

Case Presentation

Hookah Smoking: A Rising Tuberculosis Health Risk Behavior

Case History:

A 20 year old Russian university student, who had entered the United States 2 ½ years earlier, was diagnosed with extremely drug resistant tuberculosis (XDR TB). She noted travel back to Russia 6 months prior to the onset of symptoms. She denied any previous history of tuberculosis (TB) or exposure to anyone with TB. She noted a "large red swelling" at the site of a TB skin test which she received prior to entry into the United States. She presented to an emergency room with fever, chills, and night sweats which had worsened over the previous week. She also noted a 2 ½ month history of cough, a six month history of fatigue, and weight loss of 10 pounds. In the week prior to admission she received antibiotics for a presumed community acquired pneumonia but her symptoms and chest radiograph worsened. She was admitted to the hospital and underwent bronchiolavial lavage which was positive on nucleic acid amplification for *M. tuberculosis (TB)* and Klebsiella, a bacterial pathogen which can cause severe pneumonia. Treatment with the standard four drug regimen of isoniazid, rifampin, ethambutol, and pyrazinamide was started along with broad spectrum antibiotics. She had resolution of her fever, but persistence of systemic symptoms of weight loss, fatigue and cough. Her culture grew *M. tuberculosis* which was resistant to isoniazid, ethambutol, rifampin, streptomycin, ethionamide, kanamycin, rifabutine, ofloxacin, levofloxacin, amikacin, and PAS and susceptible to capreomycin, ethambutol (on agar only), linezolid, clofazamine, and cycloserine; intermediate susceptibility to moxifloxacin at an MIC of 1.0ug/ml was noted. This resistance pattern met the World Health Organization (WHO) definition of XDR-TB: TB that is resistant to isoniazid, rifampin, a fluoroquinolone, and at least one of the three second-line injectable drugs (amikacin, kanamycin, or capreomycin). Medical consultants from Heartland recommended hospitalization for isolation and initiation of therapy. After eight weeks of treatment with capreomycin, linezolid, moxifloxacin, clofazamine, and cycloserine, she converted her cultures to negative. She has tolerated the regimen very well and at least 24 months of treatment is planned for completion of therapy.

A contact investigation was initiated using both a concentric circle approach and a thorough social history and assessment. The patient in this case study was cooperative with the contact investigation interview, but was not able to provide last names of many individuals. Contacts identified included traditional contacts such as classmates, persons from her study groups, co-workers, household, family, and close social contacts. Recognition of social activities and the varying educational and volunteer activities which a university student may participate in is critical when conducting a contact investigation in a university setting. She provided additional information on a large variety of activities she was involved in, places of socialization, cell phone contacts, and Facebook contacts. She noted membership in a modeling club including a day long road trip with four other members to attend a function. She volunteered in a variety of university sponsored activities, and some of her class work included contact with young children. She also reported water pipe smoking at a local hookah bar. Recently another university student with multiple drug resistant tuberculosis noted a history of socializing in a hookah bar.

The risk of exposure and transmission in non-traditional activities is often uncertain, thus it is essential to identify and investigate all information elicited from the patient. Contact investigation is a critical component in controlling and eliminating tuberculosis, and serves to identify persons who have been exposed to active tuberculosis disease.¹ Non-traditional activities should be explored thoroughly as they might be a previously unknown conduit for transmission. In addition such activities may need to be identified as emerging health risk behaviors.

Case Presentation continued from Page 7

Hookah Background:

Hookah bars are an increasingly common site of socialization for young people, especially university students from middle and upper income families. Hookah involves a water pipe with multiple attached hoses and a number of individuals who gather at a hookah bar to smoke flavored tobacco. A single mouthpiece is shared between persons to inhale smoke from the apparatus. The water pipe (hookah) has an attached water bowl that is filled halfway with water. A hose is connected to the top of the water bowl and on the opposite side is a mouthpiece from which the smoker inhales. The smoke passes through the water before being inhaled through the mouthpiece.² When hookah bubbles through water at the base of a hookah pipe, it cools the smoke. This cooling process forces a hookah smoker to inhale twice as deeply as a cigarette smoker, which causes the smoke to penetrate deeper into the lungs. Additionally, when mouthpieces are shared there is an added risk of acquiring a variety of respiratory infections including viruses, oral bacteria infections, and tuberculosis.³ Researchers note that second-hand smoke and the spread of infectious diseases such as tuberculosis and herpes make hookah use a growing public health concern.⁴



Teaching Points:

- The World Health Organization (WHO) defines XDR-TB as TB that is resistant to isoniazid, rifampin, a fluoroquinolone, and at least one of three injectable second-line drugs (amikacin, kanamycin, or capreomycin).
- A contact investigation is an essential component in controlling and eliminating tuberculosis, and it serves to identify persons who have been exposed to someone with active tuberculosis disease.
- Recognition of social activities and the varying educational and volunteer activities available to university students is critical when conducting a contact investigation with a student.
- The hookah bar is an increasingly common site of socialization for young people, especially university students from middle and upper income families.
- When mouthpieces of Hookah pipes are shared the risk of getting colds, viruses, oral bacteria infections, and other communicable diseases like tuberculosis is increased.
- Researchers say that second-hand smoke and the spread of infectious diseases such as tuberculosis and herpes make hookah use a growing public health concern.
- More research is needed to identify the relationship of the transmission of TB and Hookah bars.

Researched by: Alysia Thomas, Heartland National TB Center

Written by: Debbie Onofre, Heartland National TB Center

Case Presentation continued from Page 2

FOOTNOTES:

¹*Guidelines for the Investigation of Contacts of Persons with Infectious Tuberculosis.* MMWR 2005; 54 (RR-15, 1-37).

²WHO Study Group on Tobacco Product Regulation (TobReg). *Waterpipe Tobacco Smoking: Health Effects, Research Needs and Recommended Actions by Regulators.* WHO, Geneva. 2005.

³Nuwayhid, I., Yamout, B., Azar, G., and Kambris, M. *Narghile (Hubble-Bubble) Smoking, Low Birth Weight and Other Pregnancy Outcomes.* American Journal of Epidemiology. 1998; V 48, No. 4. pp: 375-383.

⁴Knishkowsky, B., Amitai, Y. Water-Pipe (Narghile) Smoking: An Emerging Health Risk Behavior. *Pediatrics.* 2005; 116: e113-e119.

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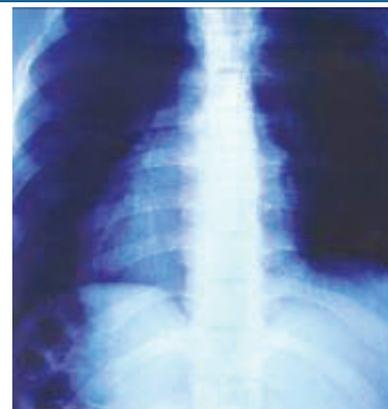
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