

# PEDIATRIC ANESTHESIA (FOR THE NON- PEDS PROVIDER)

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# OBJECTIVES

- Review common pediatric cases and anesthetic management
- Review common pediatric anesthetic complications and management



**Inhalation**  
**Vs.**  
**Intravenous**  
**Induction**

# DISTRACTION TECHNIQUES

- ◉ Miffin et al. (2012), Lee et al. (2010)
- ◉ How old does a child need to be to work a tablet or phone???
- ◉ Decrease or eliminate need to premed
- ◉ Great for special needs children



# COMMON PEDIATRIC CASES



# EAR, NOSE, AND THROAT SURGERIES

- ◉ Myringotomy tubes
- ◉ Tonsillectomy
- ◉ Adenoidectomy
- ◉ Tympanoplasty/mastoidectomy
- ◉ Sinus surgery

# MYRINGOTOMY TUBES

- ⊙ Airway choice
- ⊙ Fast
- ⊙ DEEP
- ⊙ Pain meds
  - Intranasal fentanyl (0.5 - 2 mcg/kg)
  - Intranasal dexmedetomidine (1-2 mcg/kg)
  - Ketorolac 0.5 - 1 mg/kg IM
  - Acetaminophen (up to 15 mg/kg po)
  - Ibuprofen (up to 10 mg/kg po)

# MASKING TIPS

- ◉ Forget you have 5 fingers
- ◉ Head positioning
- ◉ Infants - open mouth
- ◉ Oral airway?





# ADENOIDECTOMY

- **Obstruction**
  - Mouth breather
  - Induction “feel” and CPAP
  - Bruppacher et al., 2003
- **Masking**
- **Narcotics**
  - Lighter usually
- **Antisialagogue?**
- **Preop sedation?**

# TONSILLECTOMY

- Obstruction
  - Tonsil grade
- Steroids
- Narcotics
- Dexmedetomidine
- Antiemetics
- NSAIDs?
  - Marret et al, 2003
- Extubation technique
  - Awake vs. deep
  - Recovery position
  - “No touch” technique (Tsui, et al. 2004)



# TONSILLECTOMY

- ◉ Fire (A clinician's guide to surgical fires, 2003)
- ◉ Bleeding
- ◉ Spasm
- ◉ Post op admission?
  - 1996 American Academy of Otolaryngology Head and Neck Surgery recs
  - Newer recs/research
- ◉ Type of surgery
  - Cautery
  - Coblation
  - Intracapsular Wang et al, 2015



# AIRWAY CHOICE

## ⊙ ETT

- Cuffed
- Uncuffed
- Raman et al., 2012

## ⊙ LMA

- Ranieri et al., 2012
- Sieripina et al., 2012
- Failure rate around 10%



# OBSTRUCTIVE SLEEP APNEA

- Severity (sleep study?)
- Questions to ask:
  - STOP-Bang (Chung et al., 2008)
  - Snoring, tired, observation, blood pressure
  - BMI, age, neck circ, gender
  - Adapt for peds
- Post op admission?



# CONTROL OF TONSILLAR BLEED

- ◉ Patient appearance
- ◉ Symptomatic?
- ◉ H/H - hydration and volume status
- ◉ RSI and IV access
- ◉ Pain control
- ◉ OG presence and when
- ◉ Higher rates with tonsillectomies than tonsillotomies (Mueller et al., 2014)
- ◉ Windfurh et al., 2009, 2015

# COLD SYMPTOMS

- ◉ Frequent with these patients
- ◉ Are they optimized
- ◉ How can you optimize
- ◉ Fever present? Cough?
- ◉ When to cancel?
- ◉ What are the facility restrictions? le can you admit?



# TYMPANOPLASTY/MASTOIDECTOMY

- ◉ Simple to very involved disease
- ◉ Facial nerve monitoring
- ◉ Avoid nitrous oxide
- ◉ Deep extubation



# SINUS SURGERY

- ◉ Obstruction
- ◉ Paralysis?
- ◉ Pain meds
- ◉ Extubation
- ◉ Blood loss
- ◉ Imaging



# DENTAL RESTORATION

- ◉ Way too common!
- ◉ Consider a premed
- ◉ Intubation placement
- ◉ Contraindications
- ◉ Sedation
- ◉ Repeats (Savanheimo & Vehkalahti, 2015)



# NASAL INTUBATION

- ◉ Vasoconstriction? Timing?
- ◉ Lubrication for ETT, warm saline
- ◉ ETT size and depth
- ◉ Tools to help
  - Magill forceps
  - Driver
  - Suction catheter, rubber catheter (Watt et al, 2007)
  - Blind placement
  - Fiberoptic (Smith and Reid, 1999)
  - Video assisted



# LAPAROSCOPIC CASES

- ◉ Multi-incision vs. Single
- ◉ Insufflation pressures
- ◉ Bradycardia/asystole
- ◉ Positioning and straps

# APPENDECTOMY

- RSI?
- Temperature management
- Fluid status
- Emergency or not
  - Kim et al., 2015
  - Pinheiro et al. (2014)
  - Medical management - abx

# GENITOURINARY CASES

- Circumcision
- Orchiopexy/orchiectomy/septopexy
- Inguinal hernia repair
- Airway choice





# CAUDAL

- ◉ Common in pediatrics
- ◉ Fairly easy to place (Schuepfer et al, 2000)
- ◉ Palpate sacral cornua
- ◉ Loss of resistance, aspiration
- ◉ Easy, smooth, no “sausage”
- ◉ Postop, not surgical stimulation
- ◉ Ropivacaine, bupivacaine: 0.5 - 1 ml/kg
- ◉ Adjuncts: narcotic, clonidine



# PAIN CONTROL



# PAIN MEDICATIONS

## ⊙ Acetaminophen

- PO: 10 -15 mg/kg OR 325 - 1000 mg
- Rectal: 10 - 15 mg/kg or 120, 325, 650 mg
- IV: 15 mg/kg max 1000 mg

## ⊙ Ibuprofen

- PO: 4 - 10 mg/kg max 1200/day
- IV

## ⊙ Ketorolac

- IV: 0.5 mg/kg max 30 mg
- IM: 1 mg/kg max 30 mg

# PAIN MEDICATIONS

## ⊙ Ketamine

- PO: 6 - 10 mg/kg
- IM: 3 - 7 mg/kg
- IV :1 - 2 mg /kg
- IV: 20 - 75 mcg/kg/min

## ⊙ Dexmedetomidine

- IV: 0.5 - 1 mcg/kg over 10 - 15 min
- Infusion: 0.2 - 0.7 mcg/kg/hr
- IM: 0.5 -1 mcg/kg
- Intranasal: 1-2 mcg/kg

# OPIOIDS

- ⦿ Morphine: 0.1 - 0.2 mg/kg
- ⦿ Meperedine: 0.5 - 2 mg/kg
- ⦿ Fentanyl: 0.5 - 20 mcg/kg
- ⦿ Hydromorphone: 0.01 - 0.02 mcg/kg
- ⦿ Sufentanil: 0.05 - 0.5 mcg/kg
- ⦿ Remifentanil: 0.05 - 0.5 mcg/kg
- ⦿ PACU doses generally smaller start

# Complications And Treatment

# PRETERM NEONATES AND POST OP

- Admits?
- Surgery type
- Post conceptual age
  - Cote 1995
  - Newer recommendations
    - 60 most conservative
    - 56 standard
    - 12 hour admits
  - Comorbidities

# PERIOPERATIVE COMPLICATIONS

## ○ Laryngospasm

- Higher incidence in children
- Jaw thrust
- Positive pressure
- Lidocaine
  - IV - depends
  - IM - 5 mg/kg



# PERIOPERATIVE COMPLICATIONS

## ⊙ Bronchospasm

- Albuterol
  - Meter dose inhaler
  - Nebulizer
    - 2.5 mg if <10 kg
    - 5 mg if >10 kg
- Increased positive pressure
- Increased volatile agent
- Propofol
- Steroids
- Epi for severe cases
- Other causes of increased pressures

# PERIOPERATIVE COMPLICATIONS

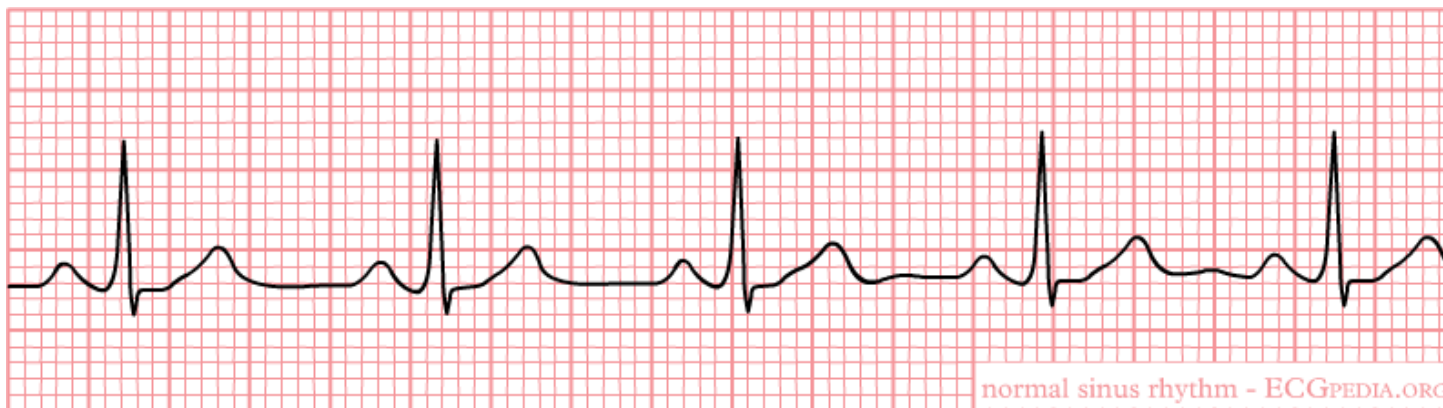
## ⊙ Postoperative Croup

- Causes
- Steroids
- Racemic epinephrine
- 2.25% nebulized
- Supplemental oxygen as needed



# BRADYCARDIA

- Cause?
- Treatment
  - Stop causative agent
  - Determine severity
    - Glycopyrolate
    - Atropine



# EMERGENCE DELIRIUM

- Parental presence?
- Cause of agitation
- Distraction techniques
- Dexmedetomidine
- Propofol
- Physostigmine



# SHIVERING

- ◉ Unusual with infants and younger children
- ◉ Problematic?
- ◉ Treatment
  - Meperidine
  - Dexmedetomidine
  - Ondansetron
  - Clonidine



# NAUSEA/VOMITING

- ⦿ Intraoperative prophylaxis?
- ⦿ Causative agent?
- ⦿ Treatment
  - Ondansetron (0.1 - 0.2 mg/kg)
  - Promethazine (0.25 - 1 mg/kg)
  - Non-opioid pain relievers
  - Hydration



QUESTIONS?

**Thank you!**

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