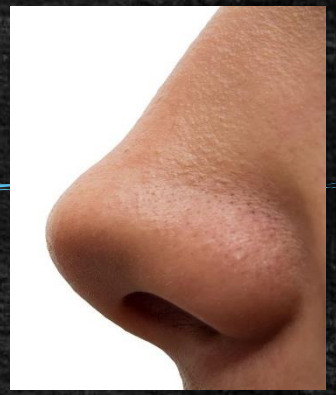
Infectious Disease Test Review

Brenda Shinar, MD, FACP

Question 1.

- A; Evaluate for *Staphylococcus aureus* nasal carriage

Prevent Staphylococcus aureus surgical site infection by evaluating for S. aureus nasal carriage



- Prevention of surgical site infection
  - Preoperative antibiotics 1-2 hours before incision and re-dosed during long cases
  - Clipping of hair versus shaving
  - Maintain perioperative normothermia
  - No need for prolonged antibiotics even with bowel spillage or drains

- 2016 World Health Organization Guidelines
- Elective Cardiovascular or Orthopedic surgery
- 2 weeks prior to surgery do nasal swab
- If positive, mupirocin 2% ointment to nasal passages q day x 5 days +/- chlorhexidine body wash

Question 2.

- B; Begin tenofovir, emtricitabine, and dolutegravir

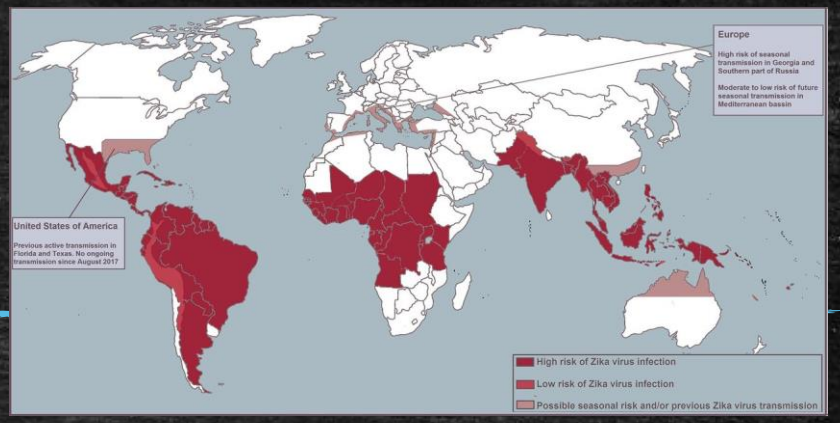
Prevent HIV infection after exposure

- EXPOSURE!
  - Percutaneous (0.3%)
  - Cutaneous (<0.09%)
  - Mucous membrane (.09%)
- Within 2 hours, start empiric 3 drug regimen for up to 4 weeks (no protease inhibitor due to side effects)
- Immediately test source patient with 4th gen HIV test of patient (or PCR viral load)
- Check exposed patient for HIV immediately, at 6 weeks and 3 months
- National Clinicians' Consultation Center PEP line: 1-888-448-4911
- Also check Hep B,C
- Risk
  Hep B>Hep C> HIV

Question 3.

- C; Zika virus IgM antibody test

Evaluate a patient with recent Zika virus exposure



- Aedes mosquito bite (CDYZ)
- 20% of infected adults will have clinical manifestations such as fever, rash, joint pain, and eye inflammation
- Outbreaks in Americans, Caribbean, and Pacific
- Maternal-fetal transmission can result in microcephaly, hydrocephalus, and brain calcifications

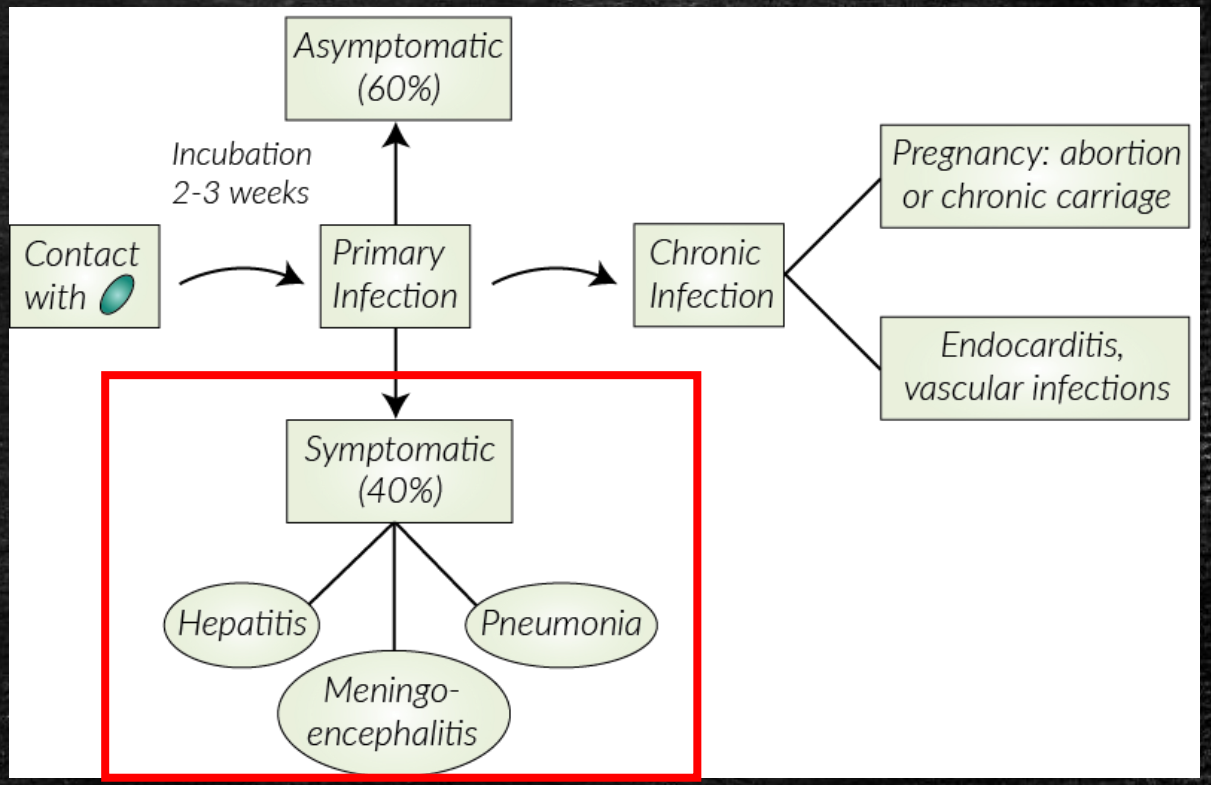
- Zika can stay in semen for several weeks and risk of transmission to sexual partner highest in first 30 days
- Recommend condom use for 3 months after infection
- IgM testing for Zika virus for patients exposed > 2 weeks prior is most appropriate diagnostic test
- RNA viral load in serum or urine not sensitive after 2 weeks

Question 4.

- B; Coxiella burnetti

Diagnose Q fever Pneumonia

- Gm negative coccobacillus zoonotic organism
- Inhalation of aerosolized body fluids from infected animals, mild PNA
- Exposure to farm animals, especially parturient (but close contact not necessary for disease as spores can spread up to 10 kilometers)
- High rates of seropositivity in farmers, veterinarians, and slaughterhouse workers



Other choices…

- Bacillus anthrax
  - Inhalation anthrax is fulminant respiratory illness
  - Inhale spores from infected animal fur or hide (goats or cattle)
  - Bioterrorism
- Chlamydia psittaci
  - Fever, severe headache, cough
  - Inhalation of dried bird droppings
  - Bird breeders and poultry farmers
- Francisella tularensis
  - Nonproductive cough, pleuritic chest pain,dyspnea with infiltrates, hilar adenopathy and pleural effusions
  - Hunters who skin their rabbits or other wild game
- Yersinia pestis
  - Sudden high fever, pleuritic chest pain, cough, hemoptysis
  - Droplets from infected rodents

Question 5.

- A; Ampicillin-sulbactam plus vancomycin

Treat an infected cat bite in a patient with risk factors for MRSA

When Cats Bite: 1 in 3 Patients Bitten in Hand Hospitalized, Infections Common

February 5, 2014

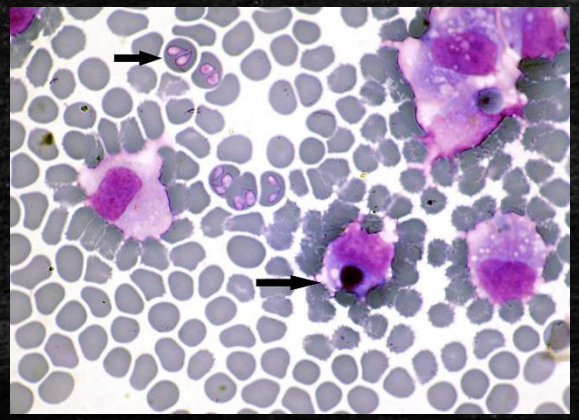
- Sharp teeth puncture deeply
- Flora from cat's mouth *and* victim's skin injected into joints and tendon sheath
- Prophylactic antibiotics in addition to good wound care (augmentin)
- IV therapy with unasyn, zosyn, or imipenem for with surgery consult
- Must cover for MRSA in patient with risk factors

Question 6.

- B; Human monocytic erlichiosis

Diagnose Human Monocytic Erlichiosis

- Tick borne disease; *Erlichia chafffeensis*
- Southeastern and South-Central US from East coast to Texas
- Febrile illness, headache, myalgias, leukopenia, thrombocytopenia, elevation in transaminases



- Laboratory diagnosis
  - DNA by PCR of whole blood
  - Rise in *IgG* specific antibody
- DELAY IN TREATMENT MAY RESULT IN SEVERE ILLNESS AND DEATH
- Clinical suspicion is sufficient to begin treatment
- Doxycycline 100 mg BID
- Defervesence in 48 hours is evidence of diagnosis

Tick borne Diseases

- Anaplasmosis
- Babesiosis
- Erlichiosis
- Heartland virus
- Lyme disease
- Rocky Mountain Spotted Fever
- Tickborne Relapsing Fever
- Tularemia

- Influenza-like symptoms
- Rash may be clue (but not always present)
- 24-48 hours of attachment to the host is required for infection to occur
- If no symptoms follow exposure to the tick bite, empiric antibiotic treatment is not indicated

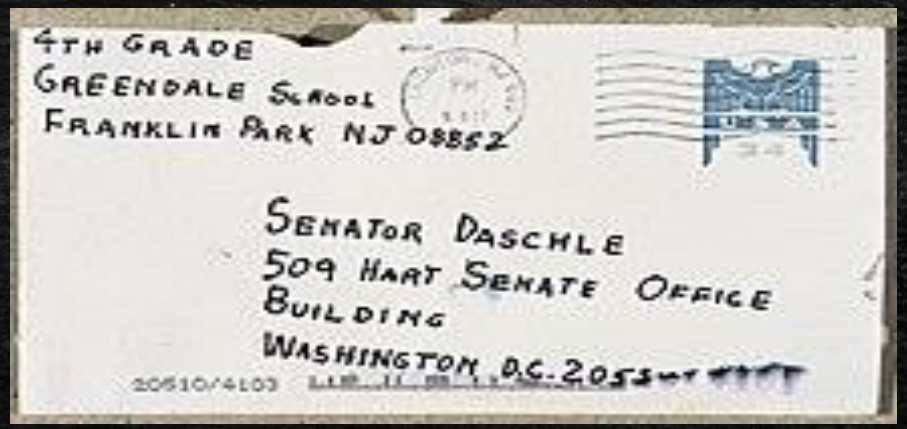
Question 7.

- D; No further testing or treatment

Manage Potential Bioterrorism-Related Anthrax Exposure

- Bacillus anthracis; gram positive, spore-forming rod-shaped bacteria
- Infection occurs by inhaling spores, eating food or water contaminated with spores, or handling wool, hides, or fur of infected animals and spores get into a break in the skin
- Spores live in soil and animals can inhale or eat them and become infected
- In the US, livestock are vaccinated against anthrax

- THERE IS NO HUMAN TO HUMAN TRANSMISSION OF ANTHRAX
- September 18, 2001
  - 5 people died, 22 became ill
  - 43 tested positive for exposure
  - 10,000 considered at risk



Inhalational Anthrax: Mortality >80%

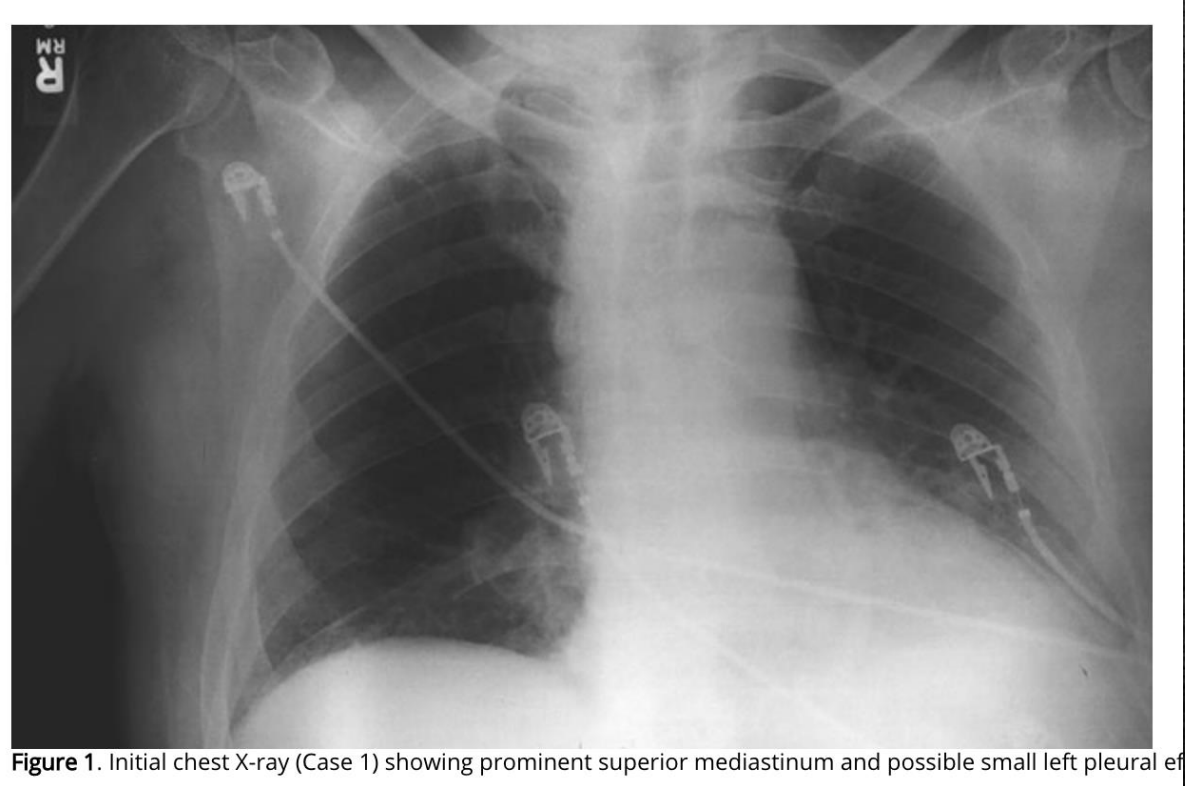
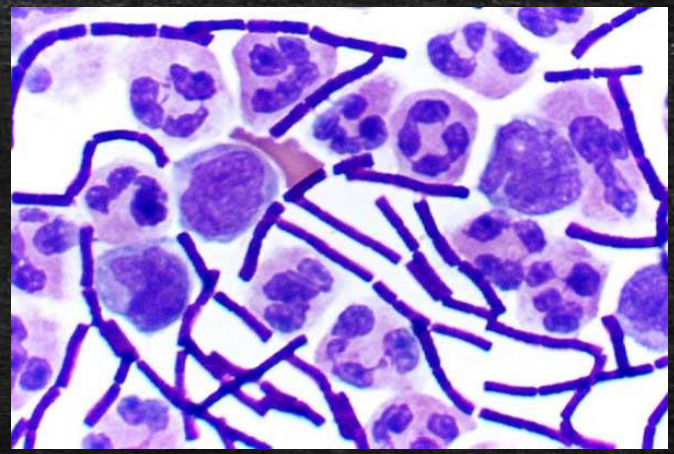


Figure 1. Initial chest X-ray (Case 1) showing prominent superior mediastinum and possible small left pleural ef

Mediastinal widening



- Raxibacumab: monoclonal antibody binds to protective antigen (PA) of B. anthrax
- Use in combination with antibiotics for inhalational anthrax

Question 8.

- A; Bone biopsy and culture

Evaluate osteomyelitis in a diabetic foot infection

- Team approach
- Culture prior to antibiotics (if possible) and obtain culture from deep tissue after debridement
- Do NOT swab the wound and send for culture
- 3-part initial assessment
  1. Whole patient (?septic)
  2. Limb/Extremity (?vascular supply)
  3. Wound (?infected)

Diabetic Foot Infections (Archived)

Published CID, 6/1/2012

Clinical Infectious Diseases, Volume 54, Issue 12, 15 June 2012, Pages e132–e173, https://doi.org/10.1093/cid/cis346

- Imaging
  - Start with plain radiograph
  - MRI best to evaluate for soft tissue abscess and osteomyelitis
  - Bone scan/WBC scan when MRI contraindicated
- Indications for amputation
  - Persistent sepsis
  - Inability to tolerate antibiotics
  - Bone destruction that compromises the integrity of the foot
- When radical resection leaves no remaining infected tissue, prescribe antibiotics for short duration only (2-5 days)

Question 9.

- B; Oseltamivir

Treat influenza virus infection with a neuraminidase inhibitor

- Who to test during high activity?
  - Any patient who presents with influenza-like illness, pneumonia, or acute onset of respiratory symptoms with or without fever
  - All patients hospitalized with acute worsening of cardiopulmonary disease
  - Any patient who develops acute respiratory distress in the hospital not attributed to another reason
- How to test?
  - Nasopharyngeal swab
  - Rapid molecular assay (not sensitive!) as outpatient/ED
  - PCR confirmation in hospital
- How to treat?
  - Start single neuraminidase inhibitor (oral oseltamivir, inhaled zanamir, or IV permivir) effective against influenza A and B
  - 5 days for uncomplicated flu
- Treat ASAP…
  - Hospitalized patients of any age regardless of illness duration prior to hospitalization
  - Outpatients with severe or progressive disease regardless of symptom duration
  - Outpatients who are high risk of complications/immunocompromised
  - Childen<2 years and adults≥ 65 years
  - Pregnant women up to 2 weeks postpartum

Influenza 1918 Pandemic

5. Influenza victims crowd into an emergency hospital near Fort Riley, Kansas in 1918. #

- Spanish flu (H1N1)
- 500 million people infected (1/3 world population) and 50 million deaths worldwide
- High mortality in 20-40 year olds, in addition to young and very old

Question 10.

- C; Rifampin, isoniazid, pyrazinamide, ethambutol, and dexamethasone

Treat suspected tuberculous meningitis

- Chronic meningitis > 4 weeks think fungal (cocci and crypto) and TB
- TB clues…
  - Endemic area
  - Suggestive CXR
  - Positive PPD or Quantiferon
- Basilar lymphocytic meningitis with cranial neuropathies and hypoglycorrhachia are BIG CLUEs!

- CSF stains and cultures are not sensitive
- Start empiric RIPE therapy WITH glucocorticoids tapered over 6-8 weeks which decreases mortality by almost 25%

Clinical Infectious Diseases, Volume 63, Issue 7, 1 October 2016, Pages e147–e195,
Published: 10 August 2016

Corticosteroids for Managing Tuberculous Meningitis
Cochrane Database Syst Rev. 2016 Apr:2016(4)Cd002244

Question 11.

- C; Intraerythrocyte tetrad forms

Diagnose Babesiosis

Problem List

Previously well 51 yo farm worker in Maine (Northeast)

Asplenia

Acute fever, headache, chills

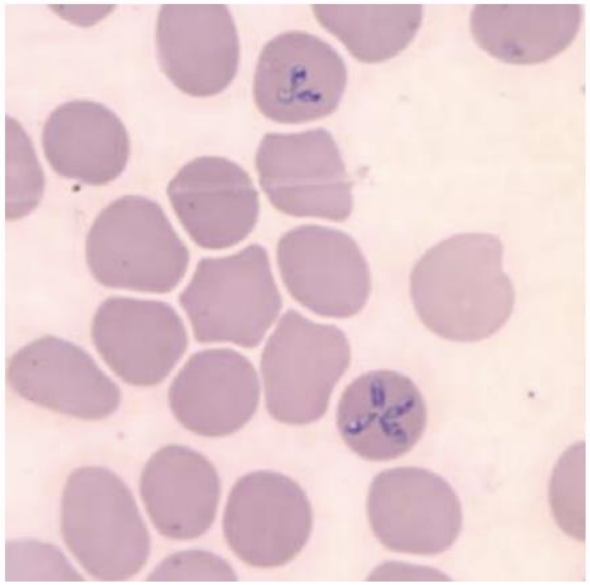
Septic/shocky vital signs with hypoxemia

Hepatomegaly, jaundice

Hemolytic anemia

Thrombocytopenia

- Asplenia
  - S. pneumo, H. flu, N. meningitidis
  - Babesiosis
  - Capnocytophagia (gm negative)



Babesia microti in a thin blood smear. Note the classic "Maltese Cross" tetrad-form in the infected rbc in the lower part of the image.

- Treatment for severe cases:
  quinine + clindamycin or
  atovaquone + azithromcyin

Tick borne Diseases

- Anaplasmosis
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- Influenza-like symptoms
- Rash may be clue (but not always present)
- 24-48 hours of attachment to the host is required for infection to occur
- If no symptoms follow exposure to the tick bite, empiric antibiotic treatment is not indicated

Question 12.

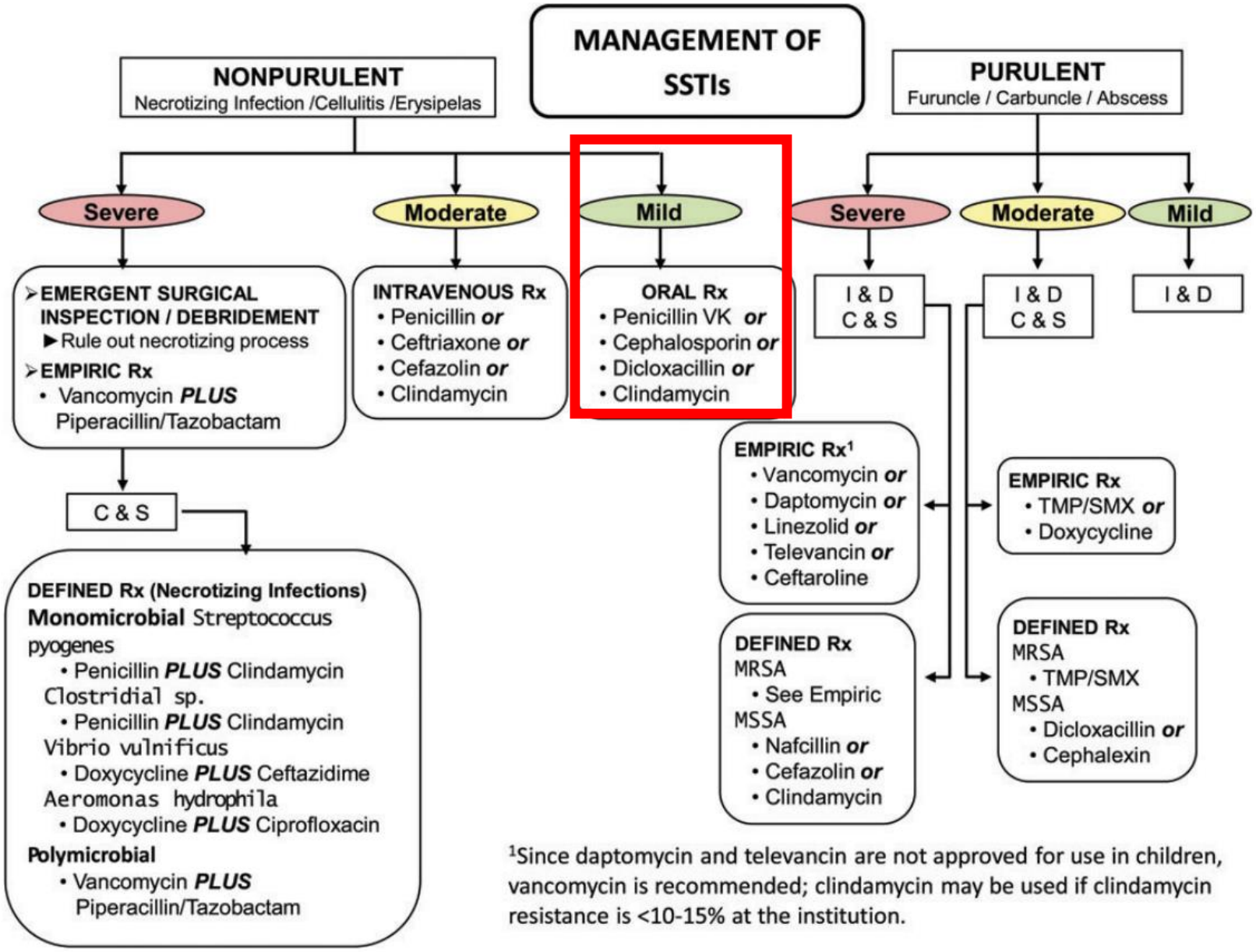
- C; Ceftriaxone and doxycycline

Treat proctitis in a patient at risk for sexually transmitted infection

- Proctitis in MSM
  - Chlamydia trachomatis (LGV)
  - Neisseria gonorrhoeae
  - Syphilis
  - Herpes Simplex
- Proctocolitis
  - Campylobacter
  - Shigella
  - Entamoeba histolytica
- Diagnosis
  - Rectal swab for nucleic acid amplification testing (NAAT) for C. trachomatis, N. gonorrhea, and HSV-1 and 3
  - If C trachomatis positive by NAAT, do further genotype testing for serovars L1, L2, and L3
- Empiric therapy
  - Ceftriaxone and doxycycline

Question 13.

- A; Clindamycin



Treat mild, nonpurulent cellulitis

Non-purulent infections usually streptococcal

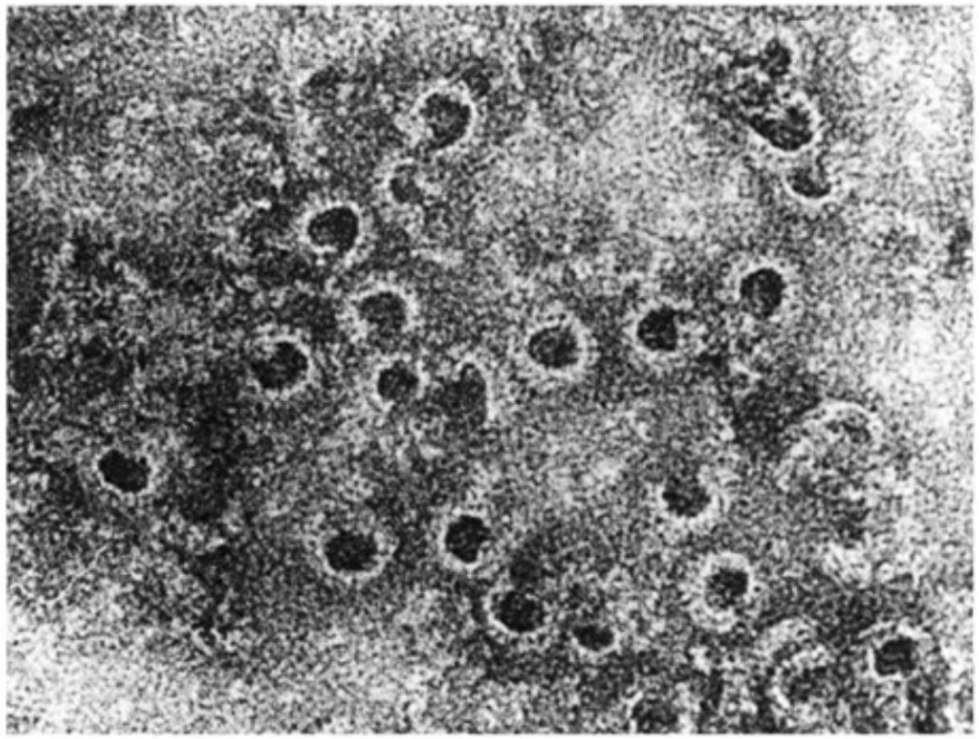
Bactrim and Doxy do not have good anti-strep activity

IDSA guidelines 2014

Question 14.

- D; Quadravalent meningococcal conjugate vaccine

Prevent infection in patients with terminal complement deficiency



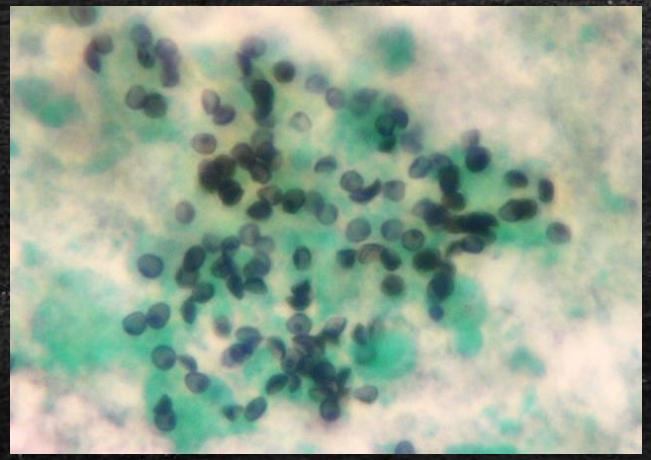
Complement-induced lesions on the membrane of a RBC

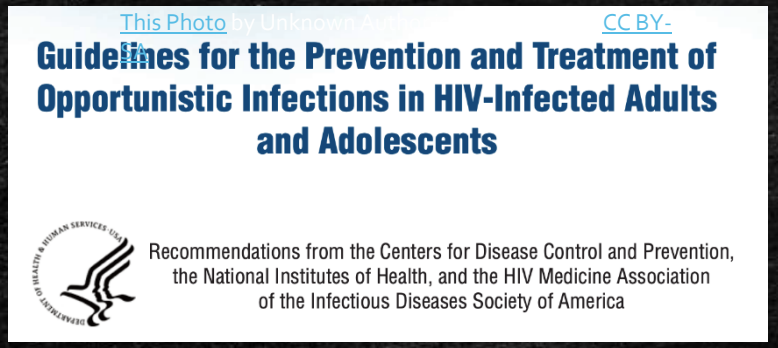
- Terminal complement deficiency (C_{5-9})
- The LACK of a BIG MAC attack!
- Predisposes to Neiserria infections (meningitidis > gonorrhea)
- Vaccination with conjugate quadrivalent meningococcal vaccine (A,C, Y, and W-135) in addition to serogroup B
- Booster every 5 years with quadrivalent

Question 15.

- C; Continue current therapy

Discontinue Pneumocystic pneumonia prophylaxis in HIV infection





Last updated March, 2019

- Primary Prophylaxis for CD4 < 200 cells
  - One ds TMP/SMX daily (A1)
  - One ss TMP/SMX daily (A1)
  - One ds TMP/SMX 3 x week (B1)
  - Continue if non-lifethreatening reactions occur or temporarily stop and resume at lower dose (70% can tolerate)
- Secondary Prophylaxis for patients with diagnosis of PJP
- Discontinue Primary *and* Secondary Prophylaxis
  - CD4 count improves to >200 for > 3 months

Question 16.

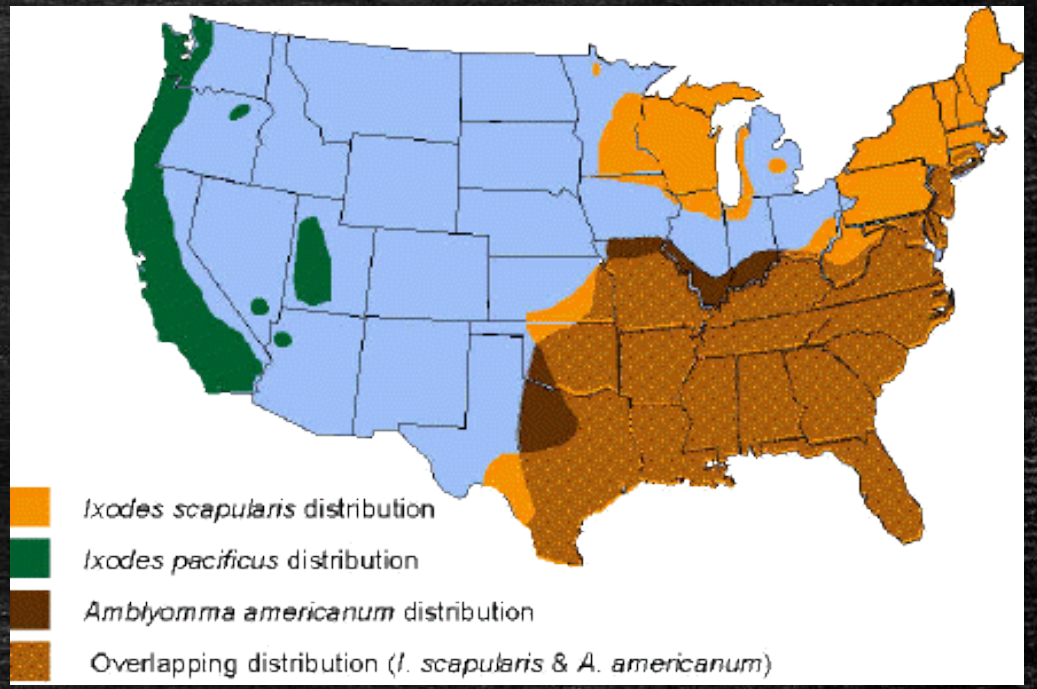
- D; Reassurance that the risk of Lyme disease is low

Manage a tick bite

- Antibiotic prophylaxis NOT indicated for
  - Anaplasmosis
  - Babesiosis
  - Erlichiosis
  - Rocky Mountain Spotted Fever
  - Other rickettsial diseases

Benefit of prophylaxis for Lyme disease after tick bite may outweigh risk IF:

- Doxycycline is not contraindicated
- Tick is identified as adult or nymphal I. scapularis
- Estimated time of attachment≥ 36 hours
- Prophylaxis can be started within 72 hours of tick removal
- Endemic area for Lyme disease



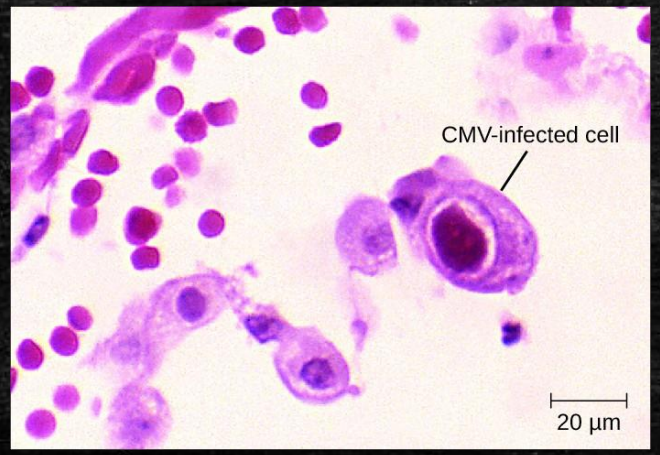
Prophylaxis for Lyme is Doxycycline 200 mg in a single dose.

Question 17.

- A; Cytomegalovirus infection

Diagnose cytomegalovirus infection in a solid organ transplant recipient with colitis:
20-60% of transplant patients develop symptomatic CMV

- Infection occurs due to:
  - Transmission from infected organ
  - Reactivation of latent infection
  - Primary infection in seroneg pt
- Donor /Recipient CMV Status
  - D+/R+; D+/R-;D-/R- ; D-R+



- Clinical manifestations
  - Pneumonitis, Hepatitis, Pancytopenia, Colitis with bloody diarrhea, Esophagitis, Adrenalitis
- Diagnosis
  - PCR viral load in body fluids
  - Tissue biopsy "owl eye" inclusions
  - Serology NOT as helpful
- Treatment
  - Valgancyclovir treatment
  - Prophylaxis

Question 18.

- C; Liposomal amphotericin and flucytosine

Treat cryptococcal meningitis

- Encapsulated yeast: *Cryptococcal neoformans*
- Clinical manifestations in immuno-compromised patients (AIDs /CMI)
  - Meningeal
  - Pulmonary
  - Skin
- Meningitis most common area of dissemination
  - Headache
  - Fever
  - CSF + cryptococcal antigen
- Treatment
  - Liposomal amphotericin and flucytosine
  - Serial LP for high ICP
  - IRIS with cART if initiated too early

Cryptococcal skin lesions like the face and look like molluscum contagiosum

Question 19.

- B; Oral fluconazole

Treat candida esophagitis

XVI. What Is the Treatment for Oropharyngeal Candidiasis?

Recommendations

122. For mild disease, clotrimazole troches, 10 mg 5 times daily, OR miconazole mucoadhesive buccal 50-mg tablet applied to the mucosal surface over the canine fossa once daily for 7–14 days are recommended *(strong recommendation; high-quality evidence)*.

123. Alternatives for mild disease include nystatin suspension (100 000 U/mL) 4–6 mL 4 times daily, OR 1–2 nystatin pastilles (200 000 U each) 4 times daily, for 7–14 days *(strong recommendation; moderate-quality evidence)*.

124. For moderate to severe disease, oral fluconazole, 100–200 mg daily, for 7–14 days is recommended *(strong recommendation; high-quality evidence)*.

XVII. What Is the Treatment for Esophageal Candidiasis?

Recommendations

131. Systemic antifungal therapy is always required. A diagnostic trial of antifungal therapy is appropriate before performing an endoscopic examination *(strong recommendation; high-quality evidence)*.

132. Oral fluconazole, 200–400 mg (3–6 mg/kg) daily, for 14–21 days is recommended *(strong recommendation; high-quality evidence)*.

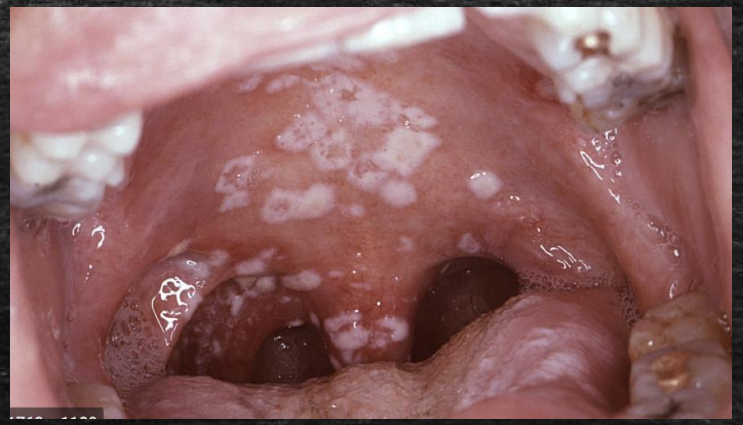
133. For patients who cannot tolerate oral therapy, intravenous fluconazole, 400 mg (6 mg/kg) daily, OR an echinocandin (micafungin, 150 mg daily, caspofungin, 70-mg loading dose, then 50 mg daily, or anidulafungin, 200 mg daily) is recommended *(strong recommendation; high-quality evidence)*.

Clinical Practice Guideline for the Management of Candidiasis: 2016 Update by the Infectious Diseases Society of America

Peter G. Pappas,[1] Carol A. Kauffman,[2] David R. Andes,[3] Cornelius J. Clancy,[4] Kieren A. Marr,[5] Luis Ostrosky-Zeichner,[6] Annette C. Reboli,[7] Mindy G. Schuster,[8] Jose A. Vazquez,[9] Thomas J. Walsh,[10] Theoklis E. Zaoutis,[11] and Jack D. Sobel[12]

Oral Candidiasis

- Risk factors:
  - Age (very young and old)
  - Immunosuppression
  - Denture wearers
  - Diabetics
  - Dry mouth
  - Inhaled steroids
- Symptoms:
  - White plaques
  - Redness/soreness
  - Cotton-like feeling in the mouth
  - Loss of taste
  - Pain while eating or swallowing
  - Cracking at the corners of mouth



Question 20.

- E; Urine culture plus ciprofloxacin

Treat recurrent cystitis in women

- Recurrent UTI
  - 3 UTIs in past 12 months OR 2 UTIs in past 6 months
- Relapse < Reinfection
  - **Relapse:** Same strain (by repeat culture) within 2 weeks of completion of initial therapy
  - **Reinfection**: Different strain than initial culprit or sterile urine culture between episodes
- Management of Simple UTI
  - Non-pregnant woman of child bearing age
  - No structural abnormalities
  - Not recurrent!
  - No culture needed
  - Nitrofurantoin x 5 days, Bactrim x 3 days, Fosfomycin x 1 day
- Management of Recurrent (Complicated) UTI
  - Send urine for culture
  - Empiric Ciprofloxacin x 7 days
  - *Received treatment within 3 months*

Questions???