MECHANISMS OF HUMAN DISEASE
AND
PHARMACOLOGY & THERAPEUTICS

CASE-BASED SMALL GROUP DISCUSSION

MHD I
SESSION 4
Bacteria

September 13, 2018
Case 1:
CC: "I’m here for a physical for work"

A 23 year old man presents for a physical before starting a new job as a city bus driver. He is healthy and takes no medications. He has no concerns except wanting to start his job as soon as he can. He has no known drug allergies. He smokes 1 pack of cigarettes a day for the past 6 years. He drinks 2 beers a night. He denies illicit drug use. His parents and brother have no medical problems that he is aware of. He acknowledges that he eats too much “fast food”. He is not married, has multiple female sex partners and does not use condoms regularly.

On physical exam he appears healthy. Head, neck, heart, lung, abdominal, and neurologic exams are unremarkable. His testes are normal. There is no penile discharge. On the shaft of his penis is a painless two centimeter ulcer with raised, indurated borders. The base of the ulcer is clean. There are bilateral small palpable, mobile, nontender inguinal lymph nodes. There are no rashes on skin examination.

Upon further questioning, the patient had not noticed the ulcer.

The physician is highly suspicious that the etiology of the ulcer is infection with a bacteria which on darkfield microscopy has 6 to 14 regularly wound coils, has corkscrew motility, and flexes centrally at 90-degree angles.

Educational Objectives

1. What is the physician's clinical diagnosis?

2. What non-serologic methods can the physician use to confirm his clinical diagnosis?
3. The patient states he has no idea how and when he “got this” infection. How would you respond?

4. Summarize the pathogenesis of the primary stage of infection with this organism.

5. Assuming that in this patient the disease is in its primary stage, what treatment should be prescribed?

6. The patient asks “can I get this again?” How will you respond?

7. Summarize means to prevent the spread of this infection.

Case 2:
A 22 year-old woman is admitted in active labor. She had not received any prenatal care. Several months prior she developed low grade fever, headache and a generalized maculopapular rash which resolved after 2 weeks. She reported that her boyfriend had a similar rash, which also involved his palms and soles. She delivers a male infant, who weighs 2100 grams. Physical examination of the baby reveals marked hepatosplenomegaly. The examination of the skin is significant for a hemorrhagic bullous rash distributed mostly on the palms of the hands and the soles of the feet.

**Maternal Laboratory Data**

- **RPR Qual**  Reactive  
  Reference Range  Non-Reactive
- **RPR Quant**  1:256

- **FTA Abs (IgG)**  Reactive  
  Reference Range  Non-Reactive

- **HIV 1 and 2 AB**  Negative  
  Reference Range  Negative

- **Rubella IgG Ab**  34.6  IU/ml  
  19 IU/ml or greater indicates presumed immunity to infection.

  Rubella status – Presumed Immune

**EDUCATIONAL OBJECTIVES**

1. Based on the information provided, what infection does the mother (and father) have? Discuss your rationale.

2. Discuss the serologic testing methods used to diagnose this infection.

3. The physician of the patient in case 1 ordered an RPR which was “nonreactive”. Explain why this may have occurred with the physician having made the correct clinical diagnosis.
4. Summarize the pathogenesis of the secondary stage of this infection.

5. Based on the given information, what disease process is the newborn manifesting? What treatment would you prescribe?

6. What serologic test(s) would you order, or not order, to support your diagnosis of this newborn? (use your background from Host Defense to answer this question)

7. How was prevention of infection in this newborn and other newborns possible?

8. The following are examples of late clinical manifestations of the congenital form of this infection. Match the symptom/sign with the appropriate description.

   **Symptom/Sign**
   
   Saber shin  
   Hutchison Teeth  
   Mulberry molars  
   Saddle nose deformity  
   CN VIII deafness  
   Rhagades
Description

Abnormal 1st lower (6 yr) teeth characterized by small biting surface and excessive number of cusps

Peg-shaped upper central incisors; they erupt during 6th yr of life with abnormal enamel, resulting in a notch along the biting surface

May be unilateral or bilateral, appears at any age, manifests initially as vertigo and high-tone hearing loss

Anterior bowing of the midportion of the tibia

Linear scars that extend in a spoke-like pattern from previous mucocutaneous fissures of the mouth, anus, and genitalia

Depression of the nasal root, a result of syphilitic rhinitis destroying adjacent bone and cartilage

Case 3 – Unknowns. Case Data will be provided during the small group session.

Be prepared to discuss cardiac and neurologic manifestations of the microbe highlighted in cases 1 and 2 and the associated pathogenesis

Cases 4 - Unknowns. Case Data will be provided during the small group session.