Dracunculiasis (Guinea-worm): On the Verge of Eradication

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Dracunculiasis is a crippling parasitic disease on the verge of eradication. During the mid 1980s there were an estimated 3.5 million cases in 20 countries worldwide, 17 of which were in Africa. Number of reported cases declined throughout 1990s to reach fewer than 10,000 cases in 2007. The number has continued to drop; only 148 cases were reported in 2013. The eradication goal endorsed by World Health Assembly is reached in numerous areas of the world, including Pakistan (last case reported in 1993), Iran (last case reported in 1976), and India (last case reported in 1997). All current endemic areas are in sub-Saharan Africa. 73% of all reported cases are found in Sudan; three others are mainly reported from Chad, Ethiopia, and Mali.

It is caused by a long threadlike nematode, Dracunculus medinensis which infects small crustacean called Cyclops (water flea), dwelling in water supplies. Ingestion of water contaminated by parasite infected Cyclops, transmits Guinea worm. Although not fatal, it is a real burden in terms of morbidity, incapacity and suffering for those affected- usually rural deprived and isolated communities, who depend mainly on open surface water sources such as ponds and shallow step wells.

Description of Dracunculiasis is found in “Turin Papyrus” (15th century BC in Egypt). It describes the ancient myth of Egyptian Sun God. Disease has also been described in ancient Indian texts. In 18th century Swedish naturalist Carl Linnaeus first suggested that “fiery serpents” plaguing Middle Eastern countries were a type of parasitic worm. First scientifically trained persons to give attention to the problem of dracontiasis were British army medical officers serving in India about the beginning of 19th century. James Macgregor, surgeon to the 88th Regiment gave an account of this disease. He found that the disease is endemic in certain small localities like the Forte region of Bombay. His Regiment was free of dracunculiasis before coming to Forte area in 1799, but during monsoon of 1800, 200 cases developed in a single unit. The later surgeons made the observation that the worm tended to emerge when the affected limb was immersed in water. The remarkable discovery of Guinea worm’s life cycle and the intermediate host Cyclops was made by a Russian traveler Alexei Fedchenko. Patrick Manson confirmed Fedchenko’s discovery and larval development. R H. Charles, working in Lahore was the first to observe male guinea worm. At a postmortem examination he found two female worms clinging to a much smaller male guinea worm about 4 centimeters long.

About one year after the infection (10 to 14 months), the female worm emerges at the site of a painful blister on lower legs (90%) or other area coming in contact with the water like the back of bhistis, who carry water in leather bags. The infected person will most often rush to a water source and place the infected limb with blister in a pond or a well to relieve some of the pain. The emerging worm then comes into contact with water and releases 1-3 million larvae into water source, often pond or a shallow well. These larvae reach infected stage after being ingested by tiny Cyclops (water flea). People swallow the

Eradicate Guinea worm from the world campaign. Sudan 2001

Stamp-Nigeria, 1990

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infected water fleas after drinking contaminated water. Cyclops are killed in the human stomach, but the infective larvae are liberated. These move into the abdominal tissue, where they mature and mate. The fertilized female worm (which measures 60-100 cms. in length) migrates under the skin to various body regions. The male worm dies soon after mating.

Worldwide eradication programs were first implemented by early 1920s focusing on water sanitation. The only way to diagnose the disease is to locate an adult worm in the lesion, or larvae from the adult worm in the ulcer. There is no vaccine to prevent, nor any medication to treat the disease besides symptomatic treatment.

Preventive strategies boil down to ensuring wider access to improved drinking water supplies to prevent infection, and implementing vector control. Organizations such as the Carter Centre, Health and Development International (HDI), Hydro Polymers of Norsk Hydro, by Norwegian Church Aid (NCA), has begun to distribute 9 million polymer pipe filters—one for every man, women and child at risk of this disease. The results have been encouraging. It is due to the success of preventive strategies that the disease is today on the verge of eradication.  

After Small Pox, Guinea worm infection will be the second disease to be eliminated from the face of our world.

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References