Sore Throats That Kill

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- No relevant financial interests in any product discussed today

Three Things

- The Infectious Highway of Death
- A rapid technique for seeing the epiglottis
- Red Flag = “Pain Out of Proportion to Exam”

Why are Sore Throats important??

- High potential morbidity and mortality
- Multiple potential spaces and fascial planes
- Extension and swelling can involve
  - Airway
  - Great Vessels
  - Cranial Nerves
  - Mediastinum
Case

- 20 year old female with sore throat seen two days ago. Treated with PCN, returns with worsening left sided pain and difficulty swallowing.
- Fever 101
- LAN
- What are you thinking first?
- What is the most common Deep Space Neck Infection?
Peritonsillar Abscess (PTA)

- Most common deep infection of neck
- Spread of tonsillitis to peritonsillar space between tonsil and superior constrictor muscles
- Spectrum
  - Tonsillitis
  - Peritonsillitis
  - Peritonsillar Abscess

PTA: Epidemiology

- Usually in younger adults
- Hx of Pharyngitis
- More common
  - Immunosuppressed
  - Diabetic
  - History of previous PTAs

PTA: Symptoms

- Pain which increases and becomes unilateral
- Radiation of pain to ear
- Dysphagia
- Difficulty opening mouth (trismus)
- Presenting sx in about 60%
- Hoarseness (hot potato) from limited movement of palate
PTA: Signs

- Clinical Differentiation PTA vs. Peritonsillitis is difficult
- Uvular deviation
- Fluctuance between upper pole of tonsil and soft palate

PTA: Management

- Adults vs. Children
- Children (<13) -- Admission and IV abx
  - ½ get better and ½ need I and D
- Adults - If suspect peritonsillitis - Abx/Steroids + FU
  - If suspect PTA- Needle/Scalpel
  - If no pus, tx with Abx/Steroids and FU in 24 hrs
  - Consider ULS to aid in diagnosis!!
  - Make sure you look at both sides and compare
PTA Ultrasound

ULS (an alternate approach)
- Using Small Linear probe
- Transcutaneous (Not Intra-Oral)
PTA drainage
- Ultrasound localized
- Anesthetize with lido, or bupivicaine
- 18 g needle aspiration
  - +/- scalpel incision
- Mehanna 2002, 60% pref Asp, 25% pref I&D
- Powell, 2012, Wide variation, little data
- Equal Re-accumulation rates

Peritonsillar Abscess
Summary
- Spectrum
  - Tonsillitis
  - Peritonsillitis
  - Peritonsillar Abscess
- Antibiotics (PCN or Clinda)
- Steroids (Decadron 6-10 mg IM)
- Drainage (with or without ULS)

Case
- 20 year old Male with fatigue malaise and pharyngitis…
  - Fever
  - Some LAN
  - Worse throat exam you have seen in weeks
Which of the following is true re: Infectious Mononucleosis?

- Splenic Rupture occurs in 5% of all cases
- Male: Female predominance is 2:1
- Splenic rupture occurs predominately in males
- Caused by EBV 100% of the time

Infectious Mononucleosis

- First described in 1920
- Most commonly EBV (CMV < Adeno, HIV)
- Mode of transmission… infected saliva

Infectious Mononucleosis

- Massive activation of T cells gives most of symptoms:
  - Tonsillitis
  - Lymphadenopathy
  - Splenomegaly
Infectious Mononucleosis

How can it kill?
- Splenic rupture (rare) > 90% in males
- Airway Obstruction
- Serious non-fatal complications
  - Meningitis
  - CN palsies
  - Guillian-Barre
  - Hemolytic anemia

Infectious Mononucleosis

No racial or sexual pref.
Occurrence 15-25 yrs.
1.5% of all college students annually

Infectious Mononucleosis

Symptoms
- Fatigue
- Malaise
- Myalgias
- Pharyngitis (worse the first week)
- LAN
Infectious Mononucleosis

- Signs: Low Grade Fevers
  - Pharyngitis
  - HSM 10-30%
  - Peri-orbital Edema 15-35%
  - Palatal petechiae
  - Occ. jaundice

- Labs -
  - WBC elevated mildly
    - >50% lymphs
    - >10% atypical lymphs
  - LFTs elevated >90%

Infectious Mononucleosis

- Clinical Management
  - Avoid vigorous splenic evaluation
  - Steroids as needed for inflammation
  - Expectant management
  - Self-limited illness (Maybe retrovirals)
  - Malaise and fatigue may remain for months
  - No sports for 4 - 6 weeks

NATURAL SELECTION

Yes, it does work.
Case
- 3 Year old unvaccinated male presents with 1 day of sore throat illness, decr. POs
- Worsening over the last few hours
- Febrile
- Tripoding
- Drooling

Pedi Epiglottitis
- Prototypical Pediatric Airway Disease
  - Decrease in significance since 1985
  - HIB Vaccine
  - Incidence decreased from 10.9:10,000 admits to 1.8:10,000
  - Is it disappearing???

Epiglottitis: Who, What…
- Children between 3-7 (older after HIB vacc)
- Non-immunized
  - Invasive bacterial disease
    - H. influenza B (less now… 25%)
    - GAβHS (increasing… 75%)
  - Minor players-
    - S. aureus, S. pneumoniae

Epiglottitis: Clinical
- Acute -- No prodrome
  - High fever
  - Sore throat
  - Toxicity
  - Rapid progression
    - 85% sick less than 24 hrs
Epiglottitis: Clinical
- Anxious
- Sniffing position (jaw forward): tripod
- Drooling: Inability to manage secretions

Epiglottitis: Management
- The “STABLE” airway should not be jeopardized.
  - IVs, Xrays, etc. should not be attempted w/o airway personnel
  - Never send to XRAY
  - ?? portable XR with no/little movement
  - Careful transport to OR for definitive airway

Epiglottitis: Diagnosis
- (in VERY STABLE, COOPERATIVE pt.)
  - Tenderness to direct palpation over ant. neck
  - Soft Tissue neck film (90% sens)
    - Loss of vallecula
    - Width of epiglottis >8mm
    - Still can be difficult and pts. require…
  - Direct, Indirect Laryngoscopy
Epiglottitis: Diagnosis

- Direct visualization with larynx-vue or fiberoptic scope may help
- If PEDs → ONLY in VERY STABLE patients
  - ONLY when advanced airway personnel present
- If Adult…

Epiglottitis: an adults only disease??

- This may only of historical significance…
- Shah, RK, Laryngoscope 2010. Avg age of epiglottitis = 45 years old & mort. rate < 1%

Adult Epiglottitis or Supraglottitis

- Cellulitis of supraglottic structures
  - Base of the tongue
  - Vallecula
  - Aryepiglottic folds
  - Arytenoid soft tissues
  - Lingual tonsils
  - Epiglottis

Adult Epiglottitis: Supraglottitis… Who, What

- Any Age, Any Season
- Male, Smokers greater risk
- Bugs: Same, but often none isolated
  - H. influenza B
  - GAβHS
  - S. aureus, S. pneumoniae
Adult Epiglottitis: Supraglottitis... Clinical

- Prodrome 1-2 days
- Dysphagia
- Odynophagia
- Sore throat
  - Pain disproportionate to clinical
- Dysphonia, Muffled voice
- Hoarseness is usually not found.
- Fever is absent in up to 50% of cases (only in the later stages of the disease)

Adult Epiglottitis: Supraglottitis... Diagnosis

- Misdiagnosed: Up to 1/3 of pts. seen but misdiagnosed with Strep.
- Tender to direct palp over ant. neck (80%)
- Soft tissue neck film (90% sens)
  - Loss of vallecula
  - Width of epiglottis >8mm
- Still can be difficult and pts. require...
- Direct, Indirect Laryngoscopy...

Supraglottitis

- How would you directly visualize the Epiglottis???
  - Patient Set Up
    - Tools
    - Instructions to patient

Supraglottitis

- Patient set up
  - Sitting up in bed
  - After Lidocaine Nebs
  - Facing you
Supraglottitis

- Tools
- Mac 3 Blade / Laryngoscope
- +/- Video Laryngoscope

Supraglottitis

- Instructions to patient
- Speak (or better yet sing) in high Mickey Mouse Voice

- Show and Tell Interlude
And now you try…
Adult Epiglottitis: Supraglottitis

- **Management**
  - Airway control:
    - Direct or Fiberoptic assisted-
  - ABX: 3rd Gen. Ceph or Unasyn
  - Steroids? Yes.
  - Guardiani, Laryngoscope 2010. 87% had steroids, assoc. with shorter ICU and overall LOS.

**Case**

- 45 year old man
  - Recent Molar Extraction
  - Diabetes
  - Fever
  - Difficulty swallowing
- Posterior Pharynx looks OK
- ...???

What is this “Doorway Diagnosis?”

**Ludwig’s Angina**

- Submandibular space
  - Sublingual Space
  - Submylohyoid Space
    - Effectively one unit
- Involvement of all spaces is the key to diagnosis
Sub-Mandibular Swelling
Ludwig’s Angina

- Predisposing conditions
  - Dental disease
  - Infection or recent extraction of 2nd or 3rd molar
  - Roots extend below mylohyoid ridge
  - Lacerations
  - Mandible Fractures
  - Salivary Calculi

Clinically:
- Ill Appearing/Anxious
- 20-40s with Nasty Teeth
- 3:2 male
- Mouth and Neck Pain
- Dysphagia/Odynophagia
- Voice Changes
- Mortality 50% in early cases, < 10% currently
Ludwig’s Angina

- **Diagnostic Studies**
  - Clinical Diagnosis
  - Soft tissue films of neck may be helpful
    - Edema/Air of soft tissues
  - CT or MRI to delineate tissues
    - After airway is secured
    - Supine patient may arrest
  - NEVER LEAVE THEM ALONE UNTIL YOU ARE COMFORTABLE

- **Treatment: 3 things**
  - Airway Protection
  - Antibiotics
  - Surgical Debridement

Ludwig’s Angina

- Airway Protection -- DANGER DANGER
  - Fiberoptic - Awake
  - Cricothyrotomy - Distorted Anatomy
  - Blind Nasal - Dangerous and not likely successful
  - Consider in OR with Tracheostomy available
  - Occasional Observation in ICU
Ludwig’s Angina

- Antibiotics
  - 3rd gen. Cephalosporin plus flagyl or Unasyn
  - Once airway is protected - 50% will resolve only with antibiotics

Ludwig’s Angina

- Surgical Debridement
  - Once recommended for all patients
  - Reserved for refractory cases
  - CT results can guide drainage

Question:

- Retropharyngeal abscess occurs in which age group primarily?
  - 1-2 year olds
  - 2-6 year olds
  - 6-12 year olds
  - 12-25 year olds
  - Over 25
Retropharyngeal Infections

- Retropharyngeal abscess is primarily a disease of childhood
- 96% of cases occurring in patients younger than 6 years of age.

Pathophysiology

- Kids
  - Children less than 4 years of age have prominent nodes -> infected -> abscess
  - Atrophy after age 4 to 6.
  - Trauma to post pharyngeal wall
    - Stick or toy in mouth -> Fall
    - Endoscopy or intubation

Pathophysiology

- Adults
  - Cellulitis in retropharyngeal area -> extends -> abscess
  - Endoscopy or intubation
  - Direct inoculation/Bacteremia - IDU
Microbiology

- Retropharyngeal abscesses are polymicrobial with both aerobes and anaerobes
  - aerobic streptococci
  - S. aureus
  - Prevotella species
  - Bacteroides species
  - Peptostreptococcus species

Clinical Findings

- Sore throat, dysphagia, odynophagia, drooling, muffled voice, and fever
- Dysphonia -- similar to a duck "quack" (cri du canard)
- Hold their necks extended
  - Keeps the swollen pharynx from compressing
- Classic – “Pain Out of Proportion to Exam”

Diagnosis: Soft Tissue Neck

- Nl width of the RP space (measured from the second vertebral body to the posterior pharyngeal wall) is
  - In Children: 3.5 mm (range, 2 to 7 mm)
  - In Adults: 3.4 mm (range, 1 to 7 mm)
  - If wider than 7 mm in both children and adults = pathology
If unsure, CT or MRI will confirm diagnosis if patient stable enough for scanner

ULS has been shown to be helpful in differentiating “cellulitis” from abscess

Retropharyngeal Abscess

- Management
  - Admission
  - Broad Spectrum Antibiotics
  - Surgical Drainage in OR
    - Perhaps after therapeutic trial
- Complications
  - Extension
    - Mediastinum, Great Vessels, Osteomyelitis
    - Infectious Highway of Death
    - Rupture

Case

- CC: HEADACHE
  - 3 yr old male BIB parents
  - Crying w/ complaint of headache and ST x 4 days
  - Progressively worsening
  - Grabbing L side of head
Visit #2

- Persistent HA
- Low grade temp
- CT Head neg
- LP wbc 1
- Dx: Viral Syndrome

Visit #3

- Sore Throat better
- Cough
- ? Swollen face right side
- Fever to 104

Thoughts?

- Fever
- Cough
- ST (now better) → Neck Pain
- Swollen Face
CT Findings

Head  Normal
Chest  LUL posterior segment pneumonia
Neck  Nonocclusive thrombus involving high R IJ and L retromolar vein extending into L IJ
What is This??
- Hint: First Described in 1936

What is This??
- Hint: First Described in 1936
- Hint: Syndrome named after a French Bacteriologist…

Lemierre’s Syndrome
- Pathophysiology:
  - Acute oropharyngeal infection
  - Direct extension of infection into lateral pharyngeal space and into the IJ
  - Subsequent secondary infectious endovasculitis
  - Septic emboli and metastatic infections
  - Most common pathogen: *Fusobacterium necrophorum*
Lemierre’s Syndrome

- **Symptoms:**
  - Initially include sore throat, lethargy, fever, and general body weakness, +/- HA
  - Avg Age 20 years old
  - High fevers, rigors, cervical lymphadenopathy, and septicemia
  - Triad: 1. pharyngitis, 2. tender/swollen neck, 3. noncavitating pulmonary infiltrates

- **Diagnosis:**
  - CT neck w/ contrast
  - Doppler: visualize echogenic thrombus in dilated IJ

- **Treatment:**
  - IV antibiotics, particularly against anaerobes
  - Anticoagulation controversial
  - Occasionally require ligation of IJ

Lemierre’s Syndrome

- Described 20 patients with anaerobic septicemia, 18 of whom died

- Prior to antibiotic era, mortality was > 50%
- With aggressive antibiotic and medical therapy, morality is very low
Summary of what this lecture covered

- Rapidly running differential for life-threatening sore throats
  - PTA
  - Mononucleosis
  - Epiglottitis
  - Ludwig's
  - Retro-Pharyngeal Abscess
  - Lemierre's

Closing Thoughts...

- Management of the sore throat that kills
  - Critical monitoring
    - Don’t leave the room until YOU are comfortable
  - Airway protection early
  - When the pain is out of proportion to exam… worry about the dangerous kinds...

Three Things

- The Infectious Highway of Death
- A rapid technique and tips for seeing the epiglottis
- Red Flag = “Pain Out of Proportion to Exam”

MOTIVATION

If a pretty poster and a cute saying are all it takes to motivate you, you probably have a very easy job; the kind robots will be doing soon.
Thanks!!!

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If you have further questions
Acute Pharyngitis

- 2% of all visits to EDs, outpt. clinics
  - 50-80% Viral
  - 5-36% GABHS
  - 1-10% EBV
  - 2-5% Chlamydia, Mycoplasma, GC
- Antibiotics Rx’d to 75% of adult pts. with pharyngitis

Why do physicians give Rx?

- MDs believe…
  - Pts. expect them
  - Pts. will come back if they don’t get Rx
  - Pts. will be unsatisfied without Rx
  - Quicker to write Rx than to explain

Problems with this assumption

- MDs are not good at predicting which pts. expect Rx
- Pts. satisfaction
  - Less on Rx, more on MDs showing concern and reassurance
- Delaying Rx does NOT increase chance of pt. returning in next few days
- Adverse pt. consequences and public health issues

Evidence for Abx Rx

So why give it?

- Prevent Rheumatic Fever
- Prevent Acute Glomerulonephritis
- Prevent Complications
- Decrease Contagion
- Relieve Symptoms
Acute Rheumatic Fever: Old Assumptions

- Early trials show reduction in ARF with PCN (RR=0.28)
  - However, number needed to treat (NNT) = 63 pts. to prevent 1 case of ARF
  - Now the incidence is MUCH lower (60x) so NNT 4000?
  - Widespread antibiotic use for strep
  - Less virulent strains
  - Improved living conditions

- Most clinically significant problem is myocarditis
- Myocarditis incidence 50-90% in kids, <33% in adults
  - Most of these cases based on echo evidence
  - Not clear how many were CLINICALLY symptomatic
  - NNT much higher --> 10000? 20000?

Acute Glomerulonephritis

- Acute Post-streptococcal Glomerulonephritis
  - Extremely rare < 20/100k
  - Antibiotics show no change in incidence

Acute Rheumatic Fever: Old Assumptions

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Decreasing Complications- Peri-Tonsillar Abscess

- Early trials in 50s and 60s show abx decrease PTA with NNT = 27
- Reviews (30,000 pts. J Fam Prac 2000;49:34-8)
  - Suggest that half of all people who have complications ALREADY have them when they presented (44%)
  - Of the other 56%
    - 67% were treated with abx but STILL had PTA
  - Useful only if directed at those with high Pre-Test Probability of GABHS
Prevention of Spread
- Often occurs in epidemics
- After 24hrs, hard to recover in culture
- Consider if close quarters

Relief of Symptoms
- Abx therapy begun within 2-3 days, speeds recovery by 1-2 days
- Caveat - Only in those patients with + culture (or high likelihood) of GAβHS

Summary of why to treat GAβHS
- Antibiotic treatment does
  - Decrease risk of extremely rare dx (ARF)
  - Decrease risk of rare complication (PTA)
  - Decrease duration of symptoms
- ONLY if they have GAβHS
- Therefore seems reasonable to only use Abx with high likelihood of GAβHS
  - or with greater risk of others (child care)

Who to treat??
- Centor Criteria
  - Tonsillar Exudates
  - Tender cervical LAN
  - Absence of Cough
  - History of Fever (38)
  - If 3 or 4 of these Sens. 75% and Spec. 75%
Who to treat??

- McIsaac Criteria
  - Centor Criteria (1 point each)
    - Tonsillar Exudates
    - Tender cervical LAN
    - Absence of Cough
    - History of Fever
  - If age < 15 add 1 point
  - If age > 45 subtract 1 point
    - McIsaac et al. CMAJ 1998;158:75-83

Likelihood of GABHS

- Assuming 15% prevalence in population
  - If score is
    - ≤0 1%
    - 1 5-10%
    - 2 10-15%
    - 3 ~35%
    - ≥4 ~50%

Treatment recommendations

- Rapid Test Available
- No Rapid Test Available

  - Both Recs based on applying clinical model and then NOT treating those with 0 or 1 points.

If you have a rapid test

- Point system
  - If 1 point or less -> no rx, no cx
  - If 2-3 points -> further testing (rapid)
  - If 4 or more points -> empirically rx

  - Prospectively validated in Canada
    - Compared with usual care
      - 52% reduction in abx, 36% reduction in cx
      - McIsaac et al. CMAJ, 2000;163(7):8111-5
If you do not have a rapid test

- Point system
  - If 1 point or less -> no rx, no cx
  - If 2 points -> don’t rx (only ~10% have GAβHS)
  - If 3-4 or more points -> empirically rx

Choice of Antibiotic

- If treating GAβHS
  - Narrow spectrum if possible
  - PCN still 1st choice
    - Little evidence of resistance
    - Can use BID dosing (500mg BID x 10d)
    - Bicillin 1.2 million units IM
  - Erythromycin 2nd choice
    - Resistance in US is uncommon

Summary of GAβHS

- All pts. should have adequate analgesics, antipyretics, and supportive care
- Clinically screen all patients with acute pharyngitis
  - If 1 point or less -- don’t treat
  - If 3-4 points -- treat
  - If 2 points
    - If in a rapid strep environment, test
    - If not, don’t treat