

Sedation and Anesthesia in Gastrointestinal Endoscopy: Indian Scenario

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J Digest Endosc 2019;10:97–100

Abstract

Sedation in endoscopy is a drug-induced depression in the level of consciousness. Traditionally, the sedation regime most commonly used for conscious sedation during gastrointestinal (GI) endoscopy was a combination of opioids and benzodiazepines. However, in the last two decades, propofol is regarded as the *sine qua non* agent for gastroenterological endoscopic sedation. A thorough risk evaluation before the procedure and monitoring during the procedure are paramount. In elective endoscopy, unplanned adverse events are rare, occurring in 1.4% of procedures. All currently available guidelines state that the endoscopist is not permitted to administer propofol and to monitor the patient. This task must be done by an additional person, who has the sole responsibility of administering the sedative and monitoring the patient. Various scoring systems exist for defining the discharge criteria, of which the Aldrete score is the most commonly used.

Keywords

- ▶ sedation
- ▶ GI endoscopy
- ▶ propofol
- ▶ Aldrete score

Introduction

Sedation in endoscopy is a drug-induced depression in the level of consciousness. The clinical objectives of administering sedation for gastrointestinal (GI) endoscopy are to relieve patient anxiety and discomfort, improve the outcome of the examination, especially during therapeutic procedures, and diminish the patient's memory of the event. Traditionally, the sedation regime most commonly used for conscious sedation during GI endoscopy was a combination of opioids and benzodiazepines. However, in the last two decades, propofol is regarded as the *sine qua non* agent for gastroenterological endoscopic sedation. Some of the major attractions of propofol sedation (PS) are rapid onset of action, rapid recovery, low incidence of postprocedure nausea and vomiting, and high degree of patient satisfaction. But aspiration is a known risk factor, largely related to suppression of laryngeal reflex and colonic perforation occurs with higher frequency in patients undergoing colonoscopy with propofol deep sedation.¹ Therefore, a thorough risk evaluation before the procedure and monitoring during the procedure are paramount. Sedation can be provided by anesthesiologists, nonanesthesiologist

physicians (NAAP, i.e., gastroenterologists or surgeons), or a well-trained nursing staff, depending on institutional and regional restrictions. Although it is feasible to perform routine endoscopies without sedation in selected patients, for complex endoscopic procedures, sedation is required.²

Presedation Assessment

Patients should provide informed consent for both endoscopy and administration of sedation through a process that involves a discussion of benefits, risks, and limitations, as well as possible alternatives to the sedation plan.³ The American Society of Anesthesiologists (ASA) guidelines indicate that patients should not drink fluids or eat solid foods for a sufficient period of time to allow for gastric emptying before the procedure.^{4,5} Specifically, these guidelines state that patients should fast for a minimum of 2 hours after ingestion of clear liquids and 6 hours after ingestion of light meals before sedation is administered.

All patients undergoing endoscopic procedures require preprocedural evaluation to assess their risk for sedation and to manage potential problems related to preexisting medical



conditions. A history and focused physical examination at the time of the procedure are necessary, including airway assessment using the Mallampati classification. Patients should then be classified using the criteria of the ASA, and the respective ASA score should be documented. Patients with an ASA class \geq III are at risk for sedation-related complications.⁶ Such patients should be sedated by a doctor who is competent for endotracheal intubation if such a situation arises. In general, endoscopy during pregnancy is not recommended unless there is a strong indication, and, if possible, it should be postponed until the second trimester.⁷ Requirements regarding airway management and cardiac life support must be available, and sedation should only be provided by properly trained staff.

Monitoring and Documentation during Endoscopic Sedation

Monitoring generally includes clinical monitoring of patient's consciousness, pulse oximetry, continuous electrocardiographic (ECG) monitoring, and automated blood pressure monitoring.⁸ In elective endoscopy, unplanned adverse events are rare, occurring in 1.4% of procedures.⁹ Risk factors for cardiopulmonary adverse events in procedures with moderate sedation are inpatient status, advanced age, and higher ASA PS classification.⁹

ECG is only recommended in patients with significant cardiovascular disease to detect and analyze arrhythmia during endoscopy. ECG is not required for low-risk patients (ASA I or II). Most guidelines recommend the use of oxygen supplementation during endoscopic sedation.² To date, there is no evidence to support the use of capnography in routine EGD or colonoscopy using moderate sedation in adults. Most guidelines recommend that monitoring data, clinical parameters, and technical parameters, as well as drug administration, should be routinely documented.^{10,11}

Pharmacology

The most commonly used drugs for sedation in GI endoscopy are benzodiazepines, opioids, and propofol. Pharmacological profiles of drugs commonly used are listed in (►Table 1).

Benzodiazepines

Benzodiazepines enhance the effect of the neurotransmitter GABA (gamma aminobutyric acid) and are commonly used in combination with opioids. Diazepam and midazolam are the most commonly used agents and have comparable efficacy and safety. Midazolam is generally favored over diazepam due to its shorter duration of action. Dose adjustment is required in the geriatric population and in patients with known hepatic and renal dysfunction.¹²

Opioids

Opioids in endoscopy primarily provide analgesia with some sedative effects. Both meperidine and fentanyl can cause depression of central ventilatory drive, and therefore diligent airway monitoring is necessary. Because of a high degree of fat solubility, fentanyl has a rapid onset and brief duration of action. A dose reduction of 50% or more is recommended in the elderly.¹³

Propofol

Propofol, a phenol derivative, is an ultrashort-acting hypnotic agent. Dose reduction is not necessary for patients with moderately severe liver disease or renal failure, whereas a dose reduction is mandatory in patients with cardiac dysfunction and in the elderly.¹² Propofol is preferred instead of midazolam for sedation in patients with liver cirrhosis as it does not cause deterioration of encephalopathy.^{14,15}

Propofol is administered intravenously as repeated bolus injection, continuous infusion, or a combination of the two. Propofol has a narrow therapeutic window; therefore, sedation might become deeper than intended. Data from

Table 1 Selected pharmacological agents for sedation and analgesia

Drug	Onset of action	Duration	Effects	Antagonist	Side effects
Diazepam	2–3 min	1–6 h	Sedative, anxiolytic, amnesic	Flumazenil	Cardiorespiratory depression
Midazolam	1–2 min	15–80 min	Sedative, anxiolytic, amnesic	Flumazenil	Cardiorespiratory depression
Meperidine	3–6 min	60–180 min	Analgesic, sedative, nonamnesic	Naloxone	Hypotension, interaction with MAO inhibitor
Fentanyl	2–3 min	30–60 min	Analgesic, sedative, nonamnesic	Naloxone	Respiratory depression, chest wall rigidity with rapid administration
Ketamine	30–50 s	5–20 min	Dissociative, sedative, analgesic, hallucinogen	None	Minimal cardiorespiratory depression, preserved protective reflexes
Propofol	30–45 s	4–8 min	Sedative, amnesic, nonanalgesic	None	Respiratory depression, hypotension, painful injection

Abbreviation, MAO, Monoamine oxidase.

the World Wide Safety registry of 6,46,080 patients who received PS administered by gastroenterologists showed a mortality rate of 1 per 1,61,515, lower than that seen when standard sedation (opioids and benzodiazepines) is used (1 per 10,000) and comparable with published data on general anesthesia administered by anesthesiologists (1 per 10,000–50,000). The most common and severe complications are dose-dependent hypotension, particularly in volume-depleted patients, and transient apnea following induction doses.

Propofol contains soybean and egg lecithin and is therefore contraindicated in patients with egg or soybean allergy.¹³

Dexmedetomidine

Dexmedetomidine is an α -2 receptor agonist with sedative, analgesic, and anxiolytic properties. It is a first-line drug for sedation in intensive care units. A distinct advantage of dexmedetomidine is the maintenance of respiratory force and preserved airway patency even in the existence of rising sedation. These properties of dexmedetomidine have verified to be beneficial in high-risk patients such as those with obstructive sleep apnea and chronic obstructive pulmonary disease, as well as those with extensive tracheomalacia. A meta-analysis of dexmedetomidine versus propofol for GI endoscopy showed that patients were more satisfied with propofol administration, especially in endoscopic examination, when compared with dexmedetomidine. There were no clear differences in cardiopulmonary complications.

Who Should Perform Endoscopic Sedation?

All currently available guidelines state that the endoscopist is not permitted to administer propofol and to monitor the patient. This task must be done by an additional person, who has the sole responsibility of administering the sedative and monitoring the patient.^{2,10,17,18} This person can be an anesthesiologist, a specially trained NAAP, or a dedicated nurse (nurse-administered PS)

Postprocedure Care and Discharge

Postprocedural monitoring of the cardiorespiratory system by qualified staff is necessary in a separate recovery room/area with equipment for monitoring and resuscitation.¹³ Because most of the serious adverse effects of sedation occur within 30 minutes after the last administration of benzodiazepines and opioids, patients should be monitored for at least 30 minutes in a recovery room.¹⁹ No defined recommendations regarding postprocedure monitoring exist.

Various scoring systems exist for defining the discharge criteria, of which the Aldrete score is the most commonly used.²⁰ It evaluates respiration, oxygen saturation, blood pressure, consciousness, and activity. The patient should be strongly advised not to drive a car, operate machinery, or engage in legally binding decisions until full recovery can safely be expected (current European guidelines recommend an interval of 6–12 hours).² Driving skills return to baseline levels within 2 hours after last propofol administration.²¹

Conflict of Interest

There is no conflict of interest.

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