

Postexposure Prophylaxis: Tuberculosis, Rabies, and Meningococcal Infection: Review Questions

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QUESTIONS

Choose the single best answer for each question.

- All of the following purified protein derivative (PPD) test results are considered positive EXCEPT:**
 - 5-mm diameter induration in a 25-year-old homosexual man who uses intravenous drugs, HIV status unknown
 - 5-mm diameter induration in a 55-year-old patient with type I diabetes mellitus
 - 10-mm diameter induration in a 65-year-old nursing home patient
 - 10-mm diameter induration in a 45-year-old patient who has had a gastrectomy
- All of the following prophylactic regimens are acceptable after meningococcus exposure in a 40-year-old man EXCEPT:**
 - Benzathine penicillin, 4 million units intramuscularly in a single dose
 - Rifampin, 600 mg orally twice a day for 2 days
 - Ceftriaxone, 250 mg intramuscularly in a single dose
 - Ciprofloxacin, 500 mg orally in a single dose
- A patient calls about her son, who was petting their dog shortly after the dog had killed a raccoon. On testing, the raccoon had rabies. The dog had been appropriately vaccinated. Which of the following management options is most appropriate?**
 - No prophylaxis is necessary, but the dog should be closely monitored by a veterinarian for 10 days and should receive a rabies booster.
 - The dog should be euthanized and the brain submitted for rabies testing. For the son, human rabies immunoglobulin (HRIG) should be administered and rabies vaccination series initiated, which can be discontinued if rabies testing is negative.
 - The dog should be euthanized and the brain submitted for rabies testing. Rabies prophylaxis for the son should be withheld until the results of the rabies testing are finalized.
 - HRIG should be administered and rabies vaccination series given to household members with direct contact with the dog.
- A 44-year-old HIV-positive white woman with a history of intravenous drug use was diagnosed with pulmonary tuberculosis (TB) in New York City 6 years ago. She was treated with isoniazid (INH), rifampin, and pyrazinamide, but with unclear compliance. Six years later, she is diagnosed with a cavitary lung lesion. She is admitted to a clinic and found to have positive acid-fast bacillus smears. Between her check-in time and placement into respiratory isolation, several clinic employees are exposed to her respiratory secretions. Follow-up PPD tests are given for all exposed employees. Two employees with previously negative PPD test results now have positive results. Which of the following is the most appropriate postexposure prophylaxis (PEP) plan for these employees?**
 - No PEP is necessary.
 - Start INH, rifampin, pyrazinamide, and ethambutol, then adjust regimen when results from the index patient's sensitivity profile are available.
 - Treat with INH for 6 months; if isolated organism is resistant, extend duration of treatment to 12 months.
 - Hold PEP until sensitivity profile from index patient is available and then choose a regimen based on sensitivities.
 - Start pyrazinamide and ethambutol, then adjust regimen when results from the index patient's sensitivity profile are available.

(turn page for answers)

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EXPLANATION OF ANSWERS

1. (B) 5-mm diameter induration in a 55-year-old patient with type I diabetes mellitus. The intravenous drug user is at high risk for HIV. With unknown HIV status he should be considered at high risk for developing active TB; therefore, a 5-mm induration diameter is a positive PPD result. The diabetes patient and the gastrectomy patient are considered to be in populations at increased risk; therefore, a diameter of 10 mm or greater is considered to be a positive PPD result. The nursing home patient is in a high-prevalence group; therefore, a diameter of 10 mm or greater is also a positive PPD result.

2. (A) Benzathine penicillin, 4 million units intramuscularly in a single dose. Penicillin does not eradicate nasopharyngeal carriage and is not appropriate for meningococcal prophylaxis. Rifampin 600 mg orally twice a day for 2 days, ceftriaxone 250 mg intramuscularly in a single dose, and ciprofloxacin 500 mg orally in a single dose are all acceptable regimens for eradication of meningococcal pharyngeal colonization in adults. Rifampin is the least expensive option and has the most clinical experience, and thus is the first-line recommendation.

3. (A) No prophylaxis is necessary, but the dog should be closely monitored by a veterinarian for 10 days and should receive a rabies booster. The dog is at low risk for developing rabies because of previous vaccination, but should receive a rabies booster. Even if the dog were known to have rabies, the boy's exposure (petting the dog) would not warrant PEP.

4. (D) Hold PEP until sensitivity profile from index patient is available and then choose a regimen based on sensitivities. The index patient is at high risk for multidrug-resistant tuberculosis (MDR-TB). She was infected in New York City which has a high prevalence of MDR-TB. Moreover, she was treated and subsequently relapsed, which should always raise the suspicion of possible MDR-TB. Once admitted, the index patient will be placed on multidrug therapy (four to five drugs) with at least two or three drugs not previously used in this patient. In this case, sensitivity data are not yet available. The mycobacterium has been isolated, and the antibiogram should be available within the next few weeks. The treatment dilemma arises when considering PEP for the clinic employees who have recently converted after exposure to this patient. The only extensively studied PEP regimen is INH, whose effectiveness has been well documented in several large-scale, well-designed clinical trials. In the event of INH-resistant strains, PEP should be tailored to the susceptibility profiles. For INH-resistant,

rifampin-sensitive strains, rifampin is the agent of choice. Rifampin is bactericidal against both intracellular and extracellular organisms. As demonstrated by Villarino et al,¹ rifampin at a dose approximating 10 mg/kg body weight per day (maximum 600 mg per day) for 24 weeks can be quite effective as TB PEP. A recent trial in HIV-infected patients² demonstrated that 8 weeks of twice weekly rifampin plus pyrazinamide was almost as efficacious as 24 weeks of twice weekly INH; failure rates were 5.0% and 3.8%, respectively. The Centers for Disease Control and Prevention now consider 2 months of rifampin plus pyrazinamide a reasonable choice for prophylaxis in HIV-infected patients.³ For strains resistant to both INH and rifampin, good data on various regimens are not available. Frequently, combination therapy with pyrazinamide and ofloxacin is used and has good anecdotal results; however, clinical trials evaluating this regimen's efficacy are lacking. In the case of MDR-TB, PEP should consist of two drugs to which the index patient's TB strain is susceptible. Currently no official recommendations exist regarding therapy during the interim between PPD conversion and sensitivity testing of the index patient. In contrast to HIV exposure, in which PEP should be initiated within hours of exposure, TB exposure is not an emergency and does not require immediate initiation of PEP. Given the potential for toxic side effects and the importance of completing a regimen for full efficacy, it is reasonable to withhold initiation of prophylaxis until sensitivities are available. At that time an appropriate regimen can be chosen to maximize efficacy and decrease toxicity.

REFERENCES

1. Villarino ME, Ridzon R, Weismuller PC, et al: Rifampin preventive therapy for tuberculosis infection: experience with 157 adolescents. *Am J Respir Crit Care Med* 1997;155:1735-1738.
2. Halsey NA, Coberly JS, Desormeaux J, et al: Randomised trial of isoniazid versus rifampicin and pyrazinamide for prevention of tuberculosis in HIV-I infection. *Lancet* 1998;351:786-792.
3. Prevention and treatment of tuberculosis among patients infected with human immunodeficiency virus: principles of therapy and revised recommendations. *MMWR Morb Mortal Wkly Rep* 1998;47(RR-20):1-61.

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