


**Procedural Sedation in the Rural ER**



Hal Irvine MD FCFP  
Rural FP – Anesthetist  
Sundre, Alberta

June 17, 2011

---

---

---

---


---

---

---

---

**Disclosure**



I do not have any affiliations (financial or otherwise) with a commercial organization that may have a direct or indirect connection to the content of my presentation.

---

---

---

---


---

---

---

---

**Objectives**



- Be familiar with the drugs commonly used for PSA
- Know the risks of PSA and the importance of preparation in order to provide safe PSA
- Be comfortable in providing PSA in the rural emergency room

---

---

---

---

---


---

---

---

**Overview**

- Indications
- Contra-indications
- Risks
- PREPARATION
- Drugs
- Post-procedure Monitoring
- Discharge Criteria



---

---

---

---

---

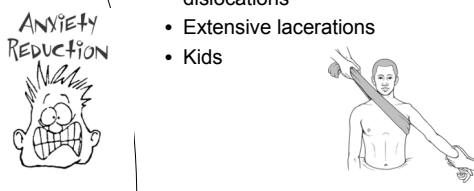
---

---

---

**Indications**

- To reduce pain and anxiety associated with procedures:
  - Reductions of fractures / dislocations
  - Extensive lacerations
  - Kids



---

---

---

---

---


---

---

---

**Contra-Indications**

- Adverse event with previous procedural sedation or general anesthesia
- Potentially difficult airway
- Procedures > 1 hour
- Medically unstable patients



---

---

---


---

---

---

---

---



### Risks

- Hypoventilation / Hypoxia / Apnea
- Aspiration
- Hypotension

---

---

---


---

---

---

---

---



### Preparation: Patient Assessment

- AMPLE History
  - Allergies
  - Medications
  - Past Medical History
  - Last oral intake
  - Event: what happened?
- Previous anesthesia / sedation
- Family history of adverse reaction to anesthesia

---

---

---


---

---

---

---

---



### Preparation: Patient Assessment

Last oral intake?

Little evidence that fasting state influences risk of aspiration for emergency procedural sedation.

Decreased gastric emptying after injury, pain, anxiety, opioids.

---

---

---

---

---

---

---

---

## Preparation: Patient Assessment

Fasting Guidelines for Elective Procedures:

2 hours clear fluids

4 hours breast milk

6 hours light solids

8 hours fat-containing meal



---

---

---

---

---

---

---

---

## Preparation: Patient Assessment

- Physical Examination:
  - Airway:
    - Mallampati score
    - Mouth opening
    - Hyoid-mental distance
    - Neck extension
  - BMI
  - Cardio-vascular
  - Respiratory / OSA



---

---

---

---

---

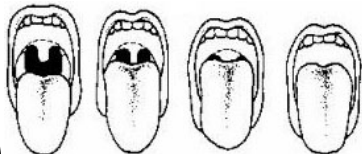
---

---

---

## Preparation: Patient Assessment

Mallampati Score:



1

2

3

4



---

---

---

---

---

---

---

---

## Preparation: Patient Assessment

Steroid dependent asthma, GERD,  
OSA on CPAP, past mandibular  
fracture, and difficult intubation.



---

---

---

---

---

---

---

---

## Preparation: Personnel

- Nursing Staff
  - At least one
- ? Second Physician



---

---

---

---

---

---

---

---

## Preparation: Set Up

- IV
- Drugs
- Emergency / Rescue Medications
  - Succinylcholine, ephedrine,  
naloxone, flumazenil
- Procedural Supplies
  - Casting supplies, portable Xray,  
suturing supplies, etc.



---

---

---


---

---

---

---

---



## Preparation: Set Up

- Monitors
  - Pulse oximetry
  - BP
  - ?ECG
- Oxygen
- Airway Support
  - OPA and BVM
  - Suction
  - Intubation equipment
  - Crash cart

---

---

---


---

---

---

---

---



## Drugs

- Midazolam
- Fentanyl
- Propofol
- Ketamine
- “Ketofol”
- “Ketazolam”
- N<sub>2</sub>O/O<sub>2</sub>: Entonox

---

---

---


---

---

---

---

---



## Midazolam / Fentanyl

Midazolam	Fentanyl
<ul style="list-style-type: none"> <li>• Benzodiazepine</li> <li>• Anxiolytic, mild muscle relaxation</li> <li>• Onset: 1 - 3 minutes</li> <li>• Duration: ~30 minutes</li> </ul>	<ul style="list-style-type: none"> <li>• Opioid</li> <li>• Analgesia</li> <li>• Onset: 1 - 3 minutes</li> <li>• Duration: ~30 minutes</li> </ul>

---

---

---

---

---

---

---

---

## Midazolam / Fentanyl



### Midazolam

- Minimal CV effect (hypotension in the compromised)
- Resp depression
- Paradoxical agitation
- Hiccups
- Reversible with flumazenil

### Fentanyl

- Minimal CV effect
- Resp depression
- Hiccups
- Itch
- Nausea / vomiting
- Muscular rigidity
- Reversible with naloxone

---

---

---

---

---

---

---

---

## Midazolam / Fentanyl



### Midazolam

- Adults:
- 0.02 - 0.1 mg/kg IV
  - Usually 2.5 - 5 mg
- Children:
- 0.05 - 0.15 mg/kg IV
  - 0.5 mg/kg PO or IN

### Fentanyl

- Adults & Children:
- 1 - 3 ug/kg IV

---

---

---

---

---

---

---

---

## Propofol



- Short acting general anesthetic
- Amnestic but not analgesic
- Onset: 1 - 2 minutes
- Duration: 5 - 10 minutes
- Muscle relaxation
- Anti-emetic
- Clear emergence / sense of well-being

---

---

---


---

---

---

---

---



### Propofol

- Apnea
- Hypotension
- Not reversible
- Easy to “overdose”

Use 20 mg (2 ml) every 30 - 60 seconds until desired level of sedation achieved

---

---


---

---

---

---

---



### Ketamine

- Dissociative anesthetic
- Analgesic
- Airway reflexes preserved
- Muscle tone preserved
- Respiratory stimulant
- Raises pulse and BP
- Smooth muscle relaxation

---

---


---

---

---

---

---



### Ketamine

- Increased airway secretions
- Laryngospasm
- Nystagmus
- Nausea / vomiting
- Emergence reactions
- Avoid in kids < 3 months
- Avoid if history of psychosis

---

---

---


---

---

---

---





## Ketamine

- Peak Effect:
  - 1 minute IV
  - 5 minutes IM
- Duration:
  - 15 minutes IV
  - 30 minutes IM

---

---

---


---

---

---

---

---



## Ketamine

Dose:  
0.5 - 2 mg/kg IV  
3 - 5 mg/kg IM

Use atropine in kids  
Use benzodiazepine  
Minimize sensory stimulation during emergence

---

---

---


---

---

---

---

---



## Sedation Cocktail for Kids

1. Midazolam 0.5 mg/kg PO in Tylenol syrup or Grape juice
2. Wait 10 - 15 minutes
3. Ketamine 3 mg/kg + Atropine 0.01 mg/kg in the same syringe IM
4. Wait 3 - 5 minutes
5. Start IV
6. Give supplemental drug if needed

---

---

---


---

---

---

---

---



### Other Drugs

- "Ketofol"  
Propofol 10mg/ml + Ketamine 10mg/ml  
mixed 1:1  
Propofol 10mg/ml 18ml + Ketamine 50mg/l  
2ml
- "Ketazolam"  
Ketamine 50 mg / 1 ml + Midazolam 5mg /  
1 ml + Saline 8 ml.  
Gives 10 ml of ketamine 5mg/ml +  
midazolam 0.5 mg/ml.
- Entonox: N<sub>2</sub>O + O<sub>2</sub> 1:1

---

---

---


---

---

---

---

---



### Post-Procedure Monitoring

- Continuous oximetry until awake  
and stable off O<sub>2</sub>
- BP and pulse every 5 minutes until  
awake and stable
- ? Continuous ECG

---

---

---


---

---

---

---

---



### Discharge Criteria

Sedation Score: 0, 1 or 2 in 7 areas:

- Resp rate
- Resp quality
- Pulse oximetry
- Pulse rate
- BP
- LOC
- Activity

---

---

---

---


---

---

---

---

**Case Example**



---

---

---

---

---


---

---

---

**Review**

- Indications
- Contra-indications
- Risks
- PREPARATION
- Drugs
- Post-procedure Monitoring
- Discharge Criteria
- Case Example



---

---

---

---

---

---

---

---

**The End**

Dr. Hal Irvine  
Bag 5  
Sundre, Alberta T0M 1X0  
403-638-2424  
irvineh@airenet.com



---

---

---

---

---

---

---

---