

Appropriate Sedation for Endoscopy

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1

Objectives

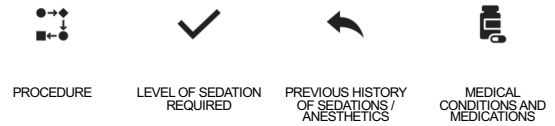
- Pre-endoscopy assessment
- Differences in anesthesia delivery based on endoscopy indication
- Aids/Tools to enhance the sedation process
- Future of sedation

7

Pre-endoscopy assessment

8

Pre-endoscopy assessment

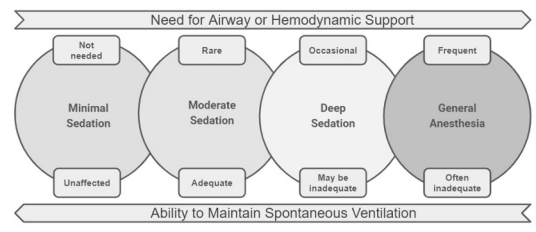


9

Sedation Requirements

10

Levels of sedation



Gross JB, Bailey PL, Corvis RT, et al. Practice guidelines for sedation and analgesia by nonanesthesiologists. Anesthesiology 2002;96:1004-17.

11

Increased sedation requirements

- Most predictive:
 - Psychiatric diagnosis, ETOH , opioid and polysubstance abuse
 - Younger age and male gender
- Marijuana / CBD usage**
- Pre-procedural anxiety
- History of abdominal pain

Rebello E, Rebello D, Jaram S, Vargas F, Machan J, Rich H. The Role of Clinical Characteristics in Stratifying Sedation Risk: A Cohort Study. Gastroenterology Res. 2021 Aug;14(4):214-219. doi: 10.14740/gr1400.

12

Decreased sedation requirements

1. Elderly
2. Medical comorbidities
3. Minimal gag reflex
4. Easy anticipated scope
5. Minimal anxiety / lack of pain syndromes
6. Patient cooperation
7. Patient preference - work/school/transport

13

Differences in anesthesia delivery based on endoscopy indication

1. Length of procedure
2. Patient specific requirements for sedation
 - a. Conditions that require more sedation
 - b. Conditions that require little to no sedation
3. Diagnostic vs therapeutic procedures
4. Post procedure requirements

14

Upper GI endoscopy with minimal sedation

- Older patients
- Male patients
- Minimal pre-procedure anxiety
- Patients without a history of abdominal pain
- Decreased pharyngeal sensitivity

Abraham N, Barkun A, Lacroix M, Fallone C, Maynard S, Buffin V, Cohen A, Daly D, Daud H, Joseph L. Predicting which patients can undergo upper endoscopy comfortably without conscious sedation. Gastrointest Endosc. 2002 Aug;56(2):190-9.

15

Conditions potentially requiring monitored anesthesia over moderate sedation

- Severe cardiovascular disease
- Difficult airway
- Obstructive sleep apnea syndrome
- Morbid obesity
- Chronic renal failure
- Chronic hepatic disease (MELD>10)
- Age >70 years
- ASA physical status III to IV
- Invasive procedures

16

Complex procedures requiring anesthesia

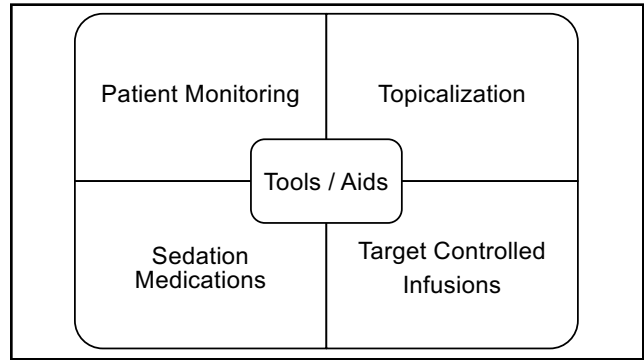
- Endoscopic ultrasound
- Spyglass ERCP
- Axios stents
- Esophageal Ablations
- Endoscopic submucosal dissection (ESD)
- Peroral Endoscopic Myotomy (POEM) – next week



17

Aids/Tools to enhance the sedation process

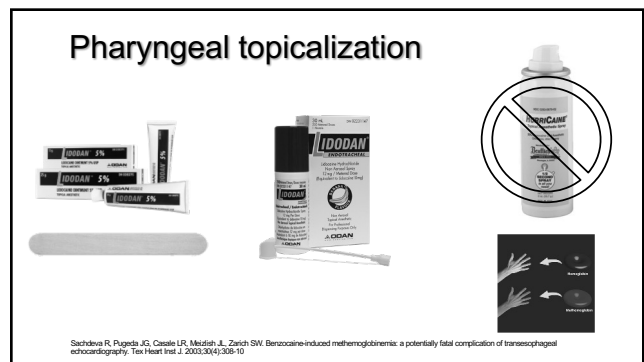
19



20

- ### Patient Monitoring
- Standard CAS monitors
 - BP, Oximetry, +/- EKG
 - Respiratory monitoring
 - +/- EtCO2 monitoring
 - +/- Respiratory plethysmography via EKG leads
 - Neuromonitoring
 - BIS / entropy monitor

21



22

Sedation Medications

23

- ### Classes of Sedation Medications
- Benzodiazepines: **midazolam** and diazepam
 - anxiolytic, amnesic, and sedative properties
 - Opioids: **fentanyl** and meperidine
 - analgesia and synergy with benzodiazepines
 - **Propofol**:
 - potent sedative for deeper sedation
 - rapid onset and short duration of action
 - requires the involvement of an anesthesiologist
 - Others: ketamine, remifentanyl, dexmedetomidine

24

Review of sedation medications for endoscopic procedures

- 36 studies (N=3918)
- Gastros and colons
- Sedation > no sedation for patient satisfaction & willing to return
- Midazolam > diazepam (improved memory and satisfaction)
- Propofol = midaz plus narc for adverse events and assessments
- Propofol > midaz plus narc for patient satisfaction and memory
- Propofol > midaz for sedation and recovery times

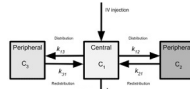
A systematic review and meta-analysis of randomized, controlled trials of moderate sedation for routine endoscopic procedures. *Gastrointest Endoscopy*. 2008 May;71(6):910-23.

25

Target controlled infusions

26

Target controlled infusion pumps for Propofol



27

Replacement for GI sedation?

- Remimazolam similar metabolism to remifentanyl ($T_{1/2} < 10$ min)
- Remimazolam = Propofol for safety and effectiveness
- Remimazolam > propofol for haemodynamic events and respiratory depression

Remimazolam tosylate compared with propofol for gastrointestinal endoscopy in elderly patients: a prospective, randomized and controlled study *BMC Anesthesiol*. 2022 Jun 10;22(1):180

28

Future of Sedation in endoscopy

1. Non-anesthesiologist administered propofol
2. Remimazolam
3. TCI pumps - with effect site modelling
4. Open and closed loop anesthesia delivery systems
5. AI & machine learning systems

29

Take home messages

1. Pharyngeal topicalization is your friend
2. Factors affecting sedation requirements
3. Sedation becoming more difficult with changing demographics and increasing procedure complexity
4. Target controlled infusion pumps

30