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STUDENT NAME: _____

Case Study Simulated/Virtual Clinical Summer 2020

Medical Surgical I

Week 4: Tuberculosis

Scenario

You are a public health nurse working at a county immunization and tuberculosis (TB) clinic. B.A. is a 61-year-old woman who wishes to obtain a food handler's license and is required to show proof of a negative Mantoux (purified protein derivative [PPD]) test before being hired. She came to your clinic 2 days ago to obtain a PPD test for TB. She has returned to have you evaluate her reaction.

1. What is TB, and what microorganism causes it?

TB is a contagious bacterial infection that usually attacks your lungs but can also spread to other parts of your body like the brain and spine. *Mycobacterium tuberculosis* is the microorganism that causes TB.

2. What is the route of transmission for TB?

Airborne

3. The CDC recommends screening people at high risk for TB and providing guidelines for preventive therapy to those at high risk for developing active disease. List five populations at high risk.

- a. Babies and young children (weak immune systems)
- b. People with the HIV infection
- c. People with organ transplants
- d. People who have been recently infected with TB bacteria
- e. People with diabetes mellitus and severe kidney disease

4. What is the preferred method for TB screening?

- a. TB skin test (Mantoux tuberculin skin test or PPD): This test requires two visits with your health care provider. At the first visit, the test is placed by injecting a small amount of tuberculin into the subcutaneous skin on the lower part of the arm. The patient must return within 48 to 72 hours for the test to be read. The results depend on the size of the raised, hard area or swelling.
- b. TB blood test (interferon-gamma release assays or IGRAs): A health care provider draws the patient's blood and sends it to the lab for analysis and results.

5. What additional information would you want to obtain from B.A. before interpreting her skin test result as positive or negative?
- a. We would want to ask if B.A. had any exposure to TB, had a positive test before, if they had been vaccinated with BCG before. We would also want to thoroughly go through the patient's medical history and do a physical examination.

CASE STUDY PROGRESS

B.A. consumes 3 to 4 ounces of alcohol (ETOH) per day and has smoked 1.5 packs of cigarettes per day for 40 years. She is a native-born American, has no risk factors according to the CDC guidelines, lives with her daughter, and becomes angry at the suggestion that she might have TB. She admits that her mother had TB when she was a child but says she has never tested positive. She says, "I feel just fine and I don't think all this is necessary."

6. How do you determine whether the test is positive or negative?

An induration of less than 5 millimeters is considered a negative test result. If it is 5 millimeters and you have been in recent contact with someone with TB, you are HIV positive, you have had an organ transplant, you are taking immunosuppressant's, or you have previously had TB it is a positive test result. If it is at least 10 millimeters and you live in a high-risk environment, work in a hospital, medical lab, or other high risk setting, or you're a child under the age of 4 it is a positive test result. If the induration is more than 15 millimeters, it is a positive test result.

7. You measure and note that the area of erythema measures 30 mm in diameter and the area of induration (hardened tissue) measures 16 mm in diameter. Determine whether B.A.'s skin test is positive or negative.

Positive, An **induration of 15 or more millimeters** is considered positive in any person, including persons with no known risk factors for TB. However, targeted skin testing programs should only be conducted among high-risk groups.

8. What does a positive PPD result mean?

I would explain that a positive PPD result means that you have been infected with bacteria that causes TB, but it does not mean you have active TB. To confirm we will perform more tests to check for an active case.

9. How would you determine whether B.A. has active TB?

I will perform a chest X-ray, sputum culture see if infection is active.

CASE STUDY PROGRESS

The physician orders a chest x-ray (CXR) and informs B.A. that her CXR is clear (shows no signs of TB). However, he must report her to the local public health department because her PPD test measured greater than 15 mm. The department will monitor her over time and initiate treatment if she gets TB.

10. According to the CDC, if a person has a positive PPD, what subsequent steps are necessary?

We would assess her symptoms. Also, we would perform a chest x-ray, because if the disease is active inflammation would be seen on an x-ray. A chest x-ray is not definitive; therefore, we would perform a sputum culture. A confirmed diagnosis of TB can only be done via a sputum culture that identifies *M. tuberculosis*.

11. According to the American Thoracic Society and CDC (2006) guidelines, what constitutes usual preventive therapy? (NOTE: Be certain to consult the most recent CDC guidelines. Also note that guidelines for diagnosing and treating TB in individuals who are HIV positive are different from those for lower-risk populations.)

Adhere to taking medication as prescribed for LTBI to prevent full blown TB.

12. Different medications are associated with different side effects. Identify the test used to monitor each possible side effect listed below.

Peripheral neuropathy (4)

Hepatitis (5)

Fever and bleeding problems (2)

Nephrotoxicity/renal failure (3)

Hyperuricemia (7)

Optic neuritis (6)

Hearing neuritis (1)

1. Audiogram

2. CBC (WBC and platelets)

3. Cr/BUN, CrCl (creatinine clearance)

4. Hepatitis C virus (HCV), AST/ALT

5. Physical exam and monofilament testing

6. Red-green discrimination and visual acuity

7. Uric acid

13. Nonadherence to drug therapy is a major problem that leads to treatment failure, drug resistance, and continued spread of TB. The CDC recommends 2 methods to ensure compliance with medication for all patients who have drug-resistant TB and those who take medication 2 or 3 times every week. Identify one of those methods.

According to the CDC directly observed therapy (DOT) always should be used in the treatment of drug-resistant TB to ensure adherence.

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- 15.** What information should B.A. receive before leaving the clinic?

B.A. should receive proper information regarding her medication, as well as information regarding proper nutrition for her health. Her exposed family should also come in and be tested for TB. And last, she should be informed that she should come in every 2-4 weeks to monitor therapy effectiveness.