

Opioid-Free Anesthesia

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NOT about eliminating Opioids!?!?!?

- ❑ Not making moral decisions about 1 class of medications
- ❑ Not about holding a medication back at the expense of outcomes
- ❑ Not (solely) about addiction

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What is it?

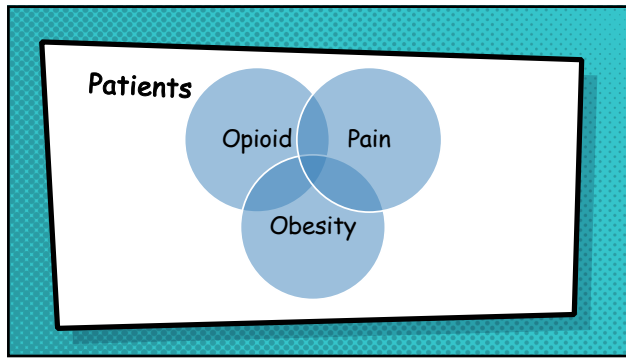
- ❑ Pro-level multimodal anesthesia
 - ❖ Opioids only offer side effects
 - ❖ Does the risk/benefit profile of opioids justify their use?
 - Less respiratory depression
 - Less PONV
 - Less post-operative opioid use
 - Avoiding unexpected hospital admissions
 - Shorter hospital stays

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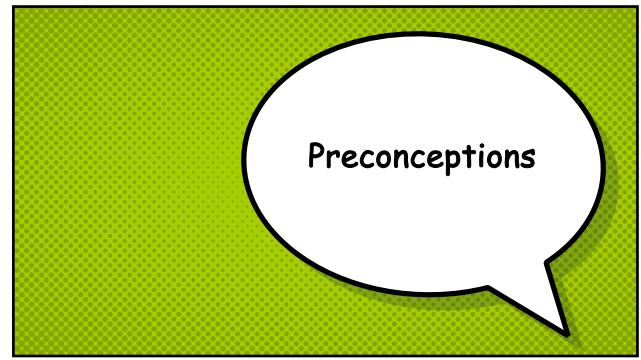
What is it?

- ❑ Natural evolution of anesthesia
 - ❖ Increases in
 - Medications available
 - Knowledge of opioids
 - Knowledge of pain mechanisms
 - Regional anesthesia
 - ❖ History of analgesia
 - High opioid
 - Multi-modal
 - ERAS
 - OFA

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Preconception #1

Opioids are Safe

× #1 cause of emergencies in PACU are respiratory

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Preconception #2

Opioids are effective for treatment of pain

× >50% of patients report moderate to severe pain

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Preconception #3

Opioid Related Side Effects (ORADES) can be treated

- × PONV/Pruritis most common cause of unexpected admission
- × Many side effects are untreatable

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Preconception #4

Intra-operative opioids don't contribute to addiction

- × Case reports of patients in recovery relapsing during anesthesia
- × Dependence occurs to 100% of patients taking opioids

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Preconception #5

Opioids are necessary for intra-operative hemodynamic control

- × Regional anesthesia
- × Opioid-Free Anesthesia

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ORADES

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ORADES

Respiratory	Pain	GI/GU
☐ Respiratory depression	☐ Sisyphus effect (Opioid Induced Hyperalgesia & Opioid Tolerance)	☐ PONV
☐ Pharyngeal muscle weakness	☐ Surgical Hyperalgesia	☐ Constipation
☐ Pneumonia	☐ Chronic post-surgical pain	☐ Ileus
		☐ Urinary Retention

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ORADES

Psychologic	Immune/Endocrine	Neurologic
☐ Addiction	☐ Immunosuppression: Killer T Cell & Cortisol Inhibition	☐ Sedation
☐ Dependence	☐ Testosterone Deficiency	☐ Pruritus
☐ Opioid Use disorder	☐ Osteoporosis: malunion	☐ Hallucination
		☐ Block REM sleep

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How-to

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Special populations

- ☐ Respiratory
 - ❖ Obese, OSA, elderly, COPD
- ☐ PONV
- ☐ Complex pain management
 - ❖ Long term opioid use, Acute on Chronic pain, Risk for CPSP
- ☐ Opioid-Use disorder
- ☐ Cancer

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Toolbox		
Gold Standard	Intra-operative management	Post-operative management
Regional Or Neuraxial	Dexmedetomidine Ketamine Lidocaine infusion Magnesium N2O Beta blockers	Acetaminophen Nsoids/coxibs Dexamethasone Gabapentinoid SSRI

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Post-op Sedation

The major complication of OFA

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Dexmedetomidine

- Benefits
 - ❖ Analgesic/Anti-hyperalgesic
 - ❖ Anxiolysis
 - ❖ Reduces shivering
 - ❖ Reduces emergence delirium

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Dexmedetomidine

- Side Effects
 - ❖ Sedation
 - ❖ Bradycardia
 - ❖ Hyper/Hypotension
- Considerations
 - ❖ 10-minute onset
 - ❖ Can't administer rapidly

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Dexmedetomidine

- ❑ Doses
 - ❖ Induction
 - 0.25-0.5 mcg/kg/10 minutes
 - ❖ Maintenance
 - 0.2-1 mcg/kg/hr
 - ❖ PACU
 - 0.1-0.5 mcg/kg/hr

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Ketamine

- ❑ Benefits
 - ❖ Analgesia/Anti-hyperalgesia
 - ❖ Bronchodilation
 - ❖ Anti-depressant

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Ketamine

- ❑ Side Effects
 - ❖ Sedation
 - ❖ Hallucinations
 - ❖ Dysphoria
- ❑ Considerations
 - ❖ No large doses near emergence

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Ketamine

- ❑ Doses
 - ❖ Induction
 - 0.25-0.5 mg/kg
 - ❖ Maintenance
 - 2-10 mcg/kg/min = 0.1-0.6 mg/kg/hr
 - ❖ Pre/PACU
 - 0.1-0.3 mg/kg/5 minutes

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Lidocaine Infusion

- ❑ Benefits
 - ❖ Analgesia/anti-hyperalgesia
 - ❖ Anti-inflammatory
 - ❖ Reduces coughing on emergence
 - ❖ Anti-viral/bacterial/fungal
- ❑ Considerations
 - ❖ Caution when other sources of local anesthetic used

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Lidocaine

- ❑ Lidocaine side-effects
 - ❖ Lowers seizure threshold
 - ❖ Mild neurologic symptoms in awake patient

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Lidocaine

- ❑ Doses
 - ❖ Induction
 - 1-2 mg/kg
 - ❖ Maintenance
 - 2-3 mg/kg/hr
 - 2% lidocaine 0.1-0.15 ml/kg/hr
 - ❖ PACU
 - 1-2 mg/kg/hr

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Magnesium

- ❑ Benefits
 - ❖ Analgesia/Anti-hyperalgesia
 - ❖ Bronchodilator
 - ❖ Reduces shivering

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Magnesium

❑ Side Effects

- ❖ Prolongs non-depolarizers
- ❖ Use caution in renal failure

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Magnesium

❑ Doses

- ❖ Induction
 - 30-50 mg/kg
- ❖ Maintenance
 - 10 mg/kg/hr

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N2O

❑ Benefits

- ❖ Analgesia/Anti-hyperalgesia
 - 50% = 15 mg morphine
- ❖ Reverses chronic central sensitization

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N2O

❑ Side Effects

- ❖ Diffusion hypoxia
- ❖ Increase in nausea if no prophylaxis
- ❖ Pulmonary Hypertension
- ❖ B12 Deficiency
- ❖ Genetic mutation

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Decisions

- ❑ Length of case
 - ❖ > 2 hours infusion
 - ❖ < 2 hours bolus
- ❑ Infusion
 - ❖ 1 bag
 - ❖ Multiple pumps

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One bag to rule them all

- ❑ 2% Lidocaine 20-30 ml
 - ❖ 2 mcg/ml Dexmedetomidine
 - 40-60 mcg
 - ❖ 2 mg/ml Ketamine
 - 40-60 mg
 - ❖ 50 mg/kg Magnesium first syringe

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Infusion

- ❑ Induction
 - ❖ 0.1 ml/kg mix
 - 80 kg = 8 ml
 - ❖ 0.5 mg/kg Esmolol
- ❑ Maintenance
 - ❖ 0.1 ml/kg/hr
 - 80 kg = 8 ml/hr
 - ❖ 0.05 - 0.15 ml/kg/hr
 - 80 kg = 4-12 ml/hr

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Infusion

- ❑ Maintenance doses
 - ❖ Dexmedetomidine 0.2 mcg/kg/hr
 - 0.1-0.3 mcg/kg/hr
 - ❖ Ketamine 0.2 mg/kg/hr
 - 0.1-0.3 mg/kg/hr
 - ❖ Lidocaine 2 mg/kg/hr
 - 1-3 mg/kg/hr
 - ❖ Magnesium 50 mg/kg

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Bolus

- ☐ 3 ml syringe
 - ❖ 25 mcg/ml Dexmedetomidine
- ☐ 5 ml syringe
 - ❖ 10 mcg/ml Dexmedetomidine
 - ❖ 10 mg/ml Ketamine
- ☐ 50 mg/kg Magnesium
 - ❖ 4 gm in 100 ml
 - ❖ 1 gm in 2 ml
- ☐ Lidocaine

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Bolus

- ☐ 3 ml syringe
 - ❖ 1 ml (100 mcg) Dexmedetomidine
- ☐ 5 ml syringe
 - ❖ 50 mg Ketamine
- ☐ Add 50 mcg (0.5 ml) Dexmedetomidine from 3 ml syringe to 5 ml syringe & dilute to 2 ml
- ☐ Dilute 5 ml syringe to 5 ml

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Bolus

- ☐ Pre-op
 - ❖ Dexmedetomidine 0.25-0.5 mcg/kg/10 minutes
- ☐ Induction
 - ❖ Ketamine 0.25-0.5 mg/kg
 - ❖ Dexmedetomidine 0.25-0.5 mcg/kg
 - ❖ Lidocaine 2 mg/kg

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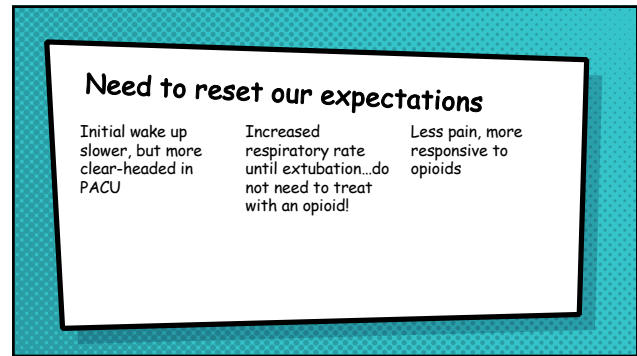
Bolus

- ☐ Maintenance
 - ❖ Magnesium 50 mg/kg
 - ❖ Dexmedetomidine 10 mcg and Ketamine 10 prn
- ☐ Emergence
 - ❖ Lidocaine 2 mg/kg

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