

SCHISTOSOMIASIS (BILHARZIA)

Schistosomiasis, or bilharzia, is a tropical water-borne disease which infects millions of people, mainly in Africa, South America and the Far East. In Kenya the infection is prevalent in many regions, notably the Lake Victoria Basin, Eastern Province, and the inland coastal strip. Schistosomiasis is confined to fresh water lakes and rivers and is not found in salt water. In areas set aside for widescale irrigation, such as rice-growing schemes and dams, schistosomiasis poses a major public health problem because of the high level of water contamination.

What causes the disease?

A microscopic, parasitic worm called *Schistosoma*, belonging to the family of flukes, causes schistosomiasis. There are 3 types of human schistosomiasis, two of which occur in Africa and South America and the other one in the Far East. *Schistosoma mansoni* worms live in the veins supplying the intestine and their eggs are passed out with faeces, while *S. haematobium* worms live in the veins supplying the bladder and their eggs are voided with urine. The *S. japonicum* species of the Far East behaves like *S. mansoni*.

The male and female worms are small enough to lie within blood vessels where they feed and reproduce. The male has a groove along his body in which the female lives. The fertilised female lays thousands of eggs in her lifetime. Some are swept along in the bloodstream to the liver, while others find their way directly into the intestine or bladder from where they exit the host, either in urine or faeces.

The life cycle

The life cycle of the schistosome worm is a complicated phenomenon, yet very successful from the parasite's point of view. An infected human passes eggs in stool or urine. If defecation or urination takes place in or near fresh water, as is so often the case in rural and slum areas, each egg will hatch on contact with the water into a tiny, hairy larva called a miracidium. The miracidium penetrates the tissues of a particular fresh-water snail, where it multiplies. After several days, many hundred swimming larvae called cercariae, with forked tails, are shed into the water by the snail. In other words, one egg excreted in human waste can give rise to thousands of aquatic cercariae. These larvae are capable of penetrating human skin. Any activity in the water, such as washing clothes, planting rice, bathing, swimming, fishing and boating, exposes one to infection by schistosome larvae. The deeper the water, the lower the risk of infection since the snail host prefers shallow water with plenty of vegetation.

Once successfully in the human host skin, the schistosome larva quickly loses its tail and begins its migration to the blood vessels supplying the intestines or the bladder, which takes it through the lungs and the liver. Each larva grows into an adult male or female worm and most infections involve numerous larvae penetrating the skin from one or more episodes of water contact. People who make their livelihood in and around water can accumulate a heavy worm burden over a number of years.

How does it cause disease?

The eggs of *S. mansoni* and *S. haematobium* are equipped with a sharp spine to enable them to burrow out of the blood vessels and penetrate into other tissues on their migration out of the host. While most eggs find their way out of the host, many become trapped in tissue and die before completing their journey. It is these trapped eggs which eventually lead to tissue damage and cause problems to the human host. *S. mansoni* eggs tend to lodge in the liver while *S. haematobium* eggs become trapped in the bladder wall. The heavier the worm infection, the greater the number of eggs which remain stuck. The body defenses of the host produce an inflammatory reaction around each egg. Over time, the inflamed tissue hardens and blockages of blood and lymph vessels occur, leading in turn to complications for the host. In the early stages of the infection, the infected person may experience a mild rash where the larval worms penetrate the skin, and otherwise some abdominal complaints. As migrating eggs burst through tissues to enter the intestines or bladder, bleeding occurs and the blood may be seen in the urine or the faeces, depending on the species. An infected person may be tired with non-specific complaints. Rarely, the acute phase can be more dramatic with fever and malaise.

In some societies where *S. haematobium* is very common, it is thought to be normal to pass bloody urine for awhile. Unfortunately, years of infection leads to a steady decline in the health of affected tissues and ultimately may lead to severe complications such as cancer of the liver, bladder or intestine. In some countries the pathology related to schistosomiasis is more severe, for example in Egypt, but the reason for this is not fully understood.

Disease control

The long-term control of schistosomiasis involves any method which prevents faeces or urine from infected persons reaching fresh-water bodies. Latrines are built and communities are educated about the disease. However, it has been found that in communities which rely on water to make their living, such as the fishing communities of Lake Victoria or the rice-growers of Mwea, social habits are very difficult to change unless regular, clean, alternative water sources are created.

Advice to travellers

On a personal level, tourists and travellers should always be aware of the possibility of contracting the infection from contact with fresh water. Swimming and other activities in suspicious water should be avoided. If you suspect that you may have acquired the infection, you should see a doctor and carry out laboratory tests. This may involve providing stool, urine and blood samples before a diagnosis is made. Treatment involves swallowing a drug called praziquantel, which must be prescribed by a doctor in specified doses. In Kenya today, despite many efforts at control, schistosomiasis remains a common infection and because it takes many years for the detrimental effects of infection to be felt, most cases go undetected.