Paediatric Anaesthesia

the children’s hospital at Westmead
This talk

- Clinical solutions to common problems
- Encourage questions and provide solutions
To Cover

- The child with a respiratory tract infection
- Induction techniques
- Laryngospasm
- Emergence Delirium
- Blood loss
- Pain relief
- Syndromes
The Patient

- 4 year old with Developmental delay and early Autism-Spectrum Disorder.
- Presents for Tonsillectomy for mild OSA
- Previous GA for grommets which didn't go well
  - Lots of screaming when he wakes up.
- Recent cough, 1 week ago, but “better now”
The Child with a Respiratory Tract Infection

- Who would cancel?
- What issues would influence your decision?
- If this were an ORIF of the radius what airway would you use?
The Child with a Respiratory Tract Infection

- ‘Good judgment comes from experience; and often experience comes from bad judgment.’
  – Rita Mae Brown (1944)
- Junior vs. Senior Anaesthetist
- Risk persists for weeks beyond peak of illness
- Hard to explain to parents- economic impact
- Reschedule? Interim URTI
The Child with a Respiratory Tract Infection

• Complications
  – Desaturation
  – Coughing
  – Breath-holding
  – Laryngospasm
  – Bronchospasm
  – Prolonged hospital stay
The Child with a Respiratory Tract Infection - patient factors

- Risk Factors
  - Copious secretions
  - Productive cough
  - Parental Smoking
  - Reactive airways
  - Young

- New cold on the day?
  - Family members with the same
  - Presence of constitutional symptoms and Fever
The Child with a Respiratory Tract Infection

- ETT vs. Mask vs. LMA?
  - Surgery influences decision

- Surgical Considerations
  - Airway surgery
  - Pain due to coughing
  - Bleeding due to coughing

- Morbidity and Mortality are low
The Child with a Respiratory Infection - Suggestions

- Cancel if concerned
- Use mask if you can
- Intubate if access to airway problematic
- Lignocaine to cords or IV
- Use opioids
- Use Propofol
- Dexamethasone early
- Have a good relationship with your surgeon
Induction Techniques

• Who would use IV? Who would use Inhalation?
• Who would have a parent in the room?
• On the lap or on the bed?
• Who routinely uses a premed?
• Who uses distraction techniques?
  – Computer games, play therapist, clowns, hypnosis.
Premeds

- **Midazolam 0.5mg/kg up to 15 mg**
  - Works in 15 to 20 minutes
  - Beware paradoxical reaction
  - Of little value if not anxious

- **Ketamine 3mg/kg and Midazolam 0.3mg/kg**
  - Ready in in 30 minutes
  - Great for the difficult, drug resistant, Autistic, ADHD

- **Clonidine 2 to 4 mcg/kg**
IV adjuncts

• **Topical Anaesthetic**
  – EMLA or Angel cream, need to wait the hour.

• **Nitrous via hudson mask**
  – Attach to common gas outlet using adaptor
  – Great for the mask phobic older child or child who won’t be held
Just as the patient falls asleep you hear a gasping squeak and then you are unable to move any air with the bag and mask.......

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Laryngospasm

- Closure of the Glottis by intinsic and extrinsic muscles
- 0.04 to 14% incidence in Paediatrics
- More common at emergence
- May result in
  - Hypoxia
  - Negative pressure pulmonary oedema
  - Aspiration
  - Cardiac Arrest 0.5%
- Think of the next patient – draw more sux
Laryngospasm – Risk Factors

- **Patient**
  - URTI, parental smoking, snoring history

- **Anaesthetic**
  - Light plane of anaesthesia
  - Controversy over airway but more with ETT
  - Awake LMA

- **Surgical**
  - Airway surgery, Bronchoscopy
  - Tonsils 27%
Laryngospasm - Prevention

- LMA removal under deep anaesthesia
- IV Lignocaine 2 mg/kg 90 secs prior to extubation
- Topical Lignocaine 4 mg/kg
- ETT deep extubation
- ETT awake with no-touch and “cough”
- Avoid stimulation
Treatment of Laryngospasm:

HELP!!

Sux administration

- IM
  - (1) 4mg/kg
  - Max onset: 3.3 min

- Intra-Lingual oral
  - (2) 1mg/kg
  - Apnoea: 1.25 min
  - (3) 3mg/kg
  - (arrhythmias)
  - Max onset: 5min

- Intra-Lingual Sub mental
  - (2) 1mg/kg
  - Apnoea: 3.5 min

- Intra osseous
  - (3) 3mg/kg
  - Max onset: 4.5 m
  - + massage: 2.15 m
Laryngospasm- Treatment

- **CPAP and 100% O2**
- Non-Pharmacological
  - Laryngospasm trigger point
  - Mandible pull
  - Intubation without relaxant

- **Drugs**
  - Propofol 0.5 to 1 mg/kg
    - If early and mild
  - Lignocaine 2mg/kg IV or topical
  - Suxamethonium 0.1 to 0.3 mg/kg
Intubation and Ventilation

• Mask Holding
  – watch soft tissues
  – Lift the face into the mask
  – Apply CPAP/PEEP

• Value of the t-piece
Intubation

- Who uses a straight blade?
- How do you position the patient?
- Shortcuts or tricks?
- Do it deep or with relaxants
- Larynx may appear displaced anteriorly
- Epiglottis more likely to require physical displacement to view glottis – straight blade technique
- Neck flexion unlikely to improve intubation angle
Curved blade tip

Straight blade tip

Tongue

Epiglottis
Intubation

- ETT size
  - \((\text{AGE} + 4)/4\)
    - Neonate 3
    - Infant 3.5

- Length at the lips
  - \((\text{AGE}/2) + 12\)

- Cuffed vs Uncuffed
  - Depends what is available
Shortcomings of cuffed paediatric tracheal tubes


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Emergence Delirium

Agitation, uncontrollable crying and potential self-harm
Distressing for everyone involved
More common with Desflurane and Sevoflurane
ENT, Eye surgery
Need to differentiate from…..
  pain, hypoxia, hypotension, hypoglycaemia, full bladder etc
Emergence Delirium - Prevention

• Good analgesia – Fentanyl 0.5 mcg/kg boluses until RR and HR normal

• Propofol 1 mg/kg at the end of the case

• Clonidine 1-2 mcg/kg

• Ketamine premed or at induction
Pain Management - Intraop

• Paracetamol +/- Ibuprofen premed for short cases
  – PR if consented
  – IV Paracetamol if budget allows

• Opioids
  – Morphine 20 mcg/kg boluses
  – Fentanyl 0.5 mcg/kg boluses
  • Titrate with spontaneously breathing patient achieving normal respiratory rate, ETC02 >45 and relative bradycardia by the end of the case.
Pain Management- Post-op

- Paracetamol 15 mg/kg regularly q4-6 hourly
  - Use lean body mass limit to 72 hours
  - 90 mg/kg per day
- Ibuprofen
  - 10 mg/kg after 6 months
- Oxycodone
  - 0.1 mg/kg q4h po
- Pain Stop
  - 0.6 ml/kg good outpatient drug
- Morphine infusions
  - Monitoring
  - 20 mcg/kg/hr
  - Don’t forget intranasal Fentanyl 1.5mcg/kg (70% bioavailability)
Blood loss

- Our child returns 12 hours later after vomiting up copious amount of blood.
- His heart rate is 130 bpm, SBP 80 mmHg
- There is no IV access
- The surgeon wants to take him to theatre to stop the bleeding.
Blood Loss

• How do you assess shock?

• Irritability, Capillary return, Urine output

• Blood pressure falls late

• Get Help – Extra hands and Extra IV access
Blood Loss in Theatre

• Always have blood ready in theatre if suspected
• Beware of loss under the drapes
• Weigh sponges
• Warm Fluids
Blood Loss

- Children tolerate fluids better than adults
- Better 10-20% ahead than behind
- Estimate your blood volume
  - Neonates 100 ml/kg
  - Child 80 ml/kg
  - Adult 70 ml/kg

- *Tell your surgeon to stop so you can catch up!*
Blood Loss- IV access

- Intraosseous
  - Medial Tibial
  - Lateral Distal Femur
  - Fast access
  - New power drills – EZ-IO
  - Don’t be afraid to use

- Feet
  - Blind saphenous
Ask the Parents

Is the patient a difficult airway?
  - Treacher-Collins, Goldenhar, etc

Is the patient a MH risk?

Myopathy- can they handle muscle relaxants, sux?

Associated Cardiac abnormalities
Time Permitting........

- Approach to the difficult airway
- T-piece vs. Circle
- Fasting
- Inhaled foreign body
- Rapid sequence induction
- Obesity
- Trauma
- Sedation for Burns dressings