Giardia essay

Environment, Water

Background information on Giardia

Giardia is luminal intestinal flagellated protozoan parasite. Giardia lamblia(also known as G. intestinalis or G. duodenalis) is the most common species that usually exhibits a typical fecal-oral lifecycle. Giardia lamblia) colonizes the upper portions of the small intestine and is the most common protozoan isolated from human stools. The prevalence is estimated at 200 million clinical cases per year [CITATION Annd3 l 1033].

Giardia lamblia exists in two forms, an active form called a trophozoite, and an inactive form called a cyst. The active trophozoite attaches to the lining of the small intestine with a " sucker" and is responsible for causing the signs and symptoms of giardiasis. The trophozoite cannot live long outside of the body and therefore it cannot spread the infection. The inactive cyst, on the other hand, can exist for prolonged periods outside the body. When it is ingested, stomach acid converts the cyst into the disease-causing trophozoite. It takes ingestion of only ten cysts to cause infection. Trophozoites produce the cysts that exit the body in the feces and spread the infection to others [CITATION Anj09 l 2057].

Life cycle

Giardia exhibits a typical fecal-oral transmission cycle [CITATION Placeholder1 l 1033]. The infection is acquired through the ingestion of cysts. Factors leading to contamination of food or water with fecal material are correlated with transmission and they include; poor personal hygiene, poor sanitation, lack of indoor plumbing, water treatment failures, use of recreational waters, male homosexuality especially through oral-anal contact

(Smith, Caccio, Cook, Nichols, & Tait, 2007).

Fecal-oral transmission essentially involves the ingestion of food or water contaminated with cysts. After ingestion by the host, the cysts transform into trophozoites which exhibit an active metabolism and are usually motile. The parasite takes up nutrients and replicates asexually during the trophic phase. Some of the trophozoites do not undergo replication but instead will develop into cysts. Cysts are characterized by a resistant wall and are excreted with the feces. The cyst wall protects the organism from desiccation outside the body of the host as the parasite undergoes a relatively dormant period awaiting ingestion by the next host [CITATION Placeholder1 l 1033].

Symptoms

The most common manifestations of giardiasis are; Diarrhea with foul smelling stool without pus or blood, abdominal pain, particularly cramping, bloating and flatulence, nausea with or without vomiting, malaise, malabsorption of fat from the intestines with consequence of weight loss, gall bladder infection, lactose intolerance, low grade fever among others (pranabeswer, 2009; Marks, nd)

The severity of the symptoms may vary greatly from mild or no symptoms to severe symptoms. Symptoms and signs of giardiasis begin seven days following infection and may continue as long as three or more weeks later. In most patients the illness is self-limiting and lasts 2-4 weeks. In many patients who are not treated, however, infection can last for several months to years with continuing symptoms.

It is important to note that giardiasis is associated with some risk factors.

Pregnant women, older adults, infants and people with compromised immunity such as people infected with HIV/AIDs, cancer, diabetes and kidney disease. Also people taking drugs that affect the immune system are at higher risk of infection by Giardia[CITATION An11 l 2057].

Diagnosis

Diagnosis of giardiasis can be achieved through visualization of the trophozoite or cysts by Microscopic examination of stained preparations or unstained wet mounts of stool samples. Serological tests using Enzyme Linked ImmunoSorbent Assay or Fluorescent Antibody Test to detect either the antibodies or the antigens and the use of duodenal aspirates or biopsies are also available (Marks, nd; Pranabeswer, 2009). Inderect serological tests are alsoavailable but they have not been found to be consistently sensitive.

Prevention and Treatment

Some predisposing factors to Giardia infections includes; poor personal hygiene, poor sanitations, water treatment failure, oral-anal contacts among others. Thus prevention of giardiasis is dependent on maintaining hygienic conditions. Prevention can be achieved through boiling, filtering or adding iodine to water. It is good to understand that giardia cysts resist chlorine treatment (Pranabeswer, 2009). Some drugs that can be used for the control includes; Metronidazole, quinacrine, tinidazole, furazolidone, and paramomycin.

Current and Potential Issues and Challenges

The current issue in Science in the area of Giardia research entails analysis of the genetic make-up and biology of the parasite that ultimately may lead

to better diagnosis and treatment of the diarrhea disease giardiasis. It will also help unravel the various pathophysiological issues related with the Giardia infection (An, 2007). A medical challenge associated with the parasite is its capacity to undergo antigenic variation—a process that allows the parasite to develop chronic and recurrent infections. Also, for proper stool sample diagnostic procedures to yield relevant clinical information several samples are required and this may put off some impatient individuals (pranabeswer, 2009; Prucca, et al., 2008)

Like any other topic in medical research there are several challenges accompanying research in Giardia. On the ethical and the financial front there is the issue of the pharmaceutical companies funding research in the area. More often than not few organisations are willing to fund research in a disease that is not so ‘ publicized’. Most funding for medical research currently seems to be directed towards such areas like malaria, HIV/AIDs, Cancer, Diabetes and lifestyle related diseases; scientist opting to venture into Giardia research find it challenging to obtain funding. This is despite the fact that the disease is endemic in the world and affects up to 200million people (An, 2007). On the other hand pharmaceutical companies, realising the financial significance of Giardia, would be fairly willing to fund research in the area. This obviously raises concerns of conflict of interest and other bioethical concerns. There are also political and ethical conflicts affecting Giardia research. This mainly affects scientists studying Giardia in drinking water. Water treatment companies and local authorities involved in ensuring provision of clean drinking water often have reservation in supporting such research fearing they would expose weaknesses in the water treatment

system hence open doors for critics. Ethically there is need to support such research in order to find areas of improvement for the sake of public health[CITATION Lan02 l 2057].

In conclusion Giardia is a water borne parasite that is found in all parts of the world affecting about 200 million people. The parasite causes a condition called Giardiasis which is associated with diarrhea, abdominal pain, particularly cramping, bloating and flatulence, nausea with or without vomiting, malaise, malabsorption of fat from the intestines with consequence of weight loss, gall bladder infection, lactose intolerance and low grade fever. The condition is transmitted through ingestion of contaminated foods and drinks thus can be prevented by observing basic hygiene etiquette. The disease is normally diagnosed by microscopy or serology but there is tremendous research to come up with more sensitive molecular tests as well as vaccine for the disease. Researchers studying Giardia, like their counterparts in the medical field, face a myriad of challenges such as financial, ethical and political challenges.

References

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