

# Helminths and anthelmintics

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Helminths are parasitic worms that can cause infections in humans and are among the most common human infections in many parts of the world, especially warm climates such as in South Africa. Anthelmintics are drugs used to rid the body of these worms.

Helminths can often live inside a person, without the person being aware of it. The parasites live in three different stages: eggs, larvae and adult worms. Humans can become infected by either eating or inhaling eggs or larvae, or larvae can enter the body through the skin. Once they enter the body, the eggs or larvae can become adult worms.

Helminths can be divided into 3 major categories: roundworms (nematodes), tapeworms (cestodes) and flukes (trematodes). The most common types of these infections are discussed below:

## Intestinal roundworms (nematodes)

Roundworm (*Ascaris*):

- Most common worm infection in the world
- Worms live in the small bowel
- Most people have no symptoms
- Occur more frequently in children who play in soil contaminated with infected faeces
- Children infested with worms may present with poor growth
- Other problems may include obstruction and rupture of the gut
- Treatments of choice are albendazole or mebendazole

Whipworm (*Trichuris*):

- Lives in large bowel
- Most people have no symptoms
- If there are symptoms, these may include: anaemia, abdominal pain, diarrhoea
- Treatments of choice are albendazole or mebendazole

Hookworm (*Ancylostoma duodenale*, *Necator americanus*):

- Worms enter through the skin during contact with contaminated soil
- Adult worm lives in small bowel
- Most people have no or few symptoms
- Can cause abdominal pain, diarrhoea, blood loss, iron deficient anaemia, weight loss
- Treatment of choice includes albendazole or mebendazole

Strongyloidiasis:

- Occurs when larvae penetrate the skin
- Most people have no symptoms
- Ivermectin or high dose albendazole are used for treatment

Pinworm (*Enterobius*, threadworm):

- Most common in children
- Most infected people have no symptoms
- If symptoms occur, these include: itching at the anus, especially in the morning (eggs are laid by the female worm during the night) with subsequent scratching
- The eggs may be under the finger nails and may easily be

transmitted to other people

- Treatment of choice includes albendazole or mebendazole
- All family members should generally be treated

## Tissue roundworms

Filariases:

- Includes lymphatic filariasis, loiasis (*Loa loa*) and onchocerciasis (River blindness)
- Ivermectin is given as a single dose and retreatment is required at intervals of 6-12 months until the adult worms have died out

Larva migrans:

- Can be cutaneous (also known as creeping eruption or sandworms) or affecting the internal organs
- The cutaneous type causes skin rashes, typically after walking or lying in the sand where dogs or cats have dropped their faeces
- Treatments include ivermectin or albendazole

## Flukes (trematodes)

Blood flukes (schistosomiasis, bilharzia):

- High prevalence in the tropical and subtropical areas of southern Africa
- The parasites enter the skin from contaminated water
- The adult worms can live in the bladder or intestines where they can cause symptoms
- Treatment of choice is praziquantel

## Tapeworms (cestodes)

Beef tapeworm (*T. saginata*) and pork tapeworm (*T. solium*)

- People can be infected by eating undercooked beef or pork
- Most people do not have symptoms
- Niclosamide and praziquantel are effective treatment, albendazole and mebendazole are alternative options

## PREVENTION

The best way to avoid helminth infection is to have good hygiene and follow some guidelines:

- Most helminths are passed on through direct contact, therefore, wash hands thoroughly before preparing or eating food
- Avoid eating poorly cooked foods, especially beef and pork
- Infected patients should wash in the morning to remove eggs laid overnight
- Avoid swimming or bathing in potentially contaminated waters

## TREATMENT

People with worm infections should see their doctors for diagnosis and treatment. Anthelmintics are medications used to treat worm infections, and these medications are not only used to treat the infections, but also to deworm patients in endemic areas. It is also important to deworm pets twice a year.

**Albendazole:** agent of choice for mixed worm infections. Safety and efficacy not established in children <1 year. Generally well

Anthelmintics in South Africa

Medication	Trade Names	Dosage Forms	Indications	Comments
Albendazole	S4 Bendex-400® Zentel® Wormadole® (400 mg)	Tablets, suspension Single - dose chewable tablets	Single and mixed intestinal parasites	A decrease in white blood cells can occur if used for longer than recommended
Mebendazole Polymorph C S1	Vermox®	Single dose tablets and suspension, Multiple dose tablets and suspension	Single and mixed worm infestations	Chocolate and banana flavoured suspensions. Mebendazole Polymorph C is the most efficacious and therapeutically favoured form of the active, Mebendazole.10
Mebendazole S1	Adco-Wormex® Cipex® D-worm® Rioworm® Vermox® Wormgo® Wormstop®	Tablets, suspension	Single and mixed worm infestations	Patients on large doses over prolonged periods of time should have their liver function and haematological parameters monitored
Niclosamide S0	Yomesan®	Tablets	Tapeworm infections	Patients should not drink alcohol during treatment
Piperazine S0	Padax® Piprine®	Granules, syrup, elixir	Roundworm and threadworm	Contraindicated in epilepsy, renal failure, and liver disease
Praziquantel S4	Biltricide® Cysticide®	Tablets	Bilharzia, neurocysticercosis	Dose reduction may be required in patients with severe liver impairment

tolerated, side effects may include epigastric pain, headache, dizziness, diarrhoea, nausea and vomiting. Tablets can be chewed, swallowed or crushed and mixed with food. Best to take the medication on an empty stomach.

**Ivermectin:** broad spectrum of activity and agent of choice for onchocerciasis, useful for filarial infections, but does not kill the adult worms. Also treats strongyloides infections. Safety and efficacy is not established for children <5 years. Generally well tolerated, but mild eye irritation and somnolence may occur. No food or alcohol should be taken for at least 2 hours before or after a dose. Not registered in South Africa, but can be obtained on a section 21 basis.

**Mebendazole:** broad spectrum anthelmintic, used widely for mixed worm infections. Use with caution in patients with Crohn's disease or ulcerative colitis because of increased absorption and potential toxicity. Safety and efficacy not established in children <1 year. Generally well tolerated, side effects can include gastrointestinal discomfort.

**Niclosamide:** eradicates beef, pork, dwarf, and fish tapeworms. Safety and efficacy has not been established for children <2 years. Uncommon side effects include gastrointestinal disturbances, lightheadedness, and pruritis ani. The medication is given as a single dose after a light breakfast. The tablets must be chewed thoroughly or crushed finely and swallowed with a small amount of water. Patients should be instructed to avoid alcohol during treatment.

**Piperazine:** an alternative for roundworm and pinworm. Contraindicated in patients with epilepsy or other neurological disorders, severe malnutrition or anaemia. Has been used in

children of all ages. Side effects are uncommon and dose related and may include mild nausea and abdominal pain.

**Praziquantel:** agent of choice for treatment of schistosomiasis. Cures about 60-90% of patients, but retreatment may be required. Can be used in children >2 years. Common side effects are mild, such as malaise, headache, dizziness, and non-specific gastrointestinal disturbances. The tablets should be swallowed whole with some liquid after a light meal.

Diethylcarbazine and thiabendazole are not available in South Africa.

The best way for patients to avoid infection is to practise good hygiene. Advise patients to be cautious of contaminated waters and food and refer them to a doctor for the necessary evaluation and follow up.

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