Sedation Regimens for Gastrointestinal Endoscopy

SAHMEDDINI.MA

DEPARTMENT OF ANESTHESIA AND CRITICAL CARE

SUMS

JUN 2023

Introduction

The aim of endoscopic sedation is to reduce patient discomfort, including anxiety and pain while preserving a minimum rate of drug-related adverse events.

Sedative drugs produce hypnosis and amnesia of discomfort but no analgesia, while opioid narcotics produce potent analgesia but little sedation

Consider both patient and procedural factors for adequate and safe sedation

Patient factors include age, body mass, medical history, concurrent medications, preprocedural anxiety, previous responses to sedation, and pain tolerance.

Procedural factors include the level of procedure-related discomfort, the need for the patient to lie relatively motionless, and the duration of the examination.

sedation

Remember that the depth of sedation is a continuum without clear boundaries.

The depth of sedation is arbitrarily divided into four levels (minimal, moderate, deep sedation, and general anesthesia)

According to four variables (responsiveness, airway, spontaneous ventilation, and cardiovascular function)

Predicting how an individual patient will respond is not always possible

sedation

Target moderate sedation.

Moderate sedation is generally accepted as an appropriate target for sedation by nonanesthesiologists.

Endoscopists also must remain aware that a patient may become sedated to a level deeper than was intended.

Monitoring during sedated endoscopy

Monitoring during sedated endoscopy typically involves :

Assessment of the electrocardiogram (EKG) pattern

Blood pressure

Pulse oximetry

Patient responsiveness.

The visual assessment of ventilatory activity

Capnography

- Capnography has been demonstrated to detect depressed respiratory activity before transient hypoxemia.
- Capnography into patient monitoring protocols for endoscopic procedures **with moderate sedation** has not been shown to improve patient safety
- However, there is evidence supporting its use in procedures **targeting deep sedation**.

SEDATIVES AND ANALGESICS

The pharmacological response of an individual patient to each specific agent is unique.

Start with a low dose, assess the response, and proceed gradually with titration.

SEDATIVES AND ANALGESICS

Sedative drugs produce hypnosis and amnesia but no analgesia.

Opioid analgesics produce potent analgesia but little sedation.

Combinations of drugs in different classes may therefore maximize patient comfort. , reduced dosages of both drug types are required because of synergism.

PHARMACOLOGY OF SEDATIVES AND ANALGESICS

Midazolam

Propofol

Opioids

Drugs	**Primary action**	**Onset of action (min)**	**Duration of effect (min)**	Metabolism/ excretion	Reversal agent	Significant adverse effects	Drug concentration in dosage form of injection
Midazolam	Sedation Amnesia	1-2	15-80	Hepatic and intestinal/ excreted in urine	Flumazenil	Respiratory depression, paradoxical response	1 mg/mL 5 mg/mL
Propofol	Sedation Amnesia	0.5- 1`	4-8	Hepatic/ excreted in urine	None	Respiratory depression, hypotension	10 mg/mL
Meperidine	Analgesia	3-6	60-180	Hepatic/ excreted in urine	Naloxone	Respiratory depression, nausea, vomiting	25 mg/mL 50 mg/mL 75 mg/mL 100 mg/mL
Fentanyl	Analgesia	1-2	30-60	Hepatic/ excreted in urine	Naloxone	Respiratory depression, nausea, vomiting	50 µg/mL

Midazolam alone

Initial dose: midazolam 1–2 mg or 0.03 mg/kg

Additional dose: midazolam 1 mg or 0.02–0.03 mg/kg (2–3 min)

Maximum doses for routine endoscopic sedation: 6 mg

Midazolam plus opioids

Initial dose: midazolam 0.5–2.5 mg + meperidine 12.5–50 mg

Midazolam 0.5–1 mg + fentanyl 12.5–75 µg

Additional dose: midazolam 1 mg (2–3 min)

Midazolam 1 mg or fentanyl 12.5–50 µg (1–3 min)

MF

Midazolam and fentanyl (MF) have now become the most commonly used moderate sedation agents.

Both agents have a relatively fast onset of action when given intravenously and a short duration of effect.

MF

Studies have shown that the cardiopulmonary complication rates with MF sedation are generally low, between 0.05% to 0.10% for EGDs and colonoscopies.

Effective reversal agents, naloxone for opioids and flumazenil for benzodiazepines, are readily available.

Propofol alone

Bolus

Initial dose: propofol 10–60 mg

Additional dose: propofol 10–20 mg (0.5 min)

Continuous

Continuous infusion by infusion pump: 2–5 mg/kg/hr or 100–200 mg/hr, with or without initial bolus 0.25–0.5 mg/kg

Combination propofol

Preinduction: midazolam 0.5–2.5 mg and/or meperidine 25–50 mg/fentanyl 25–75 µg

Induction: propofol 10–40 mg or up to 0.5 mg/kg

Maintenance of sedation: propofol 5–20 mg

Maximum doses for routine endoscopic sedation:

Maximum doses for routine endoscopic sedation:

Midazolam 6 mg

Meperidine 150 mg

Fentanyl 200 µg

Propofol 400 mg

MONITORED ANESTHESIA CARE

The administration of propofol by anesthesia professionals in order to induce deep sedation in unintubated patients is termed “monitored anesthesia care (MAC)”

Propofol sedation is associated with relatively good cognitive function in the recovery period and driving and psychomotor skills recover rapidly, in contrast to MF sedation.

MAC

A meta-analysis of 5 studies on propofol sedation for EGDs in cirrhotic patients showed that propofol led to more rapid sedation and recovery than MF, but the risk of sedation-related side effects did not differ significantly.

NURSE ADMINISTERED PROPOFOL SEDATION (NAPS)

In the United States, specially trained nurses typically administer small boluses of propofol at frequent intervals to achieve moderate sedation.

In most cases, an initial bolus of 30 to 50 mg is given through a rapidly running intravenous line, followed by boluses of 10 to 20 mg every 30 to 60 seconds

NAPS

The use of NAPS instead of MAC for low-risk patients undergoing routine GI procedures seems to represent cost savings and better resource allocation

European and American GI guidelines endorse the use of NAPS for low-risk GI procedures, provided that practitioners undergo proper training.

ASA, states that clinicians who use propofol “should be qualified to rescue patients from any level of sedation including general anesthesia

PATIENT CONTROLLED SEDATION

Patient controlled sedation (PCS) is analogous to the patient-controlled analgesia used in hospitals, where patients can control their own dosage of pain medications.

PCS has been looked at in several studies and found to be effective compared against MACand conventional MF-type sedation.

Computer-assisted propofol sedation (CAPS)

Computer-assisted propofol sedation (CAPS) allows non-anesthesiologists to administer 1% propofol as a continuous infusion after a premedication dose of fentanyl of 25 to 100 µg.

The CAPS system continuously monitors capnography, oxygen saturation, EKG and blood pressure.

In addition, the CAPS system periodically assesses patient alertness by automated response monitoring.

CAPS

In response to significant hypoxia, the CAPS system will increase supplemental oxygen delivery to the patient and trigger visual and auditory alarms to alert the provider team.

To use CAPS, an anesthesia professional must be immediately available in the same building for assistance as needed.