CHAPTER 39
Antitubercular Agents
NDEG 26A – Pharmacology I
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Antitubercular Agents
• Tuberculosis (TB)
• Caused by *Mycobacterium tuberculosis*
• Antitubercular agents treat all forms of *Mycobacterium*

*Mycobacterium* Infections
• Common infection sites
  • Lung (primary site)
  • Brain
  • Bone
  • Liver
  • Kidney

*Mycobacterium* Infections (cont’d)
• Aerobic bacillus
• Passed from infected:
  – Humans
  – Cows (bovine)
  – Birds (avian)

*Mycobacterium* Infections (cont’d)
• Tubercle bacilli are conveyed by droplets
• Droplets are expelled by coughing or sneezing, then gain entry into the body by inhalation
• Tubercle bacilli then spread to other body organs via blood and lymphatic systems
• Tubercle bacilli may become dormant, or walled off by calcified or fibrous tissue

Antitubercular Agents
First-Line Agents
isoniazid*
etambutol
pyrazinamide (PZA)
rifampin
streptomycin

Second-Line Agents
capreomycin
cycloserine
ethionamide
kanamycin
para-aminosalicylic acid (PAS)

*Most frequently used
Mechanism of Action

Three groups
• Protein wall synthesis inhibitors (streptomycin, kanamycin, capreomycin, rifampin, rifabutin)
• Cell wall synthesis inhibitors (cycloserine, ethionamide, isoniazid)
• Other mechanisms of action

Isoniazid (INH)

• Drug of choice for TB
• Resistant strains of *Mycobacterium* emerging
• Metabolized in the liver through acetylation—watch for “slow acetylators”
• Used alone or in combination with other agents

Indications

Used for the prophylaxis or treatment of TB

Antitubercular Therapy

Effectiveness depends upon:
• Type of infection
• Adequate dosing
• Sufficient duration of treatment
• Drug compliance
• Selection of an effective drug combination

Antitubercular Therapy (cont'd)

Problems
• Drug-resistant organisms
• Drug toxicity
• Patient noncompliance

Antitubercular Therapy (cont'd)

Multidrug-resistant TB (MDR-TB)
### Side Effects

- **INH**
  - Peripheral neuritis, hepatotoxicity
- **Ethambutol**
  - Retrobulbar neuritis, blindness
- **Rifampin**
  - Hepatitis, discoloration of urine, stools

### Nursing Implications

- Obtain a thorough medical history and assessment
- Perform liver function studies in patients who are to receive isoniazid or rifampin (especially in elderly patients or those who use alcohol daily)
- Assess for contraindications to the various agents, conditions for cautious use, and potential drug interactions

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### Nursing Implications

Patient education is critical

- Therapy may last for up to 24 months
- Take medications exactly as ordered, at the same time every day
- Emphasize the importance of strict compliance to regimen for improvement of condition or cure

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### Nursing Implications

Patient education is critical (cont’d)

- Remind patients that they are contagious during the initial period of their illness— instruct in proper hygiene and prevention of the spread of infected droplets
- Emphasize to patients to take care of themselves, including adequate nutrition and rest

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### Nursing Implications

- Patients should not consume alcohol while on these medications or take other medications, including OTC, unless they check with their physician
- Diabetic patients taking INH should monitor blood glucose levels because hyperglycemia may occur
- INH and rifampin cause oral contraceptives to become ineffective; another form of birth control will be needed

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### Nursing Implications

- Patients who are taking rifampin should be told that their urine, stool, saliva, sputum, sweat, or tears may become reddish orange; even contact lenses may be stained
- Pyridoxine may be needed to combat neurologic side effects associated with INH therapy
- Oral preparations may be given with meals to reduce GI upset, even though recommendations are to take them 1 hour before or 2 hours after meals
Nursing Implications

Monitor for side effects
- Instruct patients on the side effects that should be reported to the physician immediately
- These include fatigue, nausea, vomiting, numbness and tingling of the extremities, fever, loss of appetite, depression, jaundice

Nursing Implications

Monitor for therapeutic effects
- Decrease in symptoms of TB, such as cough and fever
- Lab studies (culture and sensitivity tests) and CXR should confirm clinical findings
- Watch for lack of clinical response to therapy, indicating possible drug resistance