Project: Ghana Emergency Medicine Collaborative

Document Title: ENT Case Files (2008)

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Plan for the hour

• Split into 4 groups
• You will be given 2-3 diagnoses and you have to create the cases.
• Then answer a few questions
• In 15 minute we’ll meet again as a big group to discuss our findings.
Questions

- Create a case for each diagnosis
- What is the differential diagnosis for each case?
- How do you distinguish between them? Is it a clinical diagnosis? Are ancillary tests needed?
- What is the treatment and how does it differ?
- What is the disposition and how does it differ?
Croup

- Most commonly occurs in children 3 months to 3 years, rare > 6 yrs
- Most frequent presentation 10pm - 4 am (although if seen between 12pm - 6pm more likely to be admitted)
- Yesterday nasal irritation and congestion
- This morning fever
- Tonight woke up with barking cough and stridor when crying.
- Symptoms improved when brought outside to the car
Croup

- Laryngotracheitis
- Narrowing of the subglottic trachea
- Most commonly Parainfluenza virus type 1 (fall and winter epidemics)
- Other possible culprits
  - RSV and Adenovirus is relatively common
  - Measles, Influenza, Rhinovirus, Enterovirus, HSV
Bacterial Tracheitis

- Peak incidence 3-4 yrs, but has been regularly reported in adolescents and young adults
- Features of croup and epiglottitis overlap: fever, toxic appearing, purulent secretions, stidor, and increasing respiratory distress
- Commonly misdiagnosed as croup or epiglottitis
- Poor response to usual croup treatment
- Signs/Symptoms of lower airway disease may be present
- Primary infection
  - Sudden onset of symptoms
- Secondary infection
  - Worsening of the clinical course of viral URI
Bacterial Tracheitis

- Bacterial infection of subglottic trachea and usually bronchi and lungs as well.
- Traditionally Staph areus, but also HIB Moraxella catarrhalis and anaerobes
- May occur as a complication of viral URI or as primary bacterial infection.
- Accumulation of thick pus within the lumen of the subglottic trachea
- Of 35 pts admitted to PICU in one hospital (1997-2006) with upper airway infections:
  - 3 (15%) had viral croup
  - 15 (75%) had bacterial tracheitis
  - 2 (10%) had epiglottitis

Epiglottitis

- 2-7 yrs
- Rapid onset
- High fever, sore throat, stridor, no cough
- Dysphagia, Difficulty handling oral secretions
- Pale, toxic appearing
- Anxiety
- Muffled “hot potato” voice, no hoarseness
- Sitting in the “sniffing position”
Epiglottitis

- Supraglottitis
- H. influenza, though GPC also possible
  - Staph and Strep pneumo, Strep A
- 50-85% of pts with H. flu epiglottitis have bacteremia
- Rapidly progressive inflammation of and around epiglottis
- Hib vaccine in 1991. Since that time:
  - Overall incidence decreased from 10.9 to 1.8 per 10,000 admissions (95% reduction in Hib related disease)
  - Older children on average
    - Prior to 90s mean = 3 yrs
    - Early 90s mean = 6 yrs
    - Late 90s to 2002 mean = 14.6 yrs
  - HIB now only 25%, Group A strep predominates

Shah et al Laryngoscope 114: March 2004
Differential Diagnosis

- Foreign Body
- Retropharyngeal abscess
- Trauma
- Anaphylaxis
- Angioedema
Evaluation of Stridor

• In general: Keep the kid calm
• Rapid initial assessment/management
  – Signs of respiratory failure
    • Listlessness, fatigue
    • Decreased level of consciousness
    • Marked retractions
    • Decreased or absent breath sounds
    • Tachycardia out of proportion to fever
    • Cyanosis or pallor
  – Start treatment (More on this later)
  – Intubation
    • Required in < 1% of ED croup presentations
    • Use ETT 0.5 - 1.0 mm smaller than
Evaluation of Stridor

• History
  – Sudden onset with no fever, choking and gagging…..
    Foreign body, anaphylaxis
  – Sudden onset with fever …. Likely a bacterial process.
  – Hoarseness and barking cough…. Typically absent in acute
    epiglottitis or foreign body.
  – Difficulty swallowing or Drooling…. Foreign body, epiglottitis,
    retropharyngeal abscess
  – Exposures
  – Underlying disease (congenital anomalies, previous airway
    surgery, children with neuromuscular disease) increased
    risk for more severe disease.
Ancillary Studies

• Lab studies:
  – Croup: rarely indicated
  – Bacterial tracheitis: wbc count, left shift.

• Imaging: PA and Lateral Chest, Soft Tissue Neck
  – Should never interfere with stabilization
  – Rarely indicated for croup unless:
    • Diagnosis is in question or course atypical
    • Looking for a foreign body (though most are not radio-opaque
  – Portable lateral neck used to dx epiglottitis
Lateral Neck Xrays

• Neck extended
• During inspiration
• 4 things to look at:
  – The epiglottis
  – The retropharyngeal (prevertebral space)
    • Normally widens during expiration leading to false dx
  – Tracheal air column
  – The hypopharynx
What’s Normal

- Epiglottis
- Retropharyngeal Space
- Tracheal air column
- Hypopharynx
Imaging

Source Undetermined
Croup

“Steeple sign,” subglottic narrowing
Imaging
Bacterial Tracheitis

Nonspecific edema or intraluminal irregularities of the tracheal wall
Imaging
Epiglottitis

“Thumb sign,” swelling of the epiglottis
Treatment

• Croup
  – Cold night air
  – Humidified air or O2 for more severe cases
  – Oral Dexamethasone
    • 0.6 mg/kg max dose 10mg
    • Can be given IV or IM if not tolerating PO
    • Improvement usually within 3-6 hrs but no longer significant at 24 hrs
  – Racemic epinephrine
    • 0.05 mL/kg per dose max of 0.5 mL nebulized over 15 min
    • Can be repeated Q15-20 min
    • >3 doses in 3 hrs, put them on a monitor
  – Other things to try:
    • Nebulized Budesonide 2mg
      – As effective as oral dexamethasone but more expensive
      – Can be mixed with racemic epi in the nebulizer
    • Prednisone 4mg/kg = .6mg/kg dexamethasone, volume limited
    • Prednisolone 1mg/kg - not as effective as dexamethasone
    • Heliox
How good is Dex?

- 5x reduction in # intubations in severe croup
- If intubated, remain so for 1/3 the time
- 10% reduction in need for epi
- Mild croup: 50% less likely to return for medical care

Repeat Dosing for Dex?

- Effects of Dex last 24 hrs
- No evidence for or against
- Risk progression of infection though most cases of this are anecdotal and in
  - Repeat dosing over several days
  - Neutropenic patients
Why Racemic?

- 1:1 mix of D and L isomers of epinephrine
- Supposed to reduce side effects like HTN and tachycardia
- PRCT in children with croup: no difference between racemic and L-epi (0.5 ml/kg max dose 5 ml of 1:1000)

When to pull out the R. Epi?

• Moderate retractions and/or Stridor at rest
• Single dose of epi? Safe to d/c after 2-4 hours of observation.
• 3 or more doses in 2-3 hrs, admit for cardiac monitoring
Heliox?

- Decreases airflow turbulence through airway obstruction
- RCT in 29 children with mod-severe croup heliox vs epi found no difference
- RCT in 15 children with mild croup heliox vs O2 showed trend but not significant
Treatment: Bacterial Tracheitis

• Secure the airway
  – 6/8 studies intubation rates > 70%
• Bronchoscopy - diagnostic and therapeutic
• Broad spectrum antibiotics
  – Vancomycin (mrsa, mssa, strep)
  – Clindamycin (mrsa, anaerobes)
  – Cefotaxime (moraxella, anaerobes)
Treatment: Epiglottitis

• Secure the airway
  – As soon as dx is made, prior to deterioration
  – ETT (nasal vs oral) vs Tracheostomy

• Supportive care
  – IV hydration
  – Humidified air with O2 if needed
  – Cefuroxime or Unasyn
  – Oral abx after extubation for total 7-10 days
  – +/- Steroids
Epiglottitis: Should I look in there?

- Traditional Dogma: Don’t touch ‘em
- Some now advocate a quick look with a tongue blade: No evidence
- My advice: If you are going to look….
  - Controlled environment
  - Prepared with to do something (DAC)
  - With help (ENT, Anesthesia)
Epiglottitis Management

Fig. 4. Suggested management algorithm for patients with epiglottitis. IV = intravenous.
Disposition

• Croup
  – Mild: D/C criteria:
    • No stridor at rest
    • Normal oxygenation and air exchange
    • Normal color
    • Normal LOC
    • Can tolerate PO
    • Specific instructions to caregivers as to what to watch for
  – Moderate/Severe Croup
    • Dexamethasone alone? Observe 3-4 hrs for improvement
    • Dex and 1-2 doses epi? Observe 3-4 hrs then decide
    • 3 or more doses epi? With improvement admit with cardiac monitoring. Without improvement admit to PICU.

• Bacterial Tracheitis - Admit PICU
• Epiglottitis - Admit PICU
General Indications for Admission

- Needs supplemental O2
- Still symptomatic (ie retracting, increased work of breathing)
- Toxic appearing
- Young age (< 6 mo)
- Can’t return for follow up
- Recurrent visit to ED within 24 hrs.
References