BOARD REVIEW SESSION 2
ANSWER KEY
SUNDAY AUGUST 25, 2013

Session Moderator: Dr. Scheld

Session Panelists: Drs. Ghanem, Pavia, and Talbot
Question #11 | Lyme Disease | Scheld

A 34-year-old woman was started on doxycycline two weeks ago for erythema migrans accompanied by fever and myalgias. Today, on her 14th day of treatment, she calls to say her fever and rash are gone but she is still not feeling well and wants to know what to do.

Which one of the following is the best next step for this patient?

A. Continue the doxycycline.
B. Switch to ceftriaxone.
C. Add azithromycin.
D. Stop the doxycycline.
E. Perform an echocardiogram.

Correct answer: D

Rationale:

Doxycycline is appropriate therapy for early Lyme Disease, and 10 days to two weeks of treatment is as good as longer therapy. Studies have shown that at the end of 10 days-two weeks of therapy, as many as 1/3 of patients are still symptomatic, but further treatment is not better when compared to stopping at the end of the 10 day-two week period. There is no reason here to add or switch or continue antimicrobial therapy. Cardiac involvement would be extremely unlikely this early in the disease course, if one were concerned about cardiac involvement, the best test would be an EKG to look for heart block, not an echocardiogram.
Question #12 | Gonococcal Infections| Ghanem

A 25-year-old female from California presents with the acute onset on severe pain in her right wrist. She is sexually active with multiple male partners, who only intermittently use condoms.

On presentation she is febrile and examination of the right wrist revealed swelling, erythema, and pain on motion. She has a few painless papules on examination of the skin of the lower extremities.

Which of the following tests has the highest yield for establishing the epidemiologically most likely microbiologic diagnosis in this patient?

A. Blood culture
B. Synovial fluid gram stain
C. Synovial fluid culture
D. Cervical culture
E. Oropharyngeal culture

Correct answer: D

Rationale:
This patient has disseminated gonococcal infection (DGI), which may present as a purulent gonococcal arthritis or a syndrome of tenosynovitis, dermatitis, and polyarthralgia without purulent joint infection.

Fewer than 50% of patients have a true septic arthritis.

In patients with gonococcal arthritis, the synovial fluid Gram stain is positive in only 25% of patients and cultures are positive in only 50%;

For patients without suppurative arthritis, synovial fluid cultures are only positive in 20-30% of cases.

Blood cultures yield positive results in <30% of patients.

Culture yield is greatest from mucosal sites – cervical swabs are positive in 80-90% of women and urethral swabs are positive in 50-70% of men. There are lower culture yields from rectal and oropharyngeal swabs, but may be positive so it is important to culture these sites. Cervical swab testing for GC by NAAT is an appropriate option for facilities with that option.
Question #13 | Tularemia | Scheld

A 17-year-old man is seen in the emergency room for purulent conjunctivitis. On exam his temperature is 100°F; pulse is 88. His right eye has markedly inflamed conjunctivae and a grossly purulent discharge. The eyelid is slightly tender. Vision is intact. A tender preauricular node is present on the right. The left eye is normal as is the rest of the exam.

He reports that two days before his eye began to trouble him he was removing ticks from his pet dog and killing them by squeezing them between his thumb and forefinger. He remembers getting squirited in the right eye with some “tick juice.”

Which one of the following is most likely the cause of his eye infection?

A. Adenovirus
B. Francisella
C. Ehrlichia
D. Leptospira
E. Rickettsia

Correct answer: B

Rationale:

Tularemia due to Francisella tularensis usually is transmitted through direct animal contact, but may be transmitted through the bites of deer flies, mosquitos, and ticks. Direct inoculation of Francisella into the eye through rubbing or “tick juice” results in a purulent conjunctivitis with regional (preauricular) adenopathy.

Adenovirus is a common cause of conjunctivitis and may be associated with preauricular adenopathy, but gross purulence does not occur.

Ehrlichia and Rickettsia are tick-borne pathogens but do not produce this syndrome.

Leptospirosis causes conjunctival suffusion, but this disease is usually acquired from animal urine or contaminated water, and the suffusion would be bilateral without an adjacent lymph node enlargement.

Sarcoidosis my cause an oculoglandular syndrome, but the conjunctival inflammation is not purulent.
Question #14 | Syphilis | Ghanem

A man presents with a generalized body rash one month after a painless ulcer appeared on his penis. A serum RPR is reactive with a titer of 1:4096 and a confirmatory treponemal EIA is reactive. HIV serology is negative. The patient is penicillin allergic so he is treated with doxycycline 100mg orally twice daily for two weeks. One year later, he is asymptomatic and his RPR titer is 1:512.

What is the most appropriate next step?
   A. CSF examination
   B. Desensitize and treat with intramuscular benzathine
   C. Doxycycline for two additional weeks
   D. Doxycycline for 28 days
   E. No additional therapy

Correct answer: E

Rationale:

The patient was diagnosed with secondary syphilis one year earlier and he was treated with doxycycline- an appropriate alternate agent when penicillin cannot be used. He experienced a greater than 4-fold decline in RPR titers within 12 months which is the appropriate response to therapy. Although his current titers are still high (1:512), there are no convincing data in the antibiotic era to suggest that further antibiotic therapy or a CSF examination would improve long term outcomes. As such, the patient is deemed cured and no additional therapy is warranted.
A 21-year-old male is referred to you for advice about immunizations. He is healthy except for moderately severe asthma.

He received his usual childhood immunizations (but never influenza) but he developed recurrent hives when he was a teenager. Because of a positive skin test for egg, he was told by his allergist never to eat eggs, and he studiously avoids any food with egg listed as an ingredient.

Which one of the following vaccines contains sufficient egg content to be a concern regarding routine administration (i.e. without desensitization or further testing)?

A. Measles, mumps, rubella (MMR)
B. Influenza
C. Polio
D. Varicella
E. HPV

Correct answer: B

Rationale:

The two vaccines that contain enough egg to be a concern for allergic patients are influenza (both the live attenuated and the inactivated trivalent) and yellow fever. Thus, answer B is correct. The other vaccines contain either no egg or, in the case of MMR, such minute quantities (picrograms) that they are not relevant.

Most patients who can eat egg containing food, or who have been safely given influenza vaccine in the past are at exceedingly low risk. If a patient has a valid egg allergy, as this patient appears to have, the management is not completely agreed upon: if the vaccine is needed, most allergists would confirm the skin test positivity to egg, and then use a dose escalation of vaccine, i.e. give a 10% dose followed by a 90% dose shortly at the same office visit. However, there is considerable controversy when comparing the labeling information and recommendations from various professional organizations.

Note that the one other allergy to be especially concerned about is gelatin. Most of the virus immunizations contain gelatin (bovine or porcine, which cross react), as does live oral typhoid. If the patient has a history of gelatin allergy, referral to an allergist is appropriate since the approach to such patients is complicated.

Histories of allergies to thimerosal, neomycin, yeast, or latex are rarely relevant.
Question #16 | Anaplasmosis | Scheld

This 40-year-old male presented with fever, nausea, vomiting for 4 days, attributed by the patient to eating unrefrigerated food while camping in rural Maine.

History of HIV (CD4 = 75 cells, VL = 300k).

The patient is taking only homeopathic medications. In the emergency room the patient is febrile and hypotensive with cervical adenopathy and splenomegaly but no rash.

He has mild cytopenias (WBC 3700, Platelet Count 40,000) and transaminases that are 3x normal.

After the patient was given vancomycin and imipenem and started on pressors and intubated, the lab calls you to see the following peripheral blood smear. This is seen in his peripheral smear (above).

The organism causing this syndrome that is seen on peripheral smear is:

A. Chlamydia pneumoniae
B. Rickettsia akari
C. Anaplasma phagocytophilum
D. Orientia tsutsugamushi
E. Babesia microti

Correct answer: C

Rationale:

The round blue structure is a morula, seen in monocytes in ehrlichiosis and neutrophilss in anaplasmosis. Illnesses are clinically similar but the vectors are usually different ticks and have different geographic distributions.

- Anaplasma phagocytophilum is carried by Ixodes ticks.
- Ehrlichia chaffeensis is carried by Amblyoma americanum, Dermacentor variabilis and Ixodes pacificus.
- Babesia are ring forms in erythrocytes, and are not seen in this figure.
- Rickettsia and rickettsia like organisms cannot be seen in peripheral smears, and thus B and D are incorrect.
Question #17 | HHV-6 Pavia

A 6-month-old child has a febrile seizure and is found to have acute HHV 6 infection. For that child’s immunologically normal father and pregnant mother, both of whom have no health problems, which of the following would be likely to occur if they acquired HHV 6?

A. Fever and febrile seizures in mother or father
B. Meningoencephalitis in mother or father
C. Meningoencephalitis in mother only
D. Spontaneous abortion
E. No significant pathology except for mild fever

Correct answer: E

Rationale:

HHV-6 infections usually occur during childhood and result in generally mild, self-limited illnesses which present either as roseola infantum or febrile seizures without rash. The syndrome is often diagnosed by pediatricians clinically, although serologic and PCR testing is available.

Seroprevalence rates are usually over 70%, so most children acquire this infection. Possible disease associations with HHV-6 in immunocompetent adults are not proven other than a few cases of primary infection.

Primary infection in adults is rare, and thus neither parent is likely to have any manifestation if they acquired primary infection.

A few cases of encephalitis, mesotemporal epilepsy, and mononucleosis type syndrome have been reported but they appear to be rare. For heavily immunosuppressed patients, cases of encephalitis are being reported but are so far rare even in HIV infected patients and transplant recipients.
Question #18 | Rocky Mountain Spotted Fever | Scheld

A 25-year-old African-American male turkey farmer from rural North Carolina was taken to the Emergency Department in July because of fever and headache of approximately 48-hours’ duration.

His farm had a few cows and dogs. They drank unpasteurized milk from their cows. Occasionally he noted ticks on his body, but could not remember when the last time was. They didn’t slaughter animals on the farm, but sent the turkeys elsewhere for processing. He sometimes walked around in stagnant water in the fields where he grazed the cows. He had been healthy and took no medications.

On examination:

- His temperature was 40°C, pulse 110 and BP 90/60.
- He was obviously ill and groaning from the headache but oriented x 3.
- No rash was seen.
- Slight, but definite nuchal rigidity was found but no other neurologic signs.
- Blood cultures were drawn and ceftriaxone 2 gm q12h IV begun.
- Lumbar puncture found WBC 40/cu mm, all lymphocytes and monocytes.
- CSF protein was 45 mg/dL and glucose 55 mg/dL. Gram stain was negative.
- WBC was 2,500/cu mm with a normal differential.
- Platelet count was 70,000/cu mm and hemoglobin 13 gm%.
- Routine chemistries showed aminotransferases were slightly elevated, 1.5 times the upper normal limit.

Which of the following is the most likely source of this infection?

A. Turkeys
B. Mosquitoes
C. Dog ticks
D. Unpasteurized milk
E. Stagnant water

Correct answer: C

Rationale:
The presence of leukopenia and thrombocytopenia raised the possibility of Rocky Mountain spotted fever and ehrlichiosis.
Patients with Rocky Mountain spotted fever are generally more ill than those with ehrlichiosis, so the former is more likely in this patient. Despite the name, Rocky Mountain Spotted Fever, the majority of cases occur in South Central and Southeast states, including North Carolina. Rash in spotted fever is often delayed, only occurring in the first three days in approximately half the cases. This rash is easy to miss in African Americans.

The dog tick, Dermacentor variabilis, is a major vector of Rocky Mountain Spotted Fever in the Eastern United States.

Monocytic ehrlichiosis is probably at least as common as Rocky Mountain Spotted Fever, and the two diseases resemble each other closely, except that rash is unusual in monocytic ehrlichiosis. The latter is carried by the lone star tick, Amblyomma americanum, which has dogs as its usual host.

Whether the patient was infected with Rickettsia rickettsii, the cause of spotted fever, or Ehrlichia chaffeensis, the cause of monocytic ehrlichiosis, the most likely source was a dog tick. Treatment of either would be doxycycline.

Headache, fever, and CSF pleocytosis would be consistent with leptospirosis, which could have been acquired by wading in stagnant water of his fields. Leukocytosis is common but leukocytopenia is rare in leptospirosis.

Mosquito-borne viral encephalitis (West Nile, Eastern Equine, etc.) could occur in July but the normal mental status and hematologic abnormalities are atypical. The clinical picture is inconsistent with psittacosis from turkeys and with brucellosis or other infections acquired by ingestion of unpasteurized milk.
Question #19 | Pelvic Inflammatory Disease | Ghanem

A woman is diagnosed with pelvic inflammatory disease (PID). Which of the following characteristics warrants inpatient hospital admission for parenteral therapy?

A. Diabetes  
B. First PID episode  
C. HIV infection  
D. Pregnancy  
E. Young age

Correct answer: D

Rationale:

Most women who are diagnosed with PID can be safely treated with oral antibiotics as outpatients. Certain criteria warrant inpatient admission for parenteral therapy. These include pregnancy, presence of a tubo-ovarian abscess, nausea, and vomiting. In certain instances, if appendicitis cannot be excluded, patients should also be admitted for inpatient observation. HIV infection, first PID episode, and young age are not absolute indicators for parenteral therapy.
Question #20 | Hantavirus | Pavia

This adult with the sudden onset of adult respiratory distress syndrome following a few days of fever and cough was difficult to ventilate and had copious respiratory secretions. His white blood count was normal but the chest x-ray is shown.

After a few days the patient defervesced and made a complete recovery. The episode followed working in a rodent-infested shed.

If rodents were the source of infection, which is the most likely route of infection:

A. Rodent bite
B. Inhalation while in the rodent infested closed space
C. Bite of a rodent flea
D. Bite of a rodent mite

Correct answer: B

Rationale:

This is the typical clinical presentation of hantavirus pulmonary syndrome, transmitted from inhaling the aerosolized urine and secretions of infected rodents. Infection of humans is most likely in enclosed spaces.

Other infections acquired in a rodent-infested shed would not have presented as pulmonary infiltrates (e.g., leptospirosis, endemic typhus, rickettsialpox)

Those that present as pneumonia (e.g, plague or tularemia) do not have such a rapid recovery from ARDS.

Rarely, leptospirosis can present as pneumonia in patients exposed to spray from urine-contaminated water, an event unlikely in a shed.