

PROCEDURAL SEDATION

I have NO financial disclosures

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MY MISSION

My mission in life is not merely to survive, but to thrive; and to do so, with some passion, some compassion, some humor, and some style.

Maya Angelou

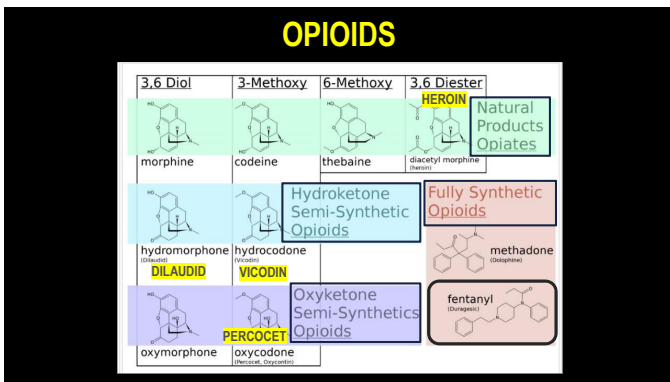
THE DISCUSSIONS FOR TODAY

Opioids
Benzodiazepines
Etomidate
Propofol



"Expertise in Procedural Sedation and Analgesia is a Core Competency In Emergency Medicine Practice."
- ACEP Clinical Policy Guidelines





OPIOIDS

WHAT WE HAVE NOW

Morphine, Hydromorphone, and Fentanyl

ADVANTAGES

Short ½ Lives Rapid Onset

Low CV Side Effects Reversible

DISADVANTAGES

Respiratory & CNS Depression

Allergic and Pseudoallergic Reactions

MORPHINE



MORPHINE

ADVANTAGES

prototype to all others

EFFECT DURATION

3 – 4 hours

DISADVANTAGES

Histamine Release

Pruritic Rash

Nausea & Vomiting

Hypotension & Bronchospasm

CURRENTLY

Morphine has **LOST STATUS** to Newer Designer Opioids with **Better Cardiovascular Stability**

FENTANYL

“The Most Popular Opioid”

POTENCY

1000 X > meperidine

125 X > morphine

NO HISTAMINE RELEASE



SHORT 1/2 LIFE

“20 minute drug for a 20 minute procedure”

VERY LITTLE SEDATION

almost pure analgesia
no anxiolysis or amnesia

FENTANYL
"The Most Popular Opioid"

DISADVANTAGES

BRADYCARDIA
HYPOTENSION
INCREASED ICP

RESPIRATORY DEPRESSION

May Occur Before Sedation
Patient will be Awake
But is Not Breathing Adequately.
He Will Respond to Commands
Ask Him to Breathe!!

FENTANYL
Rigid Chest Wall Syndrome

CAUSES

Larger Doses
Rapid Boluses
Children (higher risk)

TREATMENT

Give Naloxone
No Improvement
Perform RSI


FENTANYL

RISK FACTORS FOR WOODEN CHEST SYNDROME

High cumulative doses of fentanyl (10-15 mcg/kg)

Extremes of age

Concomitant use of meds that modify dopamine levels



Rapid IV administration

Critical illness

Lipophilic opioids (fentanyl, remifentanyl, sufentanil)

HYDROMORPHONE vs FENTANYL

	Fentanyl	Hydromorphone
Equivalent Dose	100 mcg	1.5 mg
Onset of Action	< 1 minute	10 – 15 minutes
Duration of Action	30 – 60 min	3 – 4 hrs
Renal or Liver Pts	Safe	Caution
Unstable Patients	YES short lived	Caution minor histamine
Histamine	teeny tiny	small

Not Many Head-to-Head ED Comparisons

“Fentanyl has less sedation, better urine output & less hypotension” Epidural Patients

Dilaudid increases alive days & decreases narcotic requirements” ECMO Patients

OPIOIDS + BENZODIAZEPINES
Anesthesiology 1990; 73: 826 – 830.

OPIOIDS ALONE hypoxemia (50%), lower CO ₂ response, no apnea	BENZOS ALONE no significant respiratory depression
OPIOIDS + BENZOS hypoxemia (92%) apnea (50%)	BOTTOM LINE no change in outcomes, but suggests ↑ risks

IMPORTANT POINT
The opioids poses the greater risk.

OPIOIDS + BENZODIAZEPINES
Can J Emerg Med 2006; 8 (2): 85 – 93

Large Canadian Study (979 patients)
Retrospective Case Series of Adults in Tertiary ED

DRUGS USED Fentanyl – 94% Propofol – 61.2% Midazolam – 42.5% Ketamine - 2.7%	MOST COMMON COMBO F / P (58%) & F / M (41%)
	COMPLICATIONS Hypotension (1.3%) / Desats (1.4%) Aspirations, Tubes, Deaths (zero)

OLD ACEP CLINICAL POLICY - Level B
Fentanyl & Midazolam is effective for PS & Analgesia

BENZODIAZEPINES



MIDAZOLAM (Versed®)

ACTIONS

Anxiolysis, Sedation, Anti-Convulsant,
and Amnesia (antero- & retrograde)

WATER SOLUBLE

No Vascular
Irritation

POTENCY

3 – 4 > diazepam
Better IM Absorption

DIAZEPAM or LORAZEPAM vs MIDAZOLAM

DESCRIPTON

both have longer $\frac{1}{2}$ lives than midazolam

DISADVANTAGES

diazepam has greater respiratory depression, phlebitis, and
hypotension than midazolam

NEITHER HAVE AN ADVANTAGE OVER MIDAZOLAM

if the goal is to produce a
short, titratable state of anxiolysis & sedation

DIAZEPAM vs MIDAZOLAM

Randomized Controlled Trial | J Emerg Med 2021 Jan;60(1):1-7.
doi: 10.1016/j.jemermed.2020.09.030. Epub 2020 Oct 21.

Comparing Diazepam Plus Fentanyl With Midazolam Plus Fentanyl in the Moderate Procedural Sedation of Anterior Shoulder Dislocations: A Randomized Clinical Trial

Mohammad Afzalimoghaddam¹, Maryam Feyiz Khademi², Hadi Mirfazaellan³, Pooya Payandemehr¹, Ehsan Karimialavijeh¹, Alireza Jalali¹

RESULTS

Diazepam + fentanyl is superior regarding muscle relaxation, patient and physician satisfaction, and time to reduction, when compared to midazolam and fentanyl.

REMIMAZOLAM vs MIDAZOLAM

Journal of Oral and Maxillofacial Surgery
Volume 81, Issue 5, May 2023, Pages 536-545

ELSEVIER


Anesthesia / Temporomandibular Disorders / Facial Pain

Advantages of Sedation With Remimazolam Compared to Midazolam for the Removal of Impacted Tooth in Patients With Dental Anxiety

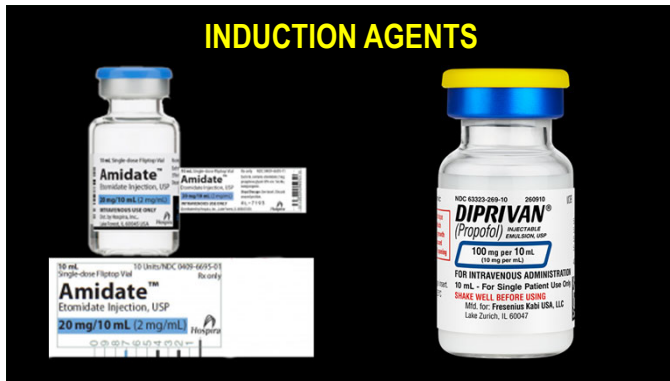
Xue Li MS¹, Meiliun Tian BS¹, Yilan Deng BS², Tingzhi She MS³, Ke Li MS¹

Remimazolam has faster onset, more rapid recovery, and less of post-operative side effects compared to midazolam.

BENZODIAZEPINES



Latest ACEP Clinical Policy
No Recommendations - Not Discussed



ETOMIDATE

<p>MECHANISM OF ACTION Ultra-Short Acting Hypnotic, Anxiolytic, Sedating & Amnesic IV Anesthetic Agent</p>	<p>CHARACTERISTICS Induction 45 seconds Duration 4 minutes Rapid Metabolism Low Histamine Release</p>
<p>VARIETY OF USES Emergent Sedative Hypnotic Procedural Sedation TBI – Decreases ICP Induction of RSI</p>	<p>CV STABILITY Stable Blood Pressure; Ideal for Shock Trauma, Hypovolemia, or CV Disease</p>

ETOMIDATE – SPECIAL POPULATIONS

<p>RENAL DISEASE AND/OR THE ELDERLY Etomidate is primarily excreted renally.</p>
<p>PREGNANCY Inadequately controlled studies. Not recommended.</p>
<p>BREASTFEEDING Etomidate levels in breast milk are small and decreases rapidly. No waiting period is required to resume breastfeeding.</p>

ETOMIDATE SIDE EFFECTS

Latest ACEP Clinical Policy
Level B (Adults) & Level C (Kids)

Inhibits Adrenal Steroid Synthesis
Last 6 - 12 hours
Don't order continuous infusions

Septic Patients have an increased risk of adrenal suppression and associated mortality.

Myoclonus usually < 1 minute but dramatic; reduced with midazolam, narcotics, propofol, or ketamine

Seizure Patients Etomidate decreases seizure threshold.

SCCM GUIDELINES FOR RSI IN THE CRITICALLY ILL

Practice Guideline > Crit Care Med. 2023 Oct 1;51(10):1411-1430.
doi: 10.1097/CCM.0000000000006000. Epub 2023 Sep 14.

Society of Critical Care Medicine Clinical Practice Guidelines for Rapid Sequence Intubation in the Critically Ill Adult Patient

SOCIETY OF CRITICAL CARE MEDICINE
Should we give steroids when using etomidate to obviate adrenal suppression?
SCCM and EM EXPERTS: no need for steroids



PROPOFOL ADVANTAGES

Profound Sedation	No Histamine
Rapid Onset	Rapid Recovery
Anti-Convulsant	Anti-Emetic
Bronchodilator	Amnestic
Reduces ICP	Anti-Inflammatory
Hypnotic	Anxiolytic

PROPOFOL DISADVANTAGES

RESPIRATORY DEPRESSION
Dose Dependent
Administration Speed

NO ANALGESIA
ALSO INJECTION PAIN

HYPOXIA - 30%
5% with Supplemental Oxygen

MYOCLONUS

HYPOTENSION MOST COMMONLY OCCURS
Women, Poor Physical Status, and
Those Given Opioids and/or Benzodiazepines

PROPOFOL ALLERGIES

CONTAINS EGG & SOY
However, Propofol contains lecithin
Most egg allergies are to albumin.

GENERIC VERSUS TRADE FORMULATIONS
Generic has sulfite. Diprivan® does not.

REVERSAL AGENTS FOR PROPOFOL

Hypoventilation
Bag Mask!

Hypotension
IV Fluids!

Latest ACEP Clinical Policy
Level A Recommendation for Children & Adults

PROPOFOL TAKE HOME POINTS

RAPID OR LARGE DOSING

May cause profound respiratory depression and hypotension, especially in hypovolemic patients.

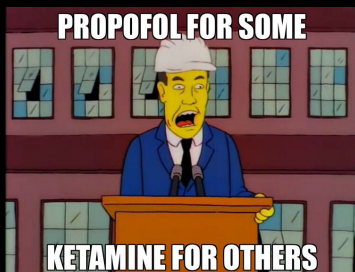
SMART USE OF PROPOFOL

Give with fentanyl for procedures requiring sedation as well as analgesia

DOSAGE OVERLAP BETWEEN

Procedural Sedation, Deep Sedation, and Anesthesia Dosages
Low Margin of Safety that is not usually Appreciated.

AND ONE FINAL NOTE, REMEMBER



THE END OF HALF THIS LECTURE!!

*“There are only three sins –
causing pain, causing fear, causing anguish
The rest is window dressing.”*

- Roger Caras

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