

Antihelminthic Drugs

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Drugs for Nematodes



Drugs for trematodes



Drugs for Cestodes



Drugs for Nematodes

I. Benzimidazoles

MOA: Inhibit microtubule synthesis & glucose uptake.

1. Mebendazole

a. Enterobiasis: single 100 mg, repeated after 2 & 4 weeks.

*All family are treated at the same time + general hygienic measures.

b. Other nematode infections: 100 mg twice daily for 3 successive days.

* iron is given in Ankylostomiasis to correct the associated anemia.

***side effects:** abdominal pain and diarrhea

2. Flubendazole:

similar to Mebendazole but also effective in **Strongyloides**.

3. Albendazole:

(broad-spectrum for nematodes & cestodes).

a. Nematode infection (ascaris, ankylostoma, enterobius & trichurius):

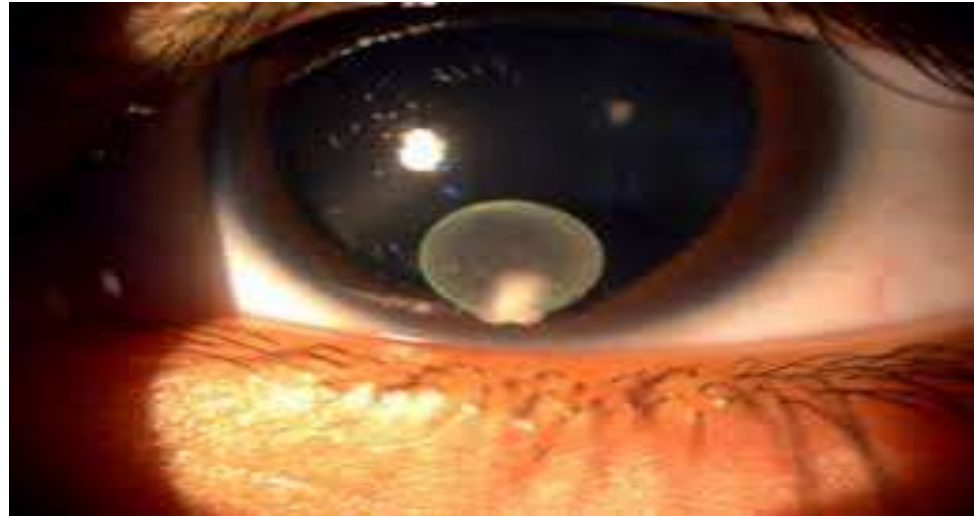
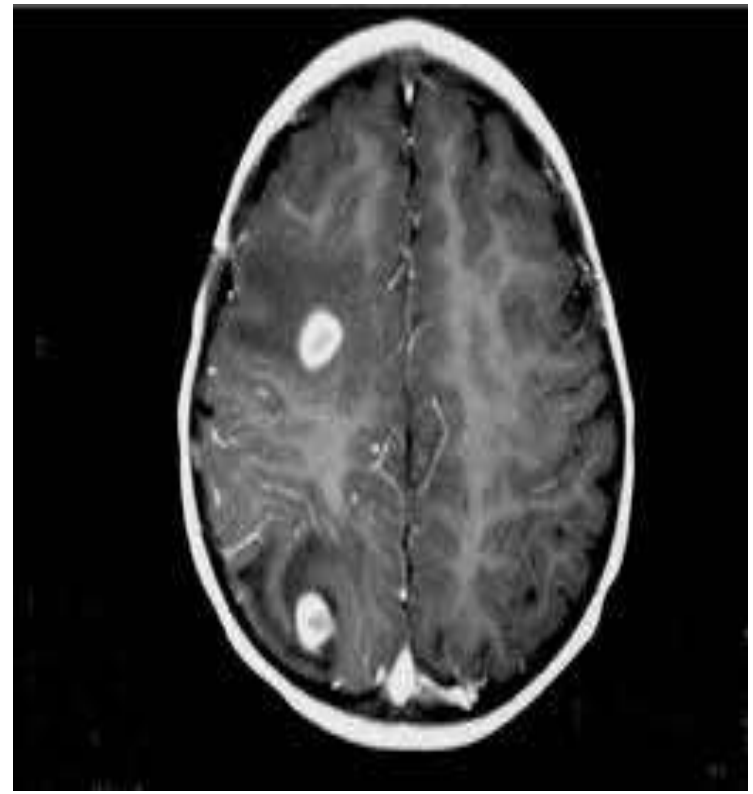
*Single oral dose 400 mg (repeated after 3 days for Ascaris & in 2 weeks for Enterobius).

b. Cestode infection: 1st choice in

* Hydatid disease.

*Neurocysticercosis: (parasitic central nervous system infection caused by the pork tapeworm *Taenia solium*).

- Medical treatment of **neurocysticercosis** is associated with inflammatory responses to dying parasites in the CNS, including headache, vomiting, hyperthermia, convulsions, and mental changes (add corticosteroids to eliminate CN symptoms).



- The drug should not be given during pregnancy or children under 2 years of age.
- It is contraindicated in ocular cysticercosis.

Adverse effects:

* Adverse effects are mild and transient and include headache and nausea When used in short-course therapy (1–3 days) for nematodes infestations.

* With Treatment of hydatid disease *for 3 months* has a risk of *hepatotoxicity* and, rarely, *agranulocytosis or pancytopenia*

4. Thiabendazole:

for treatment of Strongyloides, trichinosis and cutaneous larva migrans.

* Adverse effects:

- dizziness, anorexia, nausea, and vomiting, erythema multiforme and **Stevens-Johnson syndrome** which may cause death.



II. Pyrantel pamoate

MOA: Depolarizing NMB → spastic paralysis & worm expulsion.

- Alternative to mebendazole in ancylostoma, ascaris & enterobius.

*Adverse effects :

nausea, vomiting, and diarrhea

III. Levamisole

Depolarizing NMB & immunostimulant.

Broad-spectrum for nematodes.

IV. Anti-filarial drugs

1 . Diethylcarbamazine:

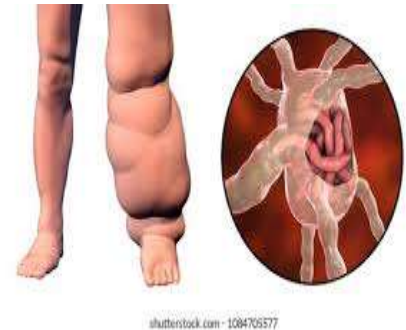
Effective on blood microfilaria of *Wucheraria bancrofti*

Mechanism of action:

used in the treatment of filariasis because of its ability to immobilize microfilariae and render them susceptible to host defense mechanisms

Pharmacokinetics:

- It is rapidly absorbed following oral administration with meals and is excreted primarily in urine.
- Urinary alkalosis and renal impairment may require dosage reduction.



*Adverse effects

- are primarily caused by host reactions to the killed organisms.
- Symptoms include fever, malaise, rash, myalgias, arthralgias, and headache, and their severity is related to parasite load.
- Most patients have leukocytosis.

2. Ivermectin

* **1st choice** for onchocerciasis -strongyloidiasis.

* **Mechanism of action:** Targets the parasite's glutamate-gated chloride channel receptors (Increases GABA transmission). Chloride influx is enhanced, and hyperpolarization occurs, resulting in paralysis of the worm.



***Pharmacokinetics:**

- The drug is given orally.
- It does not cross the blood-brain barrier
- and has no pharmacologic effects in the CNS. **However, it is contraindicated in patients with meningitis?? because their blood-brain barrier is more permeable, making CNS effects possible.**

Adverse effects:

The killing of the microfilaria can result in a **Mazotti-like reaction** (fever, headache, dizziness, somnolence, and hypotension).

Drugs for trematodes

1- Praziquantel

Broad-spectrum for trematodes & cestodes.

MOA: Increases permeability of worm cell membrane to Ca^{2+} → contraction followed by spastic paralysis & death.

1. Schistosomiasis:

* 1st choice for all species.

2. Cestodes:

* 1st choice in *Tenia*, *H. nana* and *D. latum*

* Neurocysticercosis (2nd choice to albendazole) plus corticosteroids.

* Hydatid disease (as an adjunct to albendazole)

• Advantages:

1. Drug of choice in all species.
2. High cure rate.
3. One-day treatment

Adverse effects:

- Headache, dizziness
- abdominal pain
- arthralgia, rash and pruritis.

Contraindications:

- Pregnancy & lactation.
- Children below 4 years

2- Metrifonate

- is an organophosphate **prodrug** that is converted in the body to the active metabolite.
- It acts only against **Schistosoma haematobium**.
- Toxic effects occur due to excess cholinergic stimulation.
- The drug is contraindicated in **pregnancy**

3- Oxamniquine

- It causes **paralysis of the worms**, but mechanism is unknown.
- effective only in **Schistosoma mansoni**.
- **Dizziness** is a common adverse effect (no driving for 24 h).
- It is not advisable to use the drug in **pregnancy** or in patients with a history of **seizure disorders**.

- **4- Mirazid**

- **Natural** (of plant origin).
- It induces **muscle contraction**.
- Dose: 10mg/kg orally for 3-6 days (92-98% cure rate).
- Also effective in **Fascioliasis**.

Drugs for Cestodes

- 1-Niclosamide

- 2nd line to praziquantel for
 - *T. saginata* & *solium*
 - *D. latum* & *H. nana*

MOA:

uncoupling oxidative phosphorylation or by activating ATPases.

Toxicity: mild as git distress, headache, rash

Precaution:

- In **T. solium** infection, a purgative is given to avoid cysticercosis; as damaged segments release ova which are not affected by the drug

(the drug is not effective against cysticercosis).

- It is not effective **in hydatid disease** (caused by Echinococcus granulosus "dog tapeworm") which is treated by **albendazole**.

Thank you