Infectious Dz Emergencies

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Problems that Should Raise <u>Your</u> Sphincter Tone

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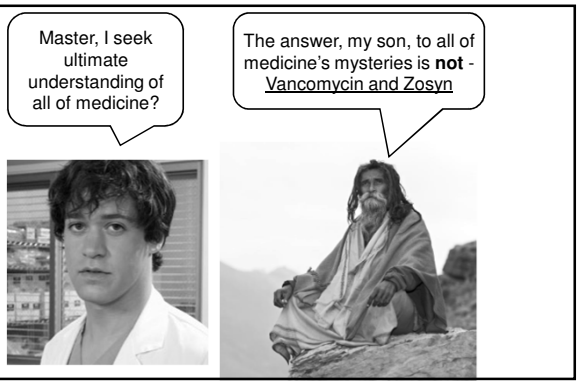

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ID - 1st Principles

Fever or Increased WBC alone ≠ Emergency

Fever ≠ Antibiotics ≠ Antipyretics

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When Are Antibiotics Really Necessary?

<u>After appropriate cultures expeditiously obtained</u>...

- You have a target
- Patient is "septic, shocky, toxic"
- Patient is immunosuppressed
  - Transplant recipient
  - Neutropenic
  - AIDS with low CD4
  - High dose steroids or "mabs"
  - Splenectomized

If Not….. Wait!

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Sepsis Spectrum and Prediction Rules

SIRS w or w/o infection → **Infection w or w/o SIRS** → **Sepsis** → **Septic Shock** → **MODS**

- **<u>SOFA</u>** – PaO2/FiO2, Glasgow coma scale, MAP, Bilirubin, Platelets, Cr
  - 2 or more points = "Sepsis"
- **<u>qSOFA</u>** – 1 point each for: SBP < 100, RR > 22, Altered mentation
  - 2 or more points associated with poor outcome

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"The prescription comes too late when the disease has gained strength by long delays"

Ovid (43 BC - 18 AD)
Remedia Anoris

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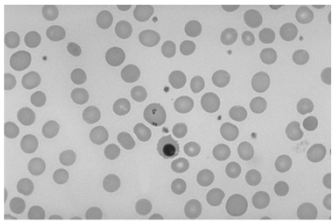
24 y.o presents to ER with 24 hrs fever. No other sx's or signs. Past hx remarkable for MVA 5 yrs ago with expl. laparotomy. Lab tech notes findings below incidentally on CBC. Why should you be worried??



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"Create her child of spleen; that it may live"

William Shakespeare
The Tragedy of King Lear

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Post-Splenectomy Sepsis

- Overall incidence is low
  - Children: 0.13-8.1%
  - Adults: 0.28-1.9%
  - Higher if ass'd with hemoglobinopathy or malignancy, lower if trauma
- 50-70% occur in 1st 2 years after splenectomy
- Risk increase 6x if prior episode of PSS

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OPSI - When to Think of It

Fever plus……...

- Known past splenectomy
- Functional Hyposplensism
  - Sickle Cell Dz, Hemoglobinopathies
  - Amyloidosis
  - SLE and RA
  - Acute alcohol use
- Howell-Jolly bodies or nucleated rbc's on blood smear

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OPSI - Organisms

- Encapsulated bacteria (≅ 75%) - "S-N-K-H-S-C-P"
  - Pneumococcus over 50%
- Capnocytophaga canimorsus
- Babesiosis and Malaria
- Bordatella holmesii
- Other bacteria
- Empiric Rx: High dose Ceftriaxone and Vanco

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Antibiotic Prophylaxis

- Controversial
- Children < 15 in 1st 3-5 years post-splenectomy
- Patient-initiated therapy for fever in adults followed by prompt evaluation
  - Amoxicillin/clavulanate 875mg po
  - Cefuroxime 1 gm po
  - Levofloxacin 750mg po
- Consider lifelong prophx in survivors of PSS

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Case History

45 y.o. male recently diagnosed with non-Hodgkins lymphoma. Started 1st cycle of CHOP chemoRx 10 days ago. Now presents with fever, chills, sore mouth, diarrhea, nausea/vomiting. Exam shows T-102 degrees and mild abdominal distension and tenderness. What is your initial impression and management?

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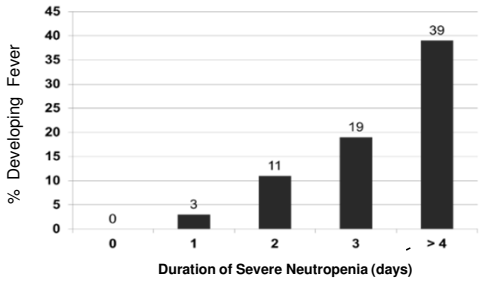
Duration of Neutropenia and Risk of Fever



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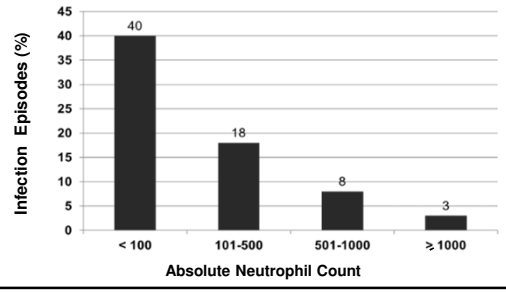
Severity of Neutropenia and Episodes of Severe Infection



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Source of Infection in Febrile Neutropenia

- Infectious source only found in 30% of cases
- Bacteremia documented in 25% of patients
- 80% of infections arise from patient's endogenous flora

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Common Sites of Neutropenic Infection

Site	Percent
Mouth/Pharynx	25
Respiratory tract	25
Skin/Soft tissue/IV sites	15
Perineal region	10
Urinary tract	8
Nose/Sinuses	5
GI	5

Note: Exam very important. Classic findings of inflammatory response will be missing. Pay close attention to pain, redness or induration

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Positive BC's in Febrile Granulocytopenic Patients

	% GNB	%GPB
1980's	60	25
1995	22	62
2000	14	76

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Treatment of Febrile Neutropenia

- Targeted therapy if clinically apparent
- Empiric Therapy
  - Monotherapy (Cefepime, Imepenem, Meropenem, Pip-Tazo). Use full dosing anti-pseudomonal dosing
- Vancomycin
  - If suspected line infection, SSTI, or OP source
  - Gram positives growing
  - Still febrile at 72 hrs
- Antifungals - add if still febrile after 5 days

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Case History:

28 yo female has 1 week history of sore throat and low grade fever. Over last 2 days, pain is severe, trouble eating and drinking. Exam shows toxic looking woman with a T-103, drooling, difficulty opening mouth wide. OP appears modestly reddened but nothing else.

Differential diagnosis?
Next Step?

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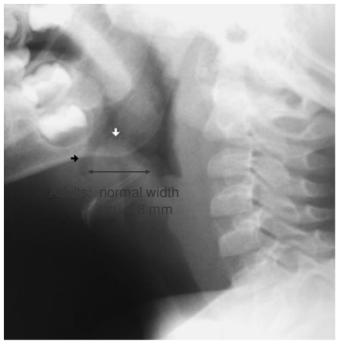
Fever and stridor or inability to handle secretions are warning signs

Thumb sign on soft-tissue lateral neck

Sensitivity of plain X-ray: 43-70%



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Epiglottitis

- Usually caused by *H. influenza*, *S. pneumo*, *S. aureus (MRSA)*
- Past: children > adults. Since Hib vaccine - incidence equivalent or higher in adults with *S. pneumo* predominating
- Dx best made with laryngoscopy in a controlled setting
  - Ready for urgent intubation and surgical airway if needed
- Airway control takes precedence over diagnostic evaluation
- Treatment: 2nd or 3rd generation CP and Vancomycin

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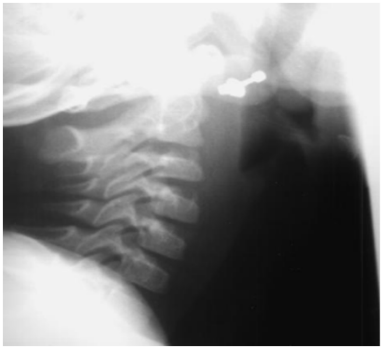

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Retropharyngeal Space Infection

- Usually due to mixed aerobic and anaerobic oral flora
- Risk of entering "Danger Space"

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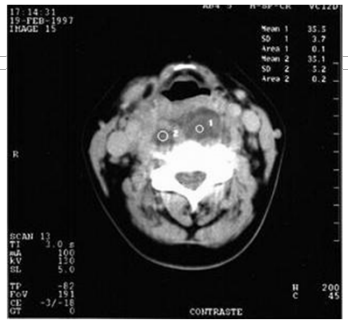

Retropharyngeal Abscess

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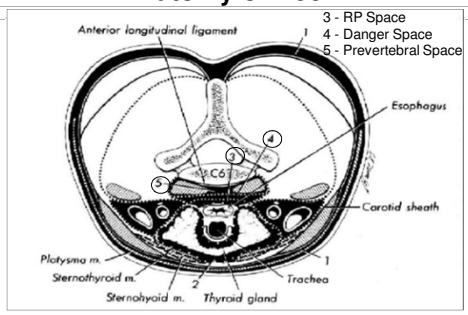
Anatomy of Neck



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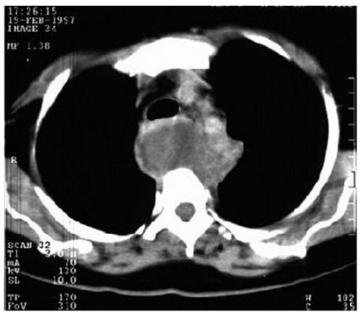

Mediastinal Extension of RP Abscess

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Retropharyngeal Space Infection

- Diagnosis: CT scan of the neck
- X-ray of soft-tissue lateral neck
  - RP space is normally < 1/2 adjacent vertebral body
- Management
  - Abx: ampicillin sulbactam, clindamycin, or carbapenem
  - Involve ENT surgeon, possibly CV surgeon

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Case History

22 yo female college student presents to U.C. with 3 day history of temps. to 103, arthralgias, myalgias, headache, and malaise. In the last 24 hours she has noticed an unusual rash. PMH is unremarkable. Exam is only noteworthy for fever and a purple blotchy rash.

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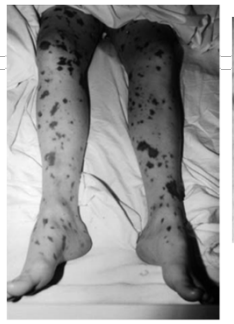

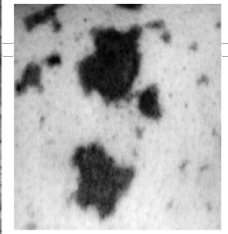

Differential Diagnosis?

Next Step?

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Fever and Purpura/Petechial Rash

- Life threatening infection until proven otherwise
  - Meningococcal sepsis +/- meningitis
  - Rocky Mountain Spotted Fever
- Other diagnoses:
  - Vasculitis
  - DIC
  - TTP
  - Febrile illness with thrombocytopenia
  - Viral illness

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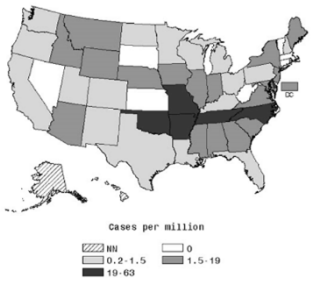
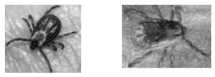
Distribution of RMSF (CDC-2010)





Dog Ticks

- Any suspicion:
  - Start Doxycycline immediately

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Meningococcal Sepsis - Management

- Patient should be placed in respiratory isolation
- Blood cultures obtained immediately
- Gram stain of buffy coat
- Empiric penicillin G or CNS penetrating cephalosporin while awaiting cultures
- Lumbar puncture

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Case History

45 y.o. construction worker fell off of scaffolding hit left thigh on the ground. No obvious trauma or break in skin. Over next 48 hours pain becomes worse in leg and he then spikes a temp of 104 degrees with chills. He presents to the ER and looks toxic. Temp is 103, P-110, BP- 98/40. Exam reveals following appearance to the extremity…….

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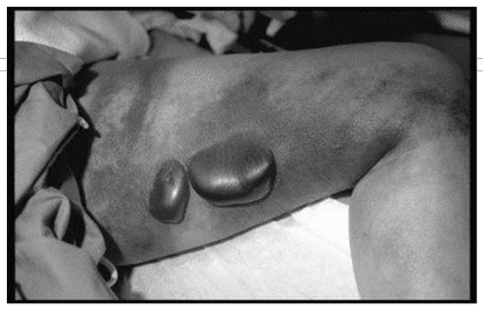

Differential diagnosis? Next Step?

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"Beauty is only skin deep, but ugly goes all the way to the bone"

Anonymous

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When to Suspect Necrotizing Fasciitis

- Exquisite pain
- Patient looks toxic
- "Woody" induration
- Bullae
- Fixed dusky purple/grayish discoloration

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Prediction Rule for Nec Fasc

Clinical Parameter		Number of Points
CRP	≥ 150 mg/dL	4
WBC	15-25k	1
	> 25k	2
Hgb	11-13.5 g/dL	1
	< 11 g/dL	2
Serum Sodium	< 135 meq/L	2
Serum Creat	> 1.6 mg/dL	2
Serum glucose	> 180 mg/dL	2

Score > 8 - 80% probability of Nec Fasc
Score 6-8 - Possible Nec Fasc
Score < 6 - 7-10% cases of Nec Fasc

Wong et al. Crit Care Med. 2004;32(7):1535

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Necrotizing Fasciitis - Management

- Diagnosis rests on clinical exam and ultimately surgical exploration
- Involve surgeon promptly
- Diagnosis +/- aided by:
  - MRI, CT, bedside incision and probing, frozen biopsy
- Antibiotics: Clindamycin + PCN
  ? IV immunoglobulin

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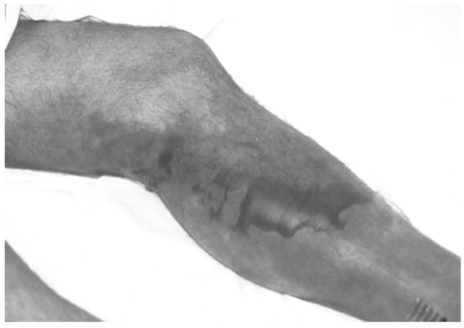

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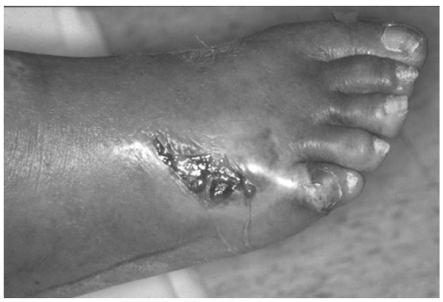

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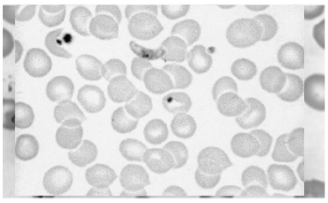
60 yo Chinese male who works for John Deere and travels regularly to and from China and India presents to WIC with fever, chills, headache 6 weeks after return from a recent purchasing trip to southern India. History is also significant for hiking in Itasca Park in MN 3 weeks before becoming ill. Hematology techs note abnormality on blood smear.



Diagnosis? Next Step?

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Falciparum Malaria - Diagnosis

- High index of suspicion
- Anemia and thrombocytopenia common
- Dx usually can be made with 2-3 sets of thick and thin blood smears over 48 hr period
- Thick smears are sensitive for presence of malaria
- Thin smears identify morphology and degree of parasitemia

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Suspected Malaria - Management

- Febrile patient from endemic area in last 6 weeks without obvious source…. *P. falciparum* until proven otherwise
- Potentially life-threatening
- Admit for observation while smears being obtained
- Once diagnosis made, immediately begin:
  - Atovaquone/proguanil or Artemether-lumefantrine or quinine+doxycycline
  - Chloroquine in limited areas of Caribbean and Central America

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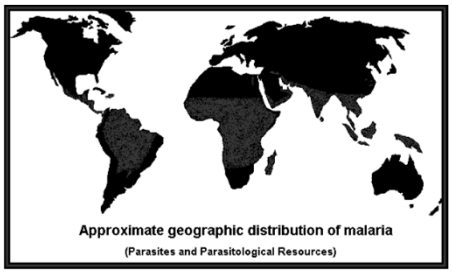
Malaria - Geographic Distribution



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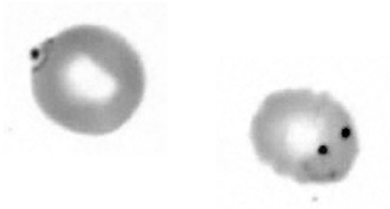
Plasmodium falciparum



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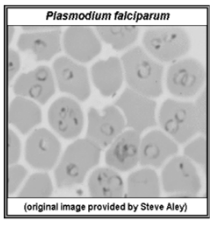
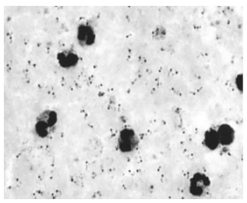
Plasmodium falciparum





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Meningitis Questions:

- LP everyone? (If you are thinking about it, answer should be yes)
- CT head before LP?
- Abx before LP?
- Give steroids or not?

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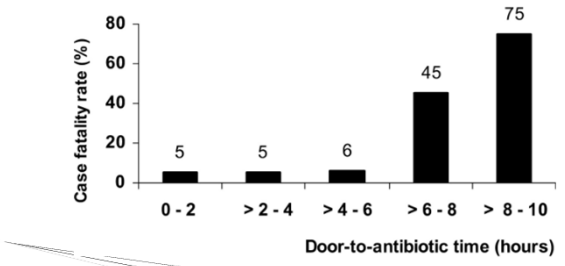
Meningitis Outcomes Based on Timing of First Antibiotic



Proulx N et al. QJM 2005;98:291-298

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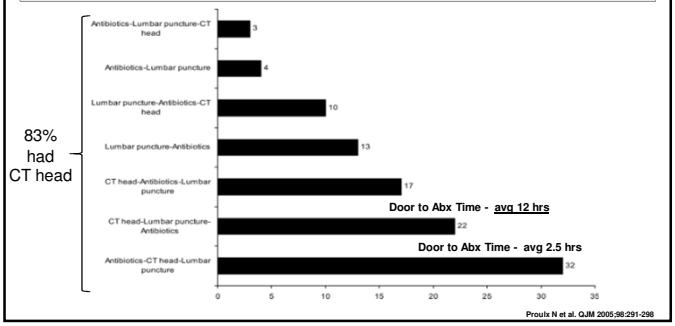
Relative frequency (%) of diagnostic–treatment sequences in adult acute bacterial meningitis.



Proulx N et al. QJM 2005;98:291-298

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Lumbar Puncture - Need to Image Head First?

- Abnormal CT w mass effect more likely if:
  - Age > 60
  - Immunocompromised state
  - Hx of CNS dz
  - Seizures
  - PE --> ⬇LOC, inability to answer 2 questions, inability to follow 2 commands, abnormal language, abnormal visual fields, gaze palsy, facial palsy, extremity drift
- If all above negative, likelihood of normal CT > 97%

NEJM 2001;345:1727-33.

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Treatment of Meningitis - General Principles

- Delay in therapy increases morbidity and mortality
- Try to obtain LP 1st, but don't delay therapy beyond 30' after presentation
- Use maximum doses of abx
- Get BCs before the abx if LP must be delayed

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Steroids in Meningitis

- Clear ↓ morbidity in children with *H. flu* meningitis, conflicting results in pneumococcal infxn
- Benefit also unclear with pneumococcus in adults, however, one blinded prospective study showed clear benefit with pneumococcus
- Dexamethasone 0.15 mg/kg q6h x4d should be started just before or concomitant with antibiotics in both children and adults
- Don't give if antibiotics were already given prior
- May ↓ penetration of vancomycin
- Discontinue in adults if NOT pneumococcus

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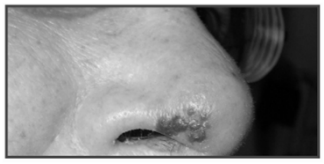
78 y.o. female presents with 2 days of tingling and burning pain in her R upper face. She then notices these lesions on her nose. Why should you be concerned?



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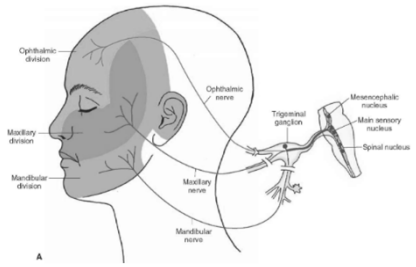
What's the Worry?



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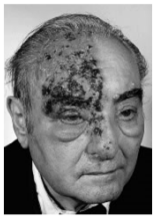
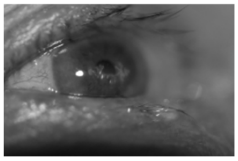
Zoster Ophthalmicus





Should get prompt referral to Ophthalmology while starting high dose ACV (800 mg 5x/d) or Valtrex 1gm tid

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Case History

55 y.o. male admitted to the hospital with 8 weeks of progressively severe upper neck pain. Has been seen in WIC and ER multiple time in past 2 mos with dx of MS neck pain. Pain became unbearable and now he is having LUE and LLE weakness of the last 6 hrs.

DDx? Next Step?

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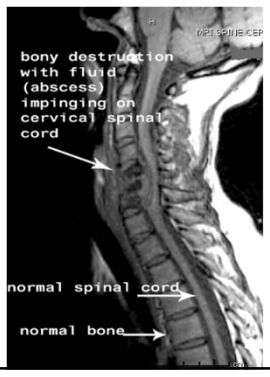

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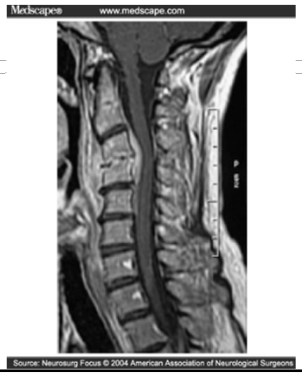

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Epidural Abscess - Clinical Manifestations

- Classic triad: exquisite localized back pain, progressive neurologic deficit, and fever
- Fever may only be present in 50%
- Typical course: Pain and radicular sx's 1st 3d → weakness over 36h → paralysis over next 24h

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Epidural Abscess-Diagnosis

- Think of it!
- Note: Most patients will try to ascribe pain to some inciting event, no matter how trivial
- ESR universally elevated
- MRI diagnostic modality of choice

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Epidural Abscess - Management

- Identify organism:
  - BC's x 2-3 before antibiotics
  - Aspirate of abscess
  - PPD if suspicious
- Empiric antibiotics
  - Vancomycin ± Ceftriaxone or Ciprofloxacin
  - Should be started ASAP
- Neurosurgical consultation ASAP

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Epidural Abcess-Outcome

- Overall mortality 18%, up to 38% for cervical abscess
- Paralysis
  - Less frequent with lumbar disease
  - Some probability for recovery if treated within 24h or incomplete cord lesion manifested by sensory sparing
  - No recovery if Rx >36h after onset

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Emergent Infectious Diseases of the Nervous System

- Acute bacterial meningitis
- Encephalitis (HSV)
- Epidural abscess
- Brain abscess

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Acute Bacterial Meningitis - Presentation

Finding	Frequency %
Fever, headache, meningusmus*	85
Altered mental status*	50-80
Kernig's or Brudzinski's sign	50
Focal cerebral signs	10-20
Seizures	30
Rash with meningococcemia	50

*Meningusmus may be subtle, esp. in elderly. Confusion more prominent in elderly.

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Lumbar Puncture

- If you think of it, it should probably be done
- Should be done ASAP
- Image head first IF:
  - papilledema present
  - focal neurologic signs
  - suspected ↑ intracranial pressure (coma, bradycardia, hypertension, CN III palsy)

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Possible Tests to Order on CSF?

- Gram Stain, routine culture
- AFB smear and culture
- Cryptococcal antigen
- Latex agglutination tests
- Fungal culture
- PCR for HSV, Enterovirus, CMV, EBV, VZV, JC virus, Lyme, Toxoplasma
- VDRL, Lyme titer, viral cultures
- C-Reactive Protein
- Oligoclonal bands, Myelin Basic Protein

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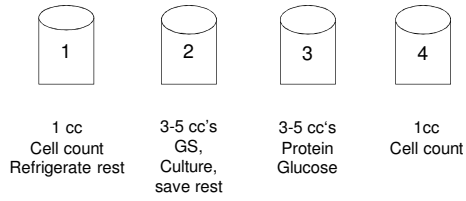
Tests to Order on CSF



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Tests to Order on CSF

- If cell count, protein, or glucose abnormal, consider in the appropriate clinical context:
  - AFB smear and culture
  - Cryptococcal antigen
  - Fungal culture
  - PCR for HSV, Enterovirus, CMV, EBV, VZV, JC virus, Lyme
  - VDRL, Lyme titer, viral cultures
  - C-Reactive Protein

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Empiric Therapy for ABM

Predisposing Factor	Antibiotic(s)
Age 18-50 yrs	3rd Gen CP +/- vanco
Age > 50 yrs	3rd Gen CP + Amp +/- vanco
Immunocompromised	Vanco + ceftazidime + Amp
Head trauma, neuro-surgery, CSF shunt	Vanco + ceftazidime

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Steroids in Meningitis

- Adult benefit only with S. pneumoniae in the developed world (decreased mortality from sepsis and shock). Greatest benefit on the sickest patients (Glasgow coma scale of 8-11 on presentation).
- Must be given prior to or along with 1st dose Abx
- Dose Dexamethasone is 0.15 mg/kg q 6 hrs x 4 days
- Stop early if not pneumococcal meningitis

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Case History

60 y.o. male presents to E.D. with 3 day hx of progressive headache and fever to 102 degrees. He had complained of some mild neck stiffness. Over the last 24 hours he has become progressively confused, somnolent, and at times combative. His wife has noticed he is not using his left arm much.

DDx? Next Step?

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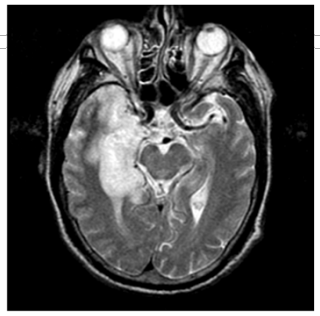

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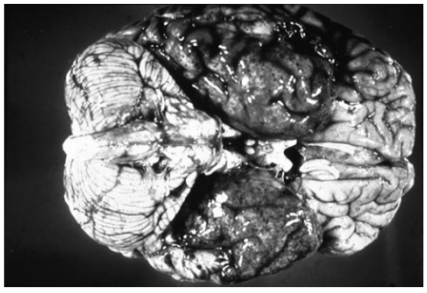

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HSV Encephalitis

- Was most common of viral encephalitides (now WNV)
- 10-20% of all viral encephalitides
- Frequency in U.S. ~ 1/250-500,000 persons/yr
- HSV-1 principal agent
- Occurs in all ages throughout the year

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HSV Encephalitis – Clinical Presentation

- Altered mentation
- Decreasing level of consciousness
- Focal neurologic findings: dysphasia, weakness, paresthesias
- Fever and personality changes uniformly present
- Seizures in up to 2/3

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Diagnosis of HSV Encephalitis

- EEG
  - Sensitivity 84%
  - Characteristic spike-and-slow wave activity and PLED's focally
- CT head
  - Mass effect in temporal lobe in 50-75% at some time
- MRI
  - v. sensitive, asymmetric early white matter changes
- HSV PCR for CSF
  - diagnostic test of choice
  - highly sensitive
  - replaced brain biopsy

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HSV Encephalitis Treatment

- Acyclovir 10 mg/kg q8h x 10-14d
- Consider empiric therapy in any suspected encephalitis pending EEG/MRI/PCR studies

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HSV Encephalitis-Outcome

	Treated	Untreated
Mortality	70-80%	30%
Neurologic sequelae	80-90%	50-60%

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