Chapter 32 Antimycobacterial Drugs

1. A 22-year-old female intravenous drug user was admitted to the hospital with a 4-week history of cough and fever. A chest radiograph showed left upper lobe cavitary infiltrate. Cultures of sputum yielded M. tuberculosis susceptible to all antimycobacterial drugs. The patient received self-administered isoniazid, rifampin, pyrazinamide, and ethambutol. Two weeks following initiation of therapy, the patient is concerned that her urine is a "funny-looking reddish color." Which drug is the most likely cause?
    - Rifampin
    - Ethambutol
    - Pyrazinamide
    - Isoniazid
2. A 32-year-old man has been on standard four-drug therapy for active pulmonary tuberculosis for the past 2 months. He has no other comorbid conditions. At his regular clinic visit, he complains of a "pins and needles" sensation in his feet. Which drug is most likely causing this?
    - Isoniazid
    - Rifampin
    - Ethambutol
    - Pyrazinamide
3. A 32-year-old man who takes standard four-drug therapy for active pulmonary tuberculosis complains about a "pins and needles" feeling in his feet. He is diagnosed with peripheral neuropathy. Which vitamin should have been included in the regimen for this patient to reduce the risk of neuropathy?
    - Thiamine
    - Niacin
    - Pyridoxine
    - Ascorbic acid
4. A 23-year-old man was started on standard four-drug antimycobacterial therapy for treatment of active TB. He has epilepsy, which is controlled with carbamazepine. He has had no

seizures in 5 years; however, upon return to clinic at 1 month, he reports having two seizures since his last visit. Which drug may be the reason his carbamazepine is less effective?

- Ethambutol
- Pyrazinamide
- Isoniazid
- Rifampin

5. A 26-year-old female HIV patient was recently diagnosed with active tuberculosis. Currently, she is on a stable HIV regimen consisting of two protease inhibitors and two nucleoside reverse transcriptase inhibitors. Which is the most appropriate regimen for treatment of her tuberculosis?
    - Rifampin + moxifloxacin + pyrazinamide + ethambuto
    - Rifabutin + isoniazid + pyrazinamide + ethambutol
    - Rifapentine + isoniazid + pyrazinamide + ethambutol
    - Rifampin + isoniazid + pyrazinamide + ethambutol
6. A 28-year-old man with MDR-TB is receiving the following medications for treatment: pyrazinamide, ethionamide, moxifloxacin, streptomycin, and paraaminosalicylic acid. Which drug in his regimen requires monitoring for QT prolongation?
    - Ethionamide
    - Streptomycin
    - Pyrazinamide
    - Moxifloxacin
7. A 46-year-old male patient with active tuberculosis is to be initiated on the four-drug regimen of isoniazid, rifampin, pyrazinamide, and ethambutol. The patient reports no other conditions except gout. Which pair of antituberculosis drugs has the potential to worsen his gout?
    - Rifampin and isoniazid
    - Ethambutol and pyrazinamide
    - Isoniazid and ethambutol
    - Rifampin and ethambutol
8. A 24-year-old man returns to the clinic 1 month after starting treatment for tuberculosis. He is receiving isoniazid, rifampin, pyrazinamide, and ethambutol. He states that he feels fine,

but now is having difficulty reading and feels he may need to get glasses. Which drug may be causing his decline in vision?

- Pyrazinamide
- Rifampin
- Isoniazid
- Ethambutol

9. A 36-year-old woman with multidrug-resistant tuberculosis is being treated with the following agents: streptomycin, cycloserine, pyrazinamide, ethionamide, and p-aminosalicylic acid. Her physician recently noticed that she appears confused and anxious, and has a slight tremor. Which drug is most likely contributing to her current state?
    - Pyrazinamide
    - Ethionamide
    - Streptomycin
    - Cycloserine
10. Which is correct regarding clofazimine in the treatment of leprosy?
    - Peripheral neuropathy is one of the most common adverse effects seen with the drug.
    - Clofazimine may cause skin discoloration over time.
    - Clofazimine should not be used in patients with a deficiency in glucose-6-phosphate dehydrogenase (G6PD).
    - The risk of erythema nodosum leprosum is increased in patients given clofazimine.


Answers
Below

1.

Correct Response: Rifampin
Explanation: Rifampin (as well as rifabutin and rifapentine) and its metabolites may color urine, feces, saliva, sputum, sweat, and tears a bright red-orange. Patients should be counseled that this is an adverse effect which is not harmful, but can stain clothes and contact lenses.

2.

Correct Response: Isoniazid
Explanation: Standard four-drug therapy for active pulmonary tuberculosis includes isoniazid. Isoniazid can cause peripheral neuropathy with symptoms including paresthesias, such as “pins and needles” and numbness.

3.

Correct Response: Pyridoxine
Explanation: Concurrent administration of pyridoxine (vitamin B_6) prevents the neuropathic actions of isoniazid. The relative deficiency of pyridoxine appears to be due to the interference of isoniazid with its activation and enhancement of the excretion of pyridoxine.

4.

Correct Response: Rifampin
Explanation: Rifampin is a potent inducer of cytochrome P450–dependent drug-metabolizing enzymes and may reduce the concentration of carbamazepine. None of the other drugs listed induce cytochrome P450 enzymes.

5.

Correct Response: Rifabutin + isoniazid + pyrazinamide + ethambutol
Explanation: Rifabutin is recommended in place of rifampin in patients coinfected with HIV, since it is a less potent inducer of CYP enzymes than rifampin. However, rifabutin is a CYP3A4 substrate and “bidirectional” interactions may result. That is, other medications, such as the protease inhibitors, may affect the concentration of rifabutin, requiring dose adjustment of rifabutin or use of alternative HIV agents.

6.

Correct Response: Moxifloxacin
Explanation: While rare, prolongation of the QT interval is associated with the fluoroquinolones. QT interval prolongation is due to the blocking of voltage-gated potassium channels. Of the available quinolones, moxifloxacin has the greatest risk. The risk may be minimized by avoiding coadministration of other medications, which may prolong the QT interval. The other agents are not associated with QT prolongation.

7.

Correct Response: Ethambutol and pyrazinamide
Explanation: Ethambutol and especially pyrazinamide both may increase uric acid concentrations and have the potential to precipitate gouty attacks. Pyrazinamideand

ethambutol-induced hyperuricemia may be controlled by use of antigout medications, such as xanthine oxidase inhibitors. Symptoms of gout must be monitored closely.

8.

Correct Response: Ethambutol
Explanation: Optic neuritis, exhibited as a decrease in visual acuity or loss of color discrimination, is the most important side effect associated with ethambutol. Visual disturbances generally are dose related and more common in patients with reduced renal function. They are reversible (weeks to months) if ethambutol is discontinued promptly.

9.

Correct Response: Cycloserine
Explanation: Cycloserine easily penetrates the CNS and may cause adverse effects involving the nervous system, including psychoses, drowsiness, tremor, paresthesia, aggression, and suicidal ideation, among others. Patients should be monitored continually for these signs and symptoms.

10.

Correct Response: Clofazimine may cause skin discoloration over time.
Explanation: Clofazimine is a phenazine dye and causes bronzing (the skin pigment color will change color, from pink to brownish-black), especially in fair-skinned patients. This occurs in a majority of patients, and generally is not considered harmful but may take several months to years to fade after discontinuing the medication.