Pediatric Rapid Sequence Induction

Ma – Resuscitation of Children chapter; notes

EMC 420: Maternal & Child Emergency Care

D. Trigg, MD

Objectives

Upon completing this lecture you will be able to discuss:

- TV necessary to ventilate children
- ET tube size and type of laryngoscope blade
- Pediatric sedating agents
- Effective cricoid pressure in children
- Pediatric neuromuscular blocking agents
- Acceptability of adult protocols and agents

TV in Pediatric Ventilation

- TV necessary to ventilate children
  - 10-15 mL / kg
  - Does the chest rise?
  - Are there BS on axillary auscultation?

Sizing Pediatric Tube and Laryngoscope Blade

- Broselow tape
- Type of laryngoscope blade
  - Miller (straight)
  - Size: I for Infant ; 2 for 2YO ; 3 for 5YO
    (these are roughly the pediatric LMA sizes)
- Tube Size
  - "rule of 'pinky'." Size of child's 5th digit
  - $\frac{16 + age}{4}$
  - Uncuffed tubes

Pediatric Intubation vs BVM

- Prehospital care

  In a large study of prehospital pediatric intubation, 830 consecutive children assigned to either:
  - Bag-valve-mask (BVM) vs
  - Endotracheal intubation (ETI)
  - Study: no significant difference in neurologic recovery or survival to hospital discharge.

Impending Respiratory Arrest

- Work of breathing
  - How fast?
    - **Slow** ("normal") rate may be a sign of impending respiratory failure
  - How hard?
    - Poor respiratory effort may be a sign of impending respiratory failure
- Respiratory failure
  - Confusion; lethargy [brain failure]
  - Poor tone [muscle failure]
  - Cyanosis ["skin failure"]

Bag-Valve-Mask/Assisted Ventilation

- Mask must make an airtight seal
- Technique and familiarity with the procedure much more important than the ability to intubate

Surgical Airways

- Needle, not surgical. cricothyrotomy is recommended for patients younger than seven
  - With a 14 gauge angiocath attached to a syringe, at a 45 degree angle caudally, connected to 100% oxygen at 50 psi.

Rapid Sequence Induction (RSI) for Intubation

- Sedation
- Cricoid pressure.
  - Decrease the risk of aspiration
- Neuromuscular blockade
  - Contraindicated if difficult intubation is anticipated
- Assume
  - A full stomach
  - Possible increased intracranial pressure.
- Preparation, preoxygenation, premedication, sedation, cricoid pressure, paralysis, intubation, verify

RSI

- Place appropriate monitors (CR, BP, pulse oximeter)
- Prepare medications and appropriate equipment
- Preoxygenate with 100% oxygen
  - Preoxygenation:
    - Breathing patients : 2-5 minutes of 100% O2 via nonrebreather , or
    - Apneic patient: 1-2 minutes via BVM.

RSI Protocols

- Premedicate with adjunctive agents
  - Lidocaine
  - Atropine 0.02 mg / kg
- Administer appropriate sedative agent
  - Ketamine 1-2 mg/kg IV IVP
    (apnea will occur with upper IV dose range, especially when given as a large bolus dose)
  - Midazolam 0.1 mg / kg IV
- Apply cricoid pressure (Sellick maneuver)

RSI Lidocaine

- "There is nothing rapid about 'Rapid Sequence Induction " - M. Richards
  - Midazolam 0.1 mg / kg IV
- Lidocaine
  - Slows procedure
  - Questionable benefit in pediatric intubation
  - Consider using in head trauma / IICP

RSI Paralysis

- Administer neuromuscular blocking agent
  - Vecuronium 0.2-0.3 mg/kg IV or
  - Rocuronium 1 mg/kg
  - Succinylcholine 1 - 2 mg/kg IV
    - Sux may have more side effects in the pediatric patient ; probably all the more reason to consider using vecuronium.
- Confirm endotracheal tube placement
  - Pulse oximetry
  - Carbon dioxide detector (yellow: yea!)
  - Other

Summary

We have discussed:

- Signs of effective ventilation in children
- Intubation equipment: ET tube, laryngoscope blade
- Pediatric sedating agents
- Effective cricoid pressure
- Pediatric neuromuscular blocking agents
- RSI basically the same as adult
  - With Atropine and Ketamine receiving more emphasis
  - With “adult agents” usually considered acceptable