Upper Airway Emergencies

Selena Hariharan, M.D.
Assistant Professor of Pediatrics
Division of Pediatric Emergency Medicine
Cincinnati Children’s Hospital Medical Center
CASE # 1

- A 9 year old boy, previously healthy, was sent home from school with a fever
- Also complaining of neck pain, headache, abdominal pain
- Physical exam: temperature of 102F, red throat, palatal petechiae, and cervical lymphadenopathy
PHARYNGITIS

- Most commonly due to viruses:
  - Adenovirus
  - Influenza
  - Enterovirus
  - Epstein-Barr virus

- Bacterial causes less likely:
  - Groups A, C, and G Streptococcus
  - Corynebacterium diptheriae
  - Neisseria gonorrhea (esp. in adolescents)
GROUP A STREPTOCOCCUS

- Humans are reservoir
- Carried in naso- and oropharynx
- Spread by direct contact
- More prevalent in winter / early spring
- Causes hemolysis of blood agar
CLINICAL PRESENTATION

- Abrupt onset of fever and sore throat
- Cervical lymphadenopathy
- Tonsillar exudate
- Palatal petechiae
- Scarlatiniform rash
- Associated with nausea, vomiting, abdominal pain, and headache
DIAGNOSIS

- Gold standard for diagnosis is culture
- Rapid tests improving in quality
- Detect antigen by latex agglutination or immunoassay
TREATMENT

- Treated to prevent acute rheumatic fever
- Penicillin and Amoxicillin are first line; can use IM or PO
- If allergic to Penicillin, can use macrolides or cephalosporins
- 5 day regimens currently being evaluated (Cefpodoxime and Azithromycin)
INFECTIOUS MONONUCLEOSIS

- Common cause of pharyngitis (confused with Strep pharyngitis)
- Presents with abrupt onset sore throat and generalized lymphadenopathy after a few days of fever and malaise
- Pharyngitis often exudative
- Associated with splenomegaly (50%), hepatomegaly (15%), and rash (5%)
DIAGNOSIS

- CBC showing absolute and relative lymphocytosis with 10 or greater percent atypical morphology
- Monospot: heterophil antibodies that agglutinate sheep erythrocytes
  - positive in up to 90% of adolescents within 3 weeks of illness
  - often negative in children, especially < 4 years old
TREATMENT

- Symptomatic care
- Must avoid vigorous activity for 1 month due to risk of splenic rupture
- Steroids controversial
  - airway compromise
  - severe thrombocytopenia
  - hemolytic anemia
CASE # 2

- 6 year old boy with a 2 day history of sore throat
- Awoke with fever, headache, stiff neck, dysphagia, and a muffled voice
- Physical exam: temperature 103F, pain on opening mouth, copious saliva, enlarged left tonsil, uvula deviated to right, cervical adenopathy
PERITONSILLAR ABSCESS

- Often polymicrobial
  - Upper respiratory aerobes and anaerobes
  - Group A Strep
  - *Staphylococcus aureus*

- Many causative microbes produce beta-lactamase

- Abscess of peritonsillar space from acute tonsillitis vs infection of Weber’s glands
CLINICAL PRESENTATION

- 2-4 day history of sore throat
- Dysphagia leading to drooling
- Fever
- “Hot potato” voice
- Trismus
- Lymphadenopathy
- Unilateral tonsillar enlargement with uvular deviation to opposite side
DIAGNOSIS

- Primarily clinical
- Needle aspiration can be both diagnostic and temporarily therapeutic
TREATMENT

- Ensure hydration and pain relief
- Otolaryngology consult
- Intravenous antibiotics with broad coverage
- Needle aspiration: well-tolerated with up to 90% resolution rate
- Incision and drainage: incise mucosa above tonsil and open cavity
- Abscess tonsillectomy now last resort
CASE # 3

- 4 year old boy with a 2 day history of sore throat, dysphagia, and fever.
- Today he had fever, “noisy breathing”, and drooling. He refused to move his neck at his PMD.
- Physical exam: Temperature 102.5F, red throat, drooling, stridor, neck stiffness, and cervical lymphadenopathy
RETROPHARYNGEAL ABScess

- Abscess between the vertebrae and the esophagus from the skull base to the mediastinum at T6
- Often polymicrobial
  - Group A Strep
  - Anaerobes
  - Staph aureus
CLINICAL PRESENTATION

- Sore throat
- Fever
- Stridor
- Dysphagia leading to drooling
- Stiff neck
- Can lead to airway compromise
- Tends to occur in younger children as lymph nodes in space atrophy with age
DIAGNOSIS

- Lateral neck radiograph
  - increase in the width of soft tissues anterior to the vertebrae (>7 mm at C2 or >14 mm at C6)
  - OR greater than half the width of the adjacent vertebral body at C2

- CT
TREATMENT

- Intravenous antibiotics: must include coverage for beta-lactamase producing organisms
  - IV Unasyn/ Timentin
  - IV Clindamycin
- Often require surgical drainage
CASE # 4

- 3 year old boy in daycare with a 2 day history of cough and rhinorrhea.
- Tonight awoke from sleep with “noisy breathing”, cough, and retractions. Symptoms improved during the drive to the hospital.
- Physical exam: Temperature 101F, respiratory rate 30, saturation 99%, no respiratory distress, stridor, or cyanosis, mild suprasternal retractions.
CROUP

- Most common cause of infectious upper airway obstruction in children
- Usually affects children between 6 months and 4 years during winter and early spring
- Due to viruses
  - Parainfluenza (60%)
  - Influenza
  - Adenovirus
  - RSV
CROUP

- Virus invades epithelium of pharynx up to larynx causing endothelial damage, edema of the vocal cords and subglottis
CLINICAL PRESENTATION

- Precedent upper respiratory infection
- Low-grade fever
- Barky cough
- Tachypnea
- Retractions
- Inspiratory stridor
DIAGNOSIS

- Clinical
- Airway radiographs: narrowing of subglottic area (steeple sign) with ballooning of hypopharynx
- Radiograph must be taken during inspiration with neck extended
TREATMENT

- Cool mist
- Racemic Epinephrine: observe for 2 hours
- Decadron
- Occasionally must intubate
  - use endotracheal tube 0.5 mm smaller than estimated to avoid damage to edematous subglottic tissue and minimize subglottic stenosis
CASE # 5

- 8 year old boy with a 2 day history of cough and fever who developed “noisy breathing” per his mother.
- Physical exam: Temperature 102.5F, respiratory rate 30, saturation 95%, inspiratory stridor, suprasternal and subcostal retractions
BACTERIAL TRACHEITIS

- Is it bacterial colonization of croup or superinfection due to mucosal destruction and local immunodeficiency induced by a viral infection?
- Debris contains sloughed epithelium, pus, and secretions
BACTERIAL TRACHEITIS

- Most common bacteria
  - Staph aureus
  - Group A Strep
  - Moraxella
  - Strep pneumoniae
Younger children are more toxic appearing at presentation and frequently require intubation to prevent respiratory failure, perhaps due to smaller caliber of airway.

- Fever
- Barky cough
- Stridor with respiratory distress
PRESENTATION-OLDER CHILDREN

- Non-toxic at presentation
- Fever
- Cough
- Stridor
DIAGNOSIS

- Clinical suspicion
- Airway radiograph: irregular tracheal margin
- Gold standard is endoscopy: shows pus and debris in trachea and at vocal cords
TREATMENT

- To operating suite for direct visualization and removal of membrane
- If necessary intubate for airway toilet
- Intravenous antibiotics
  - IV Nafcillin and a 2nd or 3rd generation cephalosporin
  - IV Clindamycin and Chloramphenicol
- Admit to ICU
CASE # 6

- 3 year old boy with 12 hours of dysphagia and fever.
- He acutely developed stridor, respiratory distress, and drooling.
- Physical exam: Temperature 103F, respiratory rate 30, unable to obtain saturation, anxious appearing child sitting forward, jaw thrust out, stridor, suprasternal and subcostal retractions.
EPIGLOTTITIS

- Normal bacterial colonization of the mucosa
- Inflammatory edema of submucosa
- Involves aryepiglottic folds, arytenoids, and eventually, the entire supraglottis.
EPIGLOTTITIS

- Most common bacteria
  - Haemophilus influenzae Type B
  - Streptococcus pneumoniae
  - Staphylococcus aureus
  - Group A Strep
CLINICAL PRESENTATION

- Abrupt onset of respiratory symptoms
- Fever
- Anxiety
- Stridor
- Respiratory distress
- Drooling
CLINICAL PRESENTATION

- Tripod position: sitting with jaw thrust forward
- “4 Ds and an S”
DIAGNOSIS

- Must have high index of suspicion as extensive work-up can be detrimental
- Lateral neck radiograph: swollen epiglottis (thumb sign), thickened aryepiglottic folds
- Direct visualization while establishing artificial airway
TREATMENT

- ESTABLISH AIRWAY!!!
- Minimize agitation until airway established by the most experienced physician available
- Intravenous antibiotic
  - IV Ceftriaxone
  - IV Cefuroxime
  - IV Cefotaxime
  - IV Ampicillin and Chloramphenicol
TREATMENT

- Contacts must receive Rifampin propylaxis
ANY QUESTIONS??

Thanks!!!