

Anti-Parasitic drugs :

Anti-Protozoa

Luminal amebicides

- ★ For All Types Of Amebiasis
- ★ Treats asymptomatic Ameba's intestinal infections

Diloxanide Furoate

- Drug of choice in asymptomatic luminal infections
- Not active against tissue trophozoites
- Used with Amebicide (Metronidazole)
- SE: Flatulence, nausea & abdominal cramps, rashes
- (Splits into diloxanide & furoic acid)

Iodoquinol

Not against intestinal wall or extraintestinal trophozoites

Paramomycine Sulfate

- Luminal Amebicide
- Not against extraintestinal amebic infections.
- Parenteral Paramomycine is for visceral Leishmaniasis

SE: abdominal distress &

- diarrhea
- It is an aminoglycoside antibiotic
- Not absorbed by GIT

Metronidazole

- For
- ★ All E. histolytica Infections
- ★ Amebic Colitis (combined with luminal amebicide)
- ★ Extraluminal amebiasis
- ★ Giardiasis
- ★ Trichomoniasis

- Has a nitro group
- Inhibits nucleic acid synthesis when the nitrogroup is reduced by the anaerobic bac. & Protozoa.

- SE: metallic taste, dry mouth, nausea, headache.

-Infrequent: vomiting, diarrhea, insomnia, weakness, dizziness, thrush, rash, dysuria, dark urine, vertigo, paresthesias, and neutropenia.
-Rare: Pancreatitis and severe central nervous system toxicity (ataxia, encephalopathy, seizures)

- Oral metronidazole is readily absorbed
- HL = 7.5 hrs
- Not effective against luminal parasites
- Metro. + luminal amebicide = effective
- X pregnancy, nursing women
- Kills trophozoites NOT cysts.

Tinidazole

- For
- ★ All E. histolytica Infections

- SAME MOA & activity as Metro BUT better tolerated & ↓ toxicity
- HL = 12 - 14 hrs.

Tetracyclines & erythromycin

- Alternative drugs for moderate colitis
- Not for extra-intestinal disease

Dehydro-emetine or emetine

- For
- ★ amebic colitis
- ★ E. histolytica trophozoites
- ★ Severe amebiasis when metronidazole can't be used

Side Effects

- Pain, tenderness, and sterile abscesses at the injection site; diarrhea, nausea, and vomiting; muscle weakness and discomfort.
- Serious toxicities include cardiac arrhythmias, heart failure, and hypotension.
- avoided because of Toxicity
- Emetine = alkaloid derived from ipecac
- Dehydroemetine = Synthetic analog
- IM or SC for 3-5 days

Mnemonic

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 Luminal Located emedium
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Oxycycline : kills **① Wuchereria bancrofti** (lymphatic filariasis)

② Onchocerciasis (river blindness)

↳ kills Wolbachia (indirectly), an intracellular bac. ^{وَبَكْهَبَ} symbiont of filarial parasites

Ivermectin : kills **① Onchocerciasis** : ^{جُعَلٌ} microfilaricidal (It doesn't kill adult worms)

↳ SE: Fatigue, dizziness, nausea, vomiting, abd. pain, rashes

② Strongyloidiasis : Ivermectin is a GABA agonist, causing worm flaccid Paralysis.

↳ SE: mild in 5-30%

Severe: high fever, hypotension, & bronchospasm

- Swelling & abscesses at site of adult worm
- corneal opacities & eye lesions.

- Doesn't cross BBB.

Praziquantel

① Anti- Nematodes

- Ascaris
- Filarias
- hook worms (*enterobius*)
- pin worms (*Trichuris trichiura*)
- whip worms

Albendazole (oral)

- For (Broad Spectrum):
 ★ Hydatid Cyst
 ★ Cysticercosis
 ★ Intestinal nematodes:
 Pinworms & hookworms
 ★ NeuroCysticercosis
 "Along with Corticosteroids" (anti-inflamm.)
 - SE: In long-term use: abd. distress, headache, fever, fatigue, alopecia, ↑ liver enzymes
 Pancytopenia

- X Pregnancy & hypersensitive people

- Metabolized in liver to albendazole Sulphoxide
 - Inhibits microtubule Synthesis in Nematodes
 - Irreversibly impairs glucose uptake

Mebendazole (oral tablets)

"Wider spectrum than albendazole"

- ★ Kills Hook worms, pinworms, ascariasis, & trichuriasis
- Inhibits microtubule Synthesis in Nematodes
- Irreversibly impairs glucose uptake
- SE: mild GI disturbance, headache: Hypersensitivity rxn, agranulocytosis (rare), alopecia, ↑ liver enzymes
- More safe than albendazole
- Less than 10% of drug is absorbed Absorption increases with fatty meal.
- Converted to inactive metabolites rapidly in liver.
- Half life of 2-6 hours

- X < 2 yrs

Dyantel (oral)

Damoate ((wide spectrum))

- ★ Kills pinworms
- ★ Ascaris
- ★ *Trichostrongylus orientalis*
- ★ Hook worm (moderate activity)
- Effective in intestinal tract NOT in tissue/ova

- For pinworm, the dose is repeated in 2 weeks.
- For ascariasis, a single dose can be repeated if eggs are found 2 weeks after treatment.
- For hookworm, a single dose is effective against light infections.
- In heavy infections, a 3-day course.
- A course of treatment can be repeated in 2 weeks.

Piperazine (oral)

Diethyl Carbamazine citrate

- ★ For Ascariasis
- ★ Blocks Ach at the myoenteric junc.

↓ Paralysis of ascaris

- Generally mild (5-30%) nausea, vomiting, diarrhea, abdominal pain, dizziness, & headache.
- Neurotoxicity & allergic reactions are rare.

Diethyl Carbamazine citrate

For
 ★ Filariasis (Microfilariae are rapidly killed, adult worms are slowly killed)

★ Loa Loa

★ Tropical eosinophilia

(-Rapidly absorbed from gut.)

- Generally mild and transient, include headache, malaise, anorexia, weakness, nausea, vomiting, and dizziness.
- As a result of the release of proteins from dying microfilariae or adult worms: fever, malaise, papular rash, headache, gastrointestinal symptoms, cough, chest pain, and muscle or joint pain.
- Leukocytosis is common (white blood cell count above the normal range in the blood).
- Eosinophilia (abnormally high amounts of eosinophils).
- Proteinuria may also occur.

② Anti- Trematodes (Flukes)

- *Schistosoma mansoni*
- *Schistosoma japonicum*
- *Schistosoma haematobium*

Bithionol

- For
 ★ Sheep liver fluke (*fasciola hepatica*)
 ★ 2nd drug of choice in lung fluke (*Paragonimus westermani*)
 - works by uncoupling oxidative phosphorylation thus reducing ATP production in helminths
 - SE: mild: diarrhea, abd. cramps, nausea, vomiting, dizziness, headache, skin rashes

Praziquantel

- ★ For All schistosoma & other cestodes & trematodes including Cysticercosis
- ★ Mass treatment

- It increases the permeability of cell membranes to calcium, resulting in paralysis, dislodgement, and death.
- Mild and transient adverse effects, except for Neurocysticercosis due to inflammatory reactions around dying parasites.
- Safe and effective as a single oral dose.
- Plasma concentrations of it increase when it is taken with a high-carbohydrate meal

Metrifonate (oral)

- Safe- lowest
- ★ Only for *S. haematobium*
- ★ Prophylactic for children
- ★ Used in mass treatment programs
- ★ Not effective against *S. mansoni* & *S. japonicum*
- It is an organophosphate cholinesterase inhibitor

Oxamniquine

- ★ Alternatives to praziquantel for ONLY *S. mansoni*
- ★ Used extensively for Mass treatment
- ★ Combined with Metrifonate in mixed s. infections
- ★ Active against both mature & immature stages

- *Taenia Solium*
- *Taenia Saginata*
- *Diphyllobothrium latum*
- *Echinococcus granulosus*

③ Anti- Cestodes

Albenazole

See above

Niclosamide

- ★ For adults tapeworms
- inhibits oxidative phosphorylation OR stimulate ATPase
- SE: Mild, infrequent GI disturbance
- It is a Salicylamide derivative
- minimally absorbed

Unknown MOA: Contraction and paralytic of the worms results in detachment from terminal venules in the mesentery and transit to the liver, where many die. Surviving females return to the mesenteric vessels but cease to lay eggs

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