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Popular Article

Toxoplasmosis: A Zoonotic parasitic disease

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Abstract

Toxoplasmosis is a zoonotic disease caused by the parasite *Toxoplasma gondii*, which can be transmitted between animals and humans. The disease is primarily transmitted through the ingestion of contaminated food or water, or through contact with infected animal feces or contaminated soil. While the domestic cat serves as the primary host for *Toxoplasma*, humans and other warm-blooded animals can become infected. Toxoplasmosis highlights the interconnectedness of human and animal health and the importance of understanding and managing zoonotic diseases. Prevention measures, including good hygiene practices and awareness among vulnerable populations, are essential to reduce the risk of infection. Further research and public health efforts are needed to mitigate the impact of toxoplasmosis as a zoonotic disease.

Introduction

Toxoplasmosis is caused by the parasite *Toxoplasma gondii*, which has a wide range of hosts, including mammals and birds. The primary host for *Toxoplasma* is the domestic cat, where sexual reproduction occurs and oocysts are shed in the feces. Humans and other warm-blooded animals can become infected with *Toxoplasma* by ingesting contaminated food or water, or through contact with infected animal feces or contaminated soil.

The zoonotic nature of toxoplasmosis is significant because it highlights the potential for transmission of the parasite between animals and humans. It serves as a reminder of the interconnectedness of human and animal health and the importance of understanding and managing zoonotic diseases (Jones, J.L. and Dubey, J.P., 2012).

Once in the host's tissues, the sporozoites transform into tachyzoites, the rapidly multiplying



form of *Toxoplasma*. The tachyzoites can invade and multiply within various cell types, including cells of the reticuloendothelial system, myocardium, liver, fibroblasts, and others.

Human toxoplasmosis

- Modes of transmission of toxoplasmosis in man:
 - Ingestion of oocysts of *T. gondii* (through food, vegetables and water contaminated by faeces of cats).
 - Ingestion of meat from infected animals (containing cysts)
- Congenital route from infected mother to the foetus.
 - Sexual mode of transmission has been suggested in view of the presence of *T. gondii* in semen and also high seroreactors among the sexually active females.
 - Organ transplantation surgery from infected individual

Symptoms and pathogenicity

Human toxoplasmosis is of two types:

a) Congenital toxoplasmosis

The occurrence of congenital toxoplasmosis primarily affects children when pregnant mothers experience a primary infection or act as carriers of a chronic infection. In cases of chronic infection, the cysts of the parasite may transition back to the tachyzoite cycle due to the stress of pregnancy or cortisone therapy, leading to the infection of the fetus. It is possible for the mother to exhibit no symptoms of the infection. Transmission typically happens during late pregnancy.

The incidence of congenital toxoplasmosis varies across different countries, ranging from 1 in 20,000 to 1 in 500 births. Severe cases can result in abortion, with the presence of the parasite detectable in all aborted materials. If the child is born alive, they may exhibit symptoms including fever, swollen lymph nodes, enlargement of the spleen (splenomegaly), enlargement of the liver (hepatomegaly), hydrocephalus, reduced head size (microcephaly), and disturbances in psychomotor development. Additionally, the child may develop choroidoretinitis and cerebral calcification.

Delayed manifestations of congenital toxoplasmosis in children may include the development of congenital cataract, choroidoretinitis, anemia, and severe mental retardation. In milder cases, however, the symptoms are minimal and difficult to recognize. (Torgerson, P.R. and Mastroiacovo, P., 2013)

b) Acquired toxoplasmosis

In 25% of cases, there is no symptomatic phase. Particularly in people with immunosuppression, the illness is severe. From a low-grade fever and minor body aches to deadly



encephalitis, symptoms might vary. Some of the common signs include fever, lymphadenopathy, lymphocytosis, ocular lesions of unknown origin, abortion, a negative obstetric history, myocarditis, and meningoencephalitis. Approximately, 75 to 80 percent of adults in India are seropositive. However, millions of minor clinical cases are unreported and are mistaken for influenza or pyrexia with unclear causes.

Toxoplasmosis in animals

The respiratory, gastrointestinal, and neurological systems' symptoms have been documented in cattle, sheep, goats, pigs, dogs, and horses. Numerous animal reports of febrile response exist. Only sheep are capable of abortion and congenital transmission. Toxoplasmosis seroprevalence in food animals is a severe public health issue. In several Indian states, it ranges from 3% to 77%.

Diagnosis in man and animals

- (i) Isolation by mice inoculation
- (ii) Demonstration of parasite / parasite antigen in tissues (histopathology or by HRPO or FITC antibody conjugate, ELISA)
- (iii) Demonstration of antibodies (Sabin Feldman Dye test, IHA, CFT, IFA, LA, modified direct Agglutination and ELISA)
- (iv) Detection of parasite DNA in tissues by using PCR techniques.

Treatment

- (i) Triple sulpha with pyremethamine is effective both against proliferative and cystic stages.
- (ii) Sulphadiazine is effective on intestinal stages in cats.
- (iii) Clindamycin is effective against both chronic and acute toxoplasmosis.

Control

Direct and indirect contact with cats should be avoided, especially by pregnant women, young girls, and women of reproductive age. Vegetables and meat should be taken after properly cooked. A clean supply of water should be used for drinking. Feeding food animals shouldn't contain meat of animal origin.

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