41. Procedural Sedation and Analgesia (PSA)

SEE THE PROCEDURAL SEDATION AND ANALGESIA PHYSICIAN CHECKLIST

Procedural sedation is the technique of administering **sedatives or dissociative agents with or without analgesics** to induce a state that allows the patient to tolerate unpleasant procedures while maintaining cardiorespiratory function.

Potential indications for procedural in the ED: fracture reduction, joint reduction, incision and drainage, chest tube placement, electro cardioversion, upper endoscopy (with a gastroenterologist), foreign body removal, burn or wound debridement

Patient selection: A pre-procedural history and physical exam, as documented in the ED record, should reflect a focused evaluation of the airway, cardiovascular status, pulmonary status, allergies, and history of prior adverse reactions to sedatives or anaesthetics. PSA may not be ideal for patients with significant chronic morbidities e.g. sleep apnoea, COPD, low baseline oxygen saturations or blood pressure, or anatomic features that would make bag valve mask (BVM) ventilation or maintaining an airway difficult.

Preparation: Monitoring equipment (continuous telemetry, pulse oximetry, BP; consider continuous end tidal CO_2 monitoring), peripheral IV, Ringer's Lactate/Hartmann's Solution, medications for PSA, naloxone (if opiates are given), equipment for procedure (e.g. scalpel), team (minimum one practitioner for sedation, one for procedure – **ONE OF THEM MUST BE PROFICIENT IN AIRWAY MANAGEMENT**), airway equipment (oxygen source, nasal cannula/face mask, BVM, suction), rescue airway equipment (endotracheal tube, laryngoscope, LMA, nasal trumpet)

OBTAIN CONSENT for **ALL** PSA Procedures

Medication for PSA (give both an Analgesic AND a Sedative unless using Ketamine which is both)

Drug	Dosage	Analgesic/ Sedative	Onset/Peak Effect	Duration of Action	Adverse Effects	Comments/Caveats
Fentanyl	IV - 0.5 – 3 µg/kg over 3-5mins	Analgesic	IV - Immediate onset, Peak effect 2-3mins	IV – 30 - 45mis	Chest wall rigidity and respiratory depression may occur with rapid IV administration	Fentanyl is preferred for a **rapid onset of analgesia** in acutely distressed patients. **Fentanyl** is preferred for patients with **hemodynamic instability** or **renal insufficiency**
Midazolam	IV - 0.05 – 0.15mg/kg	Sedative	IV - Onset 3-5 mins; Peak effect 15-30 mins	IV – 20 - 60mis	Respiratory depression, hypotension	Midazolam has a rapid onset and short duration and is classed as an **ultra-short acting benzodiazepine**, and is **2 to 3 times more potent than diazepam,** so can produce significant respiratory depression. Blood pressure decreases and heart rate increases as compensation for a decreased SVR, although CO remains unchanged.
Ketamine	Slow IV – 1 mg/kg over 30-60 seconds	Analgesic and Sedative	IV - Onset 1min; Peak effect 1 min	IV – 5 - 10mis	Laryngospasm (0.3%), hyper salivation, vomiting, emergence reaction	**Ketofol:** Can be combined in a single-syringe 1:1 mixture of 10 mg⁄mL ketamine and 10 mg⁄mL propofol (10cc syringe + 100mg Ketamine + 100mg Propofol to 10mL = 10mg/mL). The median dose is **0.7 mg/kg** each of ketamine and propofol (range = 0.2 to 3.0 mg/kg)
Propofol	IV - 0.5mg/kg; max. 1 mg/kg	Sedative	IV - Onset 45 seconds	IV – Patients generally wake up 3-5 minutes after the last dose.	Hypotension	Propofol can quickly take a patient from deep sedation to general anesthesia with a lack of spontaneous respirations if too high a dose is administered. Propofol frequently causes hypotension, but this can usually be treated successfully with a fluid bolus. Contraindicated in patients with an egg or soybean oil allergy. Propofol can cause burning when it is administered thus can be mixed with a small quantity of lidocaine. Consider starting with half of this dose in the geriatric population. Subsequent doses are administered every 2 to 3 minutes in smaller aliquots (0.5 mg/kg IV) and titrated to the desired effect.