Antiprotozoal and anthelmintics
15-04-2018
Antiprotozoal Drugs

- Metronidazole
- Tinidazole

Penetrate protozoal and bacterial cells but not mammalian cells. Work as an electron sink, so, reduced at 5-nitro group. Nitroreductase is only found in anaerobic organisms. The reduced molecule disrupts replication and transcription and inhibits DNA repair.
Metronidazole

**Spectrum of Activity:**

- *E. histolytica*
- *G. lamblia*
- *T. vaginalis*
- *Blastocystis hominis*
- *B. coli*
- *Dracunculus medinensis*

Also anaerobic G+ve and G-ve bacteria

Resistance is rare.
Metronidazole

**Kinetics:**
Good absorption and distribution, 
$\text{t}_{1/2} \ 8 \text{h}$. 
Metabolized by oxidation and glucuronide formation.
Metronidazole

**Clinical Uses:**

- All forms of amebiasis, except for the cyst passers (Diloxanide Furoate, Paromomycin or diiodohydroxyquin).
- Giardiasis.
- Trichomoniasis.
- Anaerobic bacterial infection (in dentistry).
- D. medinensis (guinea worm).
Metronidazole

Adverse Reactions:


• Tinidazole is better tolerated.
**Diloxanide Furoate**

- Effective luminal amebicide.
- Mechanism unknown.
- Drug of choice for asymptomatic cyst passers.
- Flatulence, nausea, cramps, rashes.
Antibiotics

Erythromycin
Tetracycline
  Alter bacterial flora and prevent secondary infection.

Paromomycin:
  • Aminoglycoside.
  • Direct action on ameba in the lumen.
  • Anthelminthic and for visceral leishmaniasis.
Anthelmintic Drugs

Albendazole:

Broad spectrum, which inhibits microtubule synthesis.

- Hydatid disease.
- Cysticercosis: usually given with corticosteroids to decrease inflammation caused by dying organisms.
- Pinworm.
- Hookworm.
- Ascariasis.
- Trichuriasis.
- Strongyloidiasis.
- Others
Anthelmintic Drugs

Bithionol:
- Drug of choice for Fascioliasis.
- Alternative drug for pulmonary paragonimiasis.
Anthelmintic Drugs

Diethylcarbamazepine Citrate:
• Drug of choice for the treatment and prophylaxis of:
  Filariasis: *W. bancrofti, Brugia malayi, B. timori*.
  Loiasis: *Loa loa*.
  Tropical eosinophilia: *Monsonella streptocerca*.

Immobilizes micrifilaria and alters their surface structure, displacing them from tissues and making them susceptible to destruction by host defense mechanisms.
Anthelmintic Drugs

Doxycycline:
- *W. bancrofti*.
- *Onchocerciasis*.

- Works indirectly, by killing *Wolbachia*, an intracellular bacterial symbiont of filarial parasites.
- Used for treatment and mass chemotherapy campaigns.
Anthelmintic Drugs

Ivermectin:
- **Strongyloidosis:**
  Paralyzes nematodes and arthropods by intensifying GABA mediated transmission of signals in peripheral nerves.
- **Onchocerciasis:**
  Blocks the release of microfilaria for some months after therapy.
  Also effective in controlling scabies, lice, and cutaneous larva migrans.
Ivermectin:

**Mazotti Reaction:**
Occurs in 5-30% of patients, usually mild.
Due to killing of microfilaria.
Fever, headache, dizziness, somnolence, weakness, rash, pruritus, diarrhea, joint and muscle pains, hypotension, tachycardia
Anthelmintic Drugs

Mebendazole:
- Wide spectrum.
- Inhibits microtubule synthesis.
- Ascariasis.
- Trichuriasis.
- Hookworm.
- Pinworm.
- Tablets chewed before swallowing.
- Safe drug.
Anthelmintic Drugs

Metrifonate:
- *Schistosoma haematobium.*
- Not for *S. mansoni* or *S. japonicum.*
- Organophosphate, inhibits cholinesterase, and thus paralyzes the worm, resulting in their shift from the bladder venous plexus to the small arterioles of the lung, where they are trapped, encased by the immune system and die.
- Treatment.
- Mass treatment programs.
- Prophylaxis.
Niclosamide:
Second-line drug for most tapeworm infections.
• Kills adult worms, but not the ova.
• Works by inhibition of oxidative phosphorylation.
• 2 gm single dose on an empty stomach, chewed and swallowed.
  Purgative needed.
Anthelmintic Drugs

Oxamniquine:

- Alternative to praziquantel for the treatment of *S. mansoni*, not for the others.
- Worms are detached from terminal venules in the mesentery and transit to the liver, where they die.
- Also for massive treatment.
- Safe drug.
Anthelmintic Drugs

Piperazine:

- Ascariasis.
- Causes paralysis by blocking acetylcholine, worms expelled by normal peristalsis.

70 mg/day for 2-8 days.
Or, repeat after 2 weeks.
Anthelmintic Drugs

Praziquantel:
- Schistosomes, all species, drug of choice.
- Trematodes: Clonorchiasis, Opisthorchiasis and Paragonimiasis
- Cestodes including cysticercosis.
- Increases permeability of the worm to calcium, resulting in paralysis, dislodgment and death.
- Mild and transient adverse effects, except for neurocysticercosis.
Anthelmintic Drugs

Pyrantel Pamoate:

Broad spectrum:
- Pinworm.
- Ascaris.
- Trichostrongylus orientalis.
- Hookworms.

Effective within the intestinal tract, not in the tissues or against the ova.

Works as a neuromuscular blocker.
11 mg/kg, single dose
Pancreatic Enzymes

These medications contain digestive enzymes to help break down and digest fats, starch, and proteins in food.

Extracts of hog pancreas.

Used in conditions where the pancreas cannot make or does not release enough digestive enzymes into the small intestines to digest the food (e.g., chronic pancreatitis, cystic fibrosis, cancer of the pancreas, post-pancreatectomy, post-gastrointestinal bypass surgery).
Pancrelipase

- Available in sizes with different amounts of lipase, amylase and protease.

- Dose should be adjusted according to age, weight, degree of pancreatic insufficiency, and the amount of dietary fat intake.
Pancrelipase

- Taken with plenty of fluids.
- Used regularly to get the most benefit from it.
- Taken with every meal or snack.
Pancrelipase

• Side Effects:

• Diarrhea, constipation, headache, abdominal pain/cramps/bloating, gas, dizziness, cough, nausea, or vomiting.

• May cause mucositis if not swallowed quickly.
Bile Acid therapy for Gallstones

• Ursodiol:
  
  • Naturally occurring bile acid, from bears.
  
  • Absorbed in the g.i.t. and conjugated in the liver with glycine or taurine, and excreted in the bile.
  
  • Blocks hepatic cholesterol synthesis and thereby decreases secretion of cholesterol by the liver and the amount of cholesterol in bile
  
  • Also, stabilizes hepatocyte canalicular membranes.
Bile Acid therapy for Gallstones

- Clinical Uses:
  - To dissolve small cholesterol gallstones in patients who refuse cholecystectomy or who are poor surgical candidates.
  - Prevention of gallstones in obese patients.
  - Early stage biliary cirrhosis.
  - Free of side effects.