

TB CASE STUDY #1

TB- RESPIRATORY ISOLATION

A 31-year-old caucasian male presented to the Emergency Department (ED) after experiencing gross hemoptysis. He had a 2 month history of productive cough, a 25 pound weight loss, night sweats, and fatigue. A CXR revealed bilateral cavitary infiltrates. The initial sputum specimen was smear positive 4+ and was submitted for a Nucleic Acid Amplification Test (NAAT), culture, and sensitivity. The patient has a history of heavy alcohol and drug use. He is HIV negative, Hepatitis B and C positive, has a long history of cigarette use, and a chronic smoker's cough. The patient resides with his wife and three children (ages 9, 7, and 2 years old).

TB- RESPIRATORY ISOLATION

1) The patient was admitted to the hospital, should he be placed in an Airborne Infection Isolation (AII) room?

A. No, TB has not been confirmed yet.

B. No, he should be admitted to a private room because he probably has lung cancer and isolation would be too distressing.

C. No, he can be admitted into a shared room.

D. Yes, he should be placed in an AII room.

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C. No, he can be admitted into a shared room.

D. Yes, he should be placed in an AII room.

Rationale: The patient is AFB smear positive 4+, which suggests that he is probably very infectious and should be isolated in a room with proper environmental controls for airborne precautions.1

TB- RESPIRATORY ISOLATION

The patient's NAAT was positive for *M. tuberculosis*. He was immediately started on a standard four drug regimen and tolerated the medications well. After four days of hospitalization the physician called the local health department to report the person with TB disease and his intention to discharge the patient with a prescription for INH, RIF, PZA, EMB, and vitamin B6.

TB- RESPIRATORY ISOLATION

2.) What is the appropriate response for the request to discharge?

- A. Document the patient information, fill the prescription as ordered and proceed with discharge plans.
- B. Document the patient information and inform the physician that the patient cannot be discharged until the prescription is filled by the local health department.
- C. Document the patient information and inform the physician that the patient does not meet the standard criteria for discharge.
- D. Document the patient information and discharge the patient with a follow-up appointment to the local health department.

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C. Document the patient information and inform the physician that the patient does not meet the standard criteria for discharge.

D. Document the patient information and discharge the patient with a follow-up appointment to the local health department.

Rationale: The patient does not meet the criteria for discharge from hospitalization to the home with high-risk individuals. He has not had three consecutive negative smears, has not received medications for a minimum of 10 days, and documentation of clinical improvement has not been noted.⁷

TB- RESPIRATORY ISOLATION

The patient was fairly cooperative during the first week of hospitalization, however, the nursing staff reported the patient had been out in the hallway a couple of times without his mask. The hospital staff was becoming anxious, so the physician called the local health department to coordinate the discharge.

The patient was visited in the hospital by a nurse from the local health department to coordinate his discharge. Based on recommendations from the local health department, the mother made arrangements to have the children stay next door with their grandmother as a precaution.

TB- RESPIRATORY ISOLATION

3) What is the appropriate response to the physician's request for discharge?

- A. Agree to coordinate discharge as long as the patient is on DOT.
- B. Advise the physician to delay discharge until 3 consecutive negative smears are received, patient has received a minimum of 10 days of treatment, and is clinically improving; or home arrangements have been made.
- C. Agree to coordinate the discharge since the patient is a nuisance in the hospital and keeping him there is doing more harm than good.
- D. Deny discharge until susceptibilities are known.

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C. Agree to coordinate the discharge since the patient is a nuisance in the hospital and keeping him there is doing more harm than good.

D. Deny discharge until susceptibilities are known.

Rationale: Local health departments are pressured to agree to discharge patients for various reasons. Pediatric patients exposed to TB are at high risk of developing severe forms of TB disease once infected; advocating for their protection is a critical role for public health.⁷

TB- RESPIRATORY ISOLATION

4) Regarding respiratory isolation precautions, what is an important task of this hospital visit?

- A. Educate the patient on TB infection control (home isolation precautions) in the home.
- B. To avoid a missed dose, have TB medications ready for the patient.
- C. Confirm that the patient completely understands the pathophysiology and transmission of TB.
- D. Establish a referral for smoking cessation classes.

TB- RESPIRATORY ISOLATION

4) Regarding respiratory isolation precautions, what is an important task of this hospital visit?

A. Educate the patient on TB infection control (home isolation precautions) in the home.

B. To avoid a missed dose, have TB medications ready for the patient.

C. Confirm that the patient completely understands the pathophysiology and transmission of TB.

D. Establish a referral for smoking cessation classes.

Rationale: It is important to educate the patient on steps to take to prevent the further spread of TB while in home isolation. Education should include instructions on cough etiquette, isolating self to a room, and/or not allowing visitors into their home until they are no longer infectious.

TB- RESPIRATORY ISOLATION

The patient was discharged home, and was adherent to home isolation precautions during the first week. Sputa were obtained by the local health department during his first week home, the results were still positive (1+ AFB smear, 0 AFB smear, 1+ AFB smear) and home isolation continued. At the next visit the patient was not home. The wife shared that “he got stir crazy,” went drinking with his friends Friday night, and has not been back since.

TB- RESPIRATORY ISOLATION

5) What should the local health department do at this point?

- A. Ask the wife's assistance in locating the patient and leave contact information with instructions to call the local health department when the patient returns.
- B. Leave TB medications with the wife for the patient to self-administer.
- C. Report patient to police.
- D. No action needed.

TB- RESPIRATORY ISOLATION

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B. Leave TB medications with the wife for the patient to self-administer.

C. Report patient to police.

D. No action needed.

Rationale: It is important to reinstitute home isolation because the patient has documented signs of TB disease and remains infectious despite treatment.⁴

TB- RESPIRATORY ISOLATION

Two weeks later, the patient was found at a relative's house. After re-educating the patient, he was adherent to the respiratory isolation precautions. During this time, three consecutive sputa results were reported as negative, his symptoms improved and he remained on an appropriate TB treatment regimen for two weeks. At that point, the local health department discontinued respiratory isolation precautions.

https://www.heartlandntbc.org/wp-content/uploads/2021/12/case_studies_tb_ncm_training_tools.pdf

TB- RESPIRATORY ISOLATION

Reflection

In this scenario, the patient presented to the ED with symptoms consistent with TB and was evaluated appropriately by the ED physician. Due to his positive AFB smears and his potential to infect others, the patient was immediately placed in an AII room. Because TB is a communicable disease additional criteria is required prior to discharge. The local health department should encourage the hospital to refrain from discharging the patient until three consecutive sputa results are received. However there may be situations that the local health department will need to work with the patient in making alternative living arrangements in the event that he/she is discharged prior to receiving negative results. Further, if the patient is released prior to negative results, the patient is considered contagious and it is the responsibility of the local health department to locate the patient and place him back on respiratory isolation precautions.

The image features a series of thin, black, overlapping lines that form various geometric shapes, including triangles and polygons, in the upper-left quadrant. These lines are scattered and intersect, creating a complex, abstract pattern.

VIRAL HEPATITIS CASE STUDY

CASE

Our patient, Mr. Smith, is a 43 year old caucasian male who came in today with complaints of fatigue, anorexia, malaise, nausea, vomiting, abdominal pain, and low grade fever for the past month, and recently has been alarmed by the discoloration of his skin and sclera turning yellow. He states that his urine has become dark and stool has become clay colored.

Past Medical History: Blood transfusion in 1992 due to major blood loss in a motor vehicle accident, arthralgia, peripheral neuropathy, hospitalization due to drug overdose in 2010. Patient states that he is fully up to date on vaccination.

Social History: Patient is an injectable drug user for the past 12 years and is currently sexually active with multiple male partners and states he uses protection “sometimes”. His current occupation is a car mechanic.

Family History: Mother: history of hyperlipidemia and diabetes father died of myocardial infarction, no other siblings or family history available.

DIFFERENTIAL DIAGNOSIS

While all forms of viral hepatitis present with similar symptoms, (jaundice, fever, abdominal pain, nausea, and fatigue) they are also different in many ways. Below we describe the possible differential diagnoses for our patient.

- **Hep C Rationale:** The patient's complaints of fatigue, anorexia, malaise, nausea, vomiting, abdominal pain, low grade fever, jaundice, dark urine, clay-colored stool and joint pain are all symptoms of hepatitis C (Viral Hepatitis, 2018). The patient's medical history of blood transfusion and social history of injectable drug use put him at risk for HCV since Hepatitis C causes most cases of post-transfusion hepatitis and it is transmitted parenterally, usually through injection drug use (McCance & Huether, 2019). What's more, there is no vaccine for HCV. Collectively, these factors provide rationale for considering Hepatitis C as a differential diagnosis.

DIFFERENTIAL DIAGNOSIS

- **Hepatitis B Rationale:** The patient's complaints of fatigue, anorexia, malaise, nausea, vomiting, abdominal pain, low grade fever, jaundice, dark urine, clay-colored stool and joint pain are also symptoms of hepatitis B. In the United States, sexual contact is the most common way that hepatitis B spreads among adults (McCance & Huether, 2019). People are also more likely to have hepatitis B if they are men who have sex with men, especially if they have had more than one sex partner in the last 6 months (Viral Hepatitis, 2018). Patient's report of being sexually active with multiple male partners increases his chance of HBV. All these factors provide rationale for considering Hepatitis B as a differential diagnosis. However, the transmission and development of hepatitis B can be prevented through vaccine. Since the patient is fully up to date on vaccination, we can rule out the possibility of him being infected by HBV.

DIFFERENTIAL DIAGNOSIS

- **Hepatitis D Rationale:** Individuals suffering from hepatitis D have symptoms such as fatigue, nausea and vomiting, poor appetite, darkening of the urine color, lightening of the stool color and yellowish tint to the whites of the eyes and skin, which match all patient's description of symptoms (Viral Hepatitis, 2018). The patient being a parenteral drug users enhances his chance of hepatitis D virus infection since HDV spreads through blood and other body fluids (McCance & Huether, 2019). Hepatitis D virus also only infects people when they have a hepatitis B virus infection. Since the patient is at risk for HBV he is more susceptible to HDV.

QUESTIONS AND ANSWERS

1). Vaccinations can prevent all forms of viral hepatitis

A). True

B). False

QUESTIONS AND ANSWERS

1). Vaccinations can prevent all forms of viral hepatitis

A). True

B). False

Answer: false. There is currently no vaccination for HCV

QUESTIONS AND ANSWERS

2). Common signs of symptoms of acute viral hepatitis C include (select all that apply)

- A). jaundice
- B). RUQ pain
- C). nausea
- D). depression
- E). seizures
- F). fever

QUESTIONS AND ANSWERS

2). Common signs of symptoms of acute viral hepatitis C include (select all that apply)

A). jaundice

B). RUQ pain

C). nausea

D). depression

E). seizures

F). Fever

Answer: A, B, C, F. These are all common signs and symptoms of acute viral hepatitis A,B, and C. Seizures and depression are not.

QUESTIONS AND ANSWERS

3). Which of the following is a diagnostic criteria for Hepatitis C?

- A). Icterus
- B). Anti-HCV IgG
- C). microscopy
- D). Anti-Hepatitis IgM or IgA

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B). Anti-HCV IgG

C). microscopy

D). Anti-Hepatitis IgM or IgA

Answer: B. Icterus can be a sign of hepatitis, but it is not a diagnostic criteria, C and D are not relevant to Hep C diagnosis

QUESTIONS AND ANSWERS

4.) What percent of individuals infected with Hepatitis C are able to clear it without any treatment in the acute phase?

- A.) 30%
- B.) 20%
- C.) 15%
- D.) 80%

QUESTIONS AND ANSWERS

4.) What percent of individuals infected with Hepatitis C are able to clear it without any treatment in the acute phase?

A.) 30%

B.) 20%

C.) 15%

D.) 80%

Answer: B, 20%. Only 20% of individuals are able to fight off the hepatitis C virus on their own with their immune system, but unfortunately most people end up developing chronic hepatitis C which can cause further liver damage such as liver disease, liver failure, or even liver cancer.

QUESTIONS AND ANSWERS

5.) Which of the following are not typical roles of a healthy liver?

- A). Synthesis of immune components
- B). Filter Blood
- C). Maintain Blood Glucose
- D). Metabolize Drugs

QUESTIONS AND ANSWERS

5.) Which of the following are not typical roles of a healthy liver?

A). Synthesis of immune components

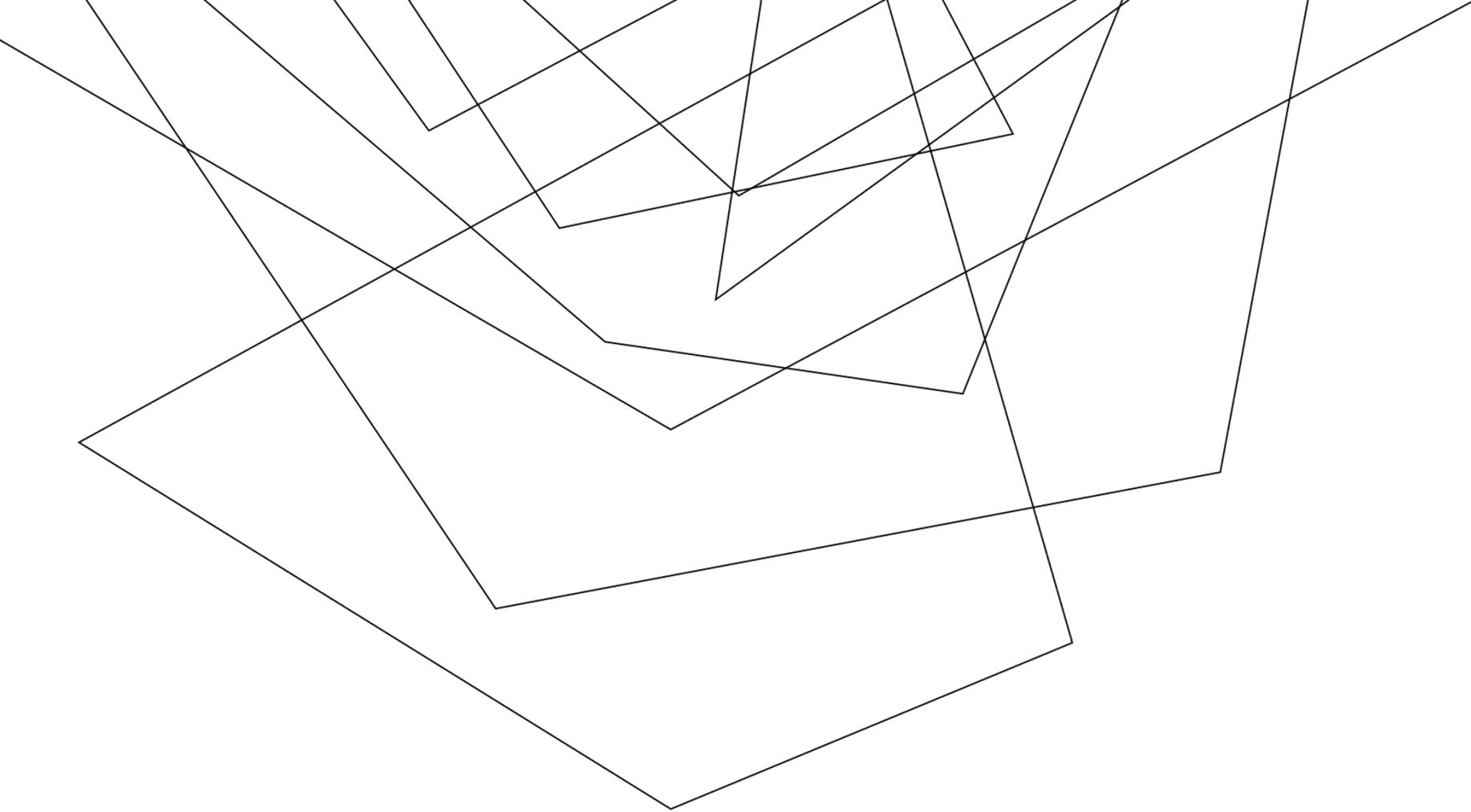
B). Filter Blood

C). Maintain Blood Glucose

D). Metabolize Drugs

Answer: A- the liver does not create immune components, that is the role of the lymphatic system. The liver's main role is to filter toxins and aid in digestion.

<https://u.osu.edu/viralhepatitis/quiz-answers-with-rationale/>



TB CASE STUDY #2

EVALUATION OF A CONTACT TO A PATIENT WITH PULMONARY TB

A 20 year old Marshallese woman was identified and screened during a contact investigation. She provided documentation of TST results she received two years ago prior to her admission into school which indicated she was negative with a 0 mm induration. Her current skin test is indurated at 6 mm. She denies any symptoms of cough, fatigue, night sweats, chills, or fever but did report an unintended weight loss of 14 pounds.

EVALUATION OF A CONTACT TO A PATIENT WITH PULMONARY TB

1) How do we interpret the TST reaction?

- 2) A. Negative, she is foreign-born and it is less than 10 mm.
- B. Positive, she is a contact to a TB patient with pulmonary disease.
- C. Negative, there is <10 mm difference in reaction size from her previous TST.
- D. Positive, any change in TST induration should be interpreted as positive.

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D. Positive, any change in TST induration should be interpreted as positive.

Rationale: This patient is considered TST positive with a TST >5mm and known recent contact to a person with infectious TB disease.

EVALUATION OF A CONTACT TO A PATIENT WITH PULMONARY TB

2) What places her at high risk for TB disease?

- A. Age
- B. She is foreign-born.
- C. Recent contact to a person with active TB disease.
- D. Both B and C

EVALUATION OF A CONTACT TO A PATIENT WITH PULMONARY TB

2) What places her at high risk for TB disease?

- A. Age
- B. She is foreign-born.
- C. Recent contact to a person with active TB disease.

D. Both B and C

Rationale: People at high risk for progressing to TB disease after becoming infected with *M. tuberculosis* includes those identified in a contact investigation and foreign-born persons from areas with high incidence of TB.¹⁷

EVALUATION OF A CONTACT TO A PATIENT WITH PULMONARY TB

She was referred for a CXR and medical evaluation. Her CXR report was abnormal with cavitory lesion in the left apex with left apical pleural thickening and her medical examination revealed no significant findings. Given her multiple risk factors for TB disease, she is placed in respiratory isolation and instructed to provide sputa. She is unable to provide a natural sputum specimen, even with coaching.

EVALUATION OF A CONTACT TO A PATIENT WITH PULMONARY TB

- 3) What is the next appropriate action by the local health department nurse?**
- A. Do nothing, if she cannot produce a sputum she likely doesn't have TB disease.
 - B. Start her on treatment for TB infection.
 - C. Arrange for a sputum induction.
 - D. Start her on treatment for TB disease.

EVALUATION OF A CONTACT TO A PATIENT WITH PULMONARY TB

3) What is the next appropriate action by the local health department nurse? A. Do nothing, if she cannot produce a sputum she likely doesn't have TB disease.

B. Start her on treatment for TB infection.

C. Arrange for a sputum induction.

D. Start her on treatment for TB disease.

Rationale: A sputum induction procedure should be arranged for patients who are unable to produce a natural sputum specimen.

EVALUATION OF A CONTACT TO A PATIENT WITH PULMONARY TB

With the help of induction, she is able to provide one sputum sample which was reported back as AFB-smear negative. The physician initiated standard four drug regimen based on radiographic abnormality, positive skin test and significant weight loss.

EVALUATION OF A CONTACT TO A PATIENT WITH PULMONARY TB

- 4) Is this patient considered infectious?** A. This patient could potentially be infectious.
- B. This patient is not infectious since her sputum was AFB smear negative.
- C. This patient is not infectious since she has only extrapulmonary TB.
- D. This patient is not infectious since her sputum had to be induced

EVALUATION OF A CONTACT TO A PATIENT WITH PULMONARY TB

4) Is this patient considered infectious?

A. This patient could potentially be infectious.

B. This patient is not infectious since her sputum was AFB smear negative.

C. This patient is not infectious since she has only extrapulmonary TB.

D. This patient is not infectious since her sputum had to be induced

Rationale: A cavity in the lung is one of many factors associated with infectiousness.

EVALUATION OF A CONTACT TO A PATIENT WITH PULMONARY TB

5.) Should a contact investigation be initiated?

- A. No, she is already part of a contact investigation.
- B. No, culture confirmation has not been received.
- C. No, her sputum was negative.
- D. Yes, she is a secondary case of TB.

EVALUATION OF A CONTACT TO A PATIENT WITH PULMONARY TB

5.) Should a contact investigation be initiated?

- A. No, she is already part of a contact investigation.
- B. No, culture confirmation has not been received.
- C. No, her sputum was negative.

D. Yes, she is a secondary case of TB.

Rationale: A contact investigation should be initiated for a person suspected of pulmonary tuberculosis with a cavitary CXR.

https://www.heartlandntbc.org/wp-content/uploads/2021/12/case_studies_tb_ncm_training_tools.pdf

EVALUATION OF A CONTACT TO A PATIENT WITH PULMONARY TB

Reflection

In this scenario, the local health department has identified a contact to a patient diagnosed with pulmonary TB. The contact was initially evaluated with a TST and a symptom screening. Although the contact is foreign born and there was less than a 10 mm difference between her previous TST and her current one, any person identified during a contact investigation with a TST induration > 5 mm is considered positive. Along with her risk factors for TB disease her abnormal CXR report changes her classification from a contact to a potential secondary case of TB. Often when patients are asymptomatic, they are unable to produce sputa spontaneously and must be coached. Coaching can include demonstrating deep breathing techniques such as huffing and physically repositioning the patient for optimal production of sputa. If after proper coaching, the patient is unable to produce a natural sputa the local health department should arrange for a sputum induction. It is important to recognize that a patient with one AFB smear negative result does not meet the requirement for determining potential infectiousness, regardless of the patient's inability to produce a sputa naturally. Given that she is being considered for pulmonary TB, has negative AFB sputum smears, and a cavitary CXR, a contact investigation surrounding this patient should be initiated.