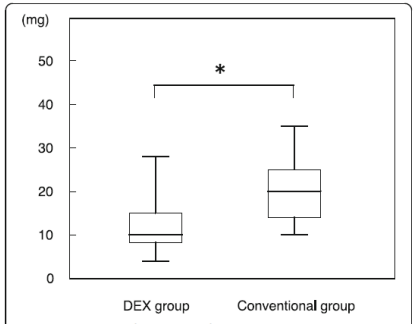


Fig. 2 Comparison of total dose of midazolam in DEX (combined dexmedetomidine and midazolam) and conventional group (midazolam alone). *$p < 0.01$

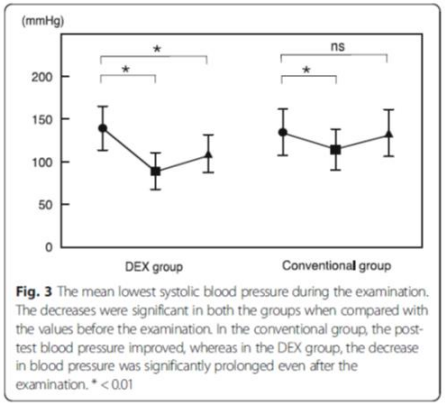


Fig. 3 The mean lowest systolic blood pressure during the examination. The decreases were significant in both the groups when compared with the values before the examination. In the conventional group, the post-test blood pressure improved, whereas in the DEX group, the decrease in blood pressure was significantly prolonged even after the examination. * < 0.01

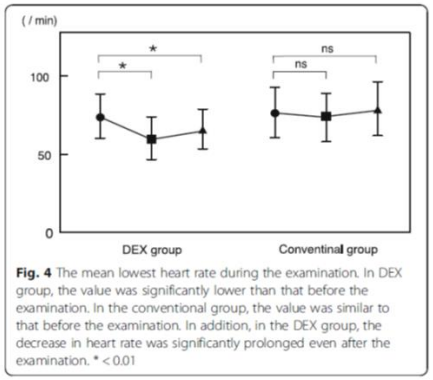


Fig. 4 The mean lowest heart rate during the examination. In DEX group, the value was significantly lower than that before the examination. In the conventional group, the value was similar to that before the examination. In addition, in the DEX group, the decrease in heart rate was significantly prolonged even after the examination. * < 0.01

Figure 1 The anesthesiologist is providing care for a patient undergoing endoscopic retrograde cholangiopancreatography under monitored anesthesia care in an endoscopy suite outside of the operating room

Due to the configuration of the equipment in the room, he is totally surrounded by equipment. The anesthesia cart is out of view behind the anesthesia machine and is not readily accessible.

Figure 1 The anesthesiologist is providing care for a patient undergoing endoscopic retrograde cholangiopancreatography under monitored anesthesia care in an endoscopy suite outside of the operating room

Due to the configuration of the equipment in the room, he is totally surrounded by equipment. The anesthesia cart is out of view behind the anesthesia machine and is not readily accessible.

Figure 2 – Monitoring (Heart rate, SaO2, ETCO2, Respiratory rate, Non invasive blood pressure) during ERCP in prone position at Niguarda Hospital (ETCO2 is integrated in the monitor)

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Digestive Endoscopy

Italian Society of Digestive Endoscopy (SIED) position paper on the non-anaesthesiologist administration of propofol for gastrointestinal endoscopy

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[c] Digestive Endoscopy Unit, Ospedale di Carpi, Ramazzini Hospital, Carpi, Modena, Italy
[d] Gastroenterology Unit, Ospedale S. Maria degli Angeli Hospital, Pordenone, Italy

In the present document, the Italian Society of Digestive Endoscopy (SIED) Sedation Group, on behalf of the SIED, presents a series of updated position statements concerning propofol sedation in GI endoscopy. The paper summarizes the advantages of propofol, how it should be administered and how patients should be monitored. Moreover, details concerning proper training of non-anaesthesiologist personnel involved in its use are provided. Protocols concerning propofol use s must be shared with the hospital's anaesthesiology staff and approved by the hospital's Executive Director.

Deep sedation and anaesthesia in complex gastrointestinal endoscopy: a joint position statement endorsed by the British Society of Gastroenterology (BSG), Joint Advisory Group (JAG) and Royal College of Anaesthetists (RCoA)

Reena Sidhu,[1] David Turnbull,[2] Mary Newton,[3] Siwan Thomas-Gibson,[4] David S Sanders,[1] Srisha Hebbar,[5] Rehan J Haidry,[6,7] Geoff Smith,[8] George Webster[6]

outcomes. This position statement outlines the current use of sedation in the UK and highlights the role for anaesthetist-led deep sedation practice with a focus on propofol sedation although the choice of sedative or anaesthetic agent is ultimately the choice of the anaesthetist.