Toxoplasmosis

Significance

Toxoplasma gondii is a protozoan parasite that can infect many animals, including man. It belongs to a larger group of parasites that are collectively called "coccidia". Toxoplasma occurs worldwide - an estimated 30% of all human beings have been infected by T. gondii at some point in their lives.

Most infections are silent and have no ill effect on the patient. Occasionally, T. gondii infections can be devastating. If a woman who has not previously been infected with T. gondii becomes infected while she is pregnant, there is a significant chance that the organism will produce severe neurological damage in the developing fetus. T. gondii is also a special risk in the case of individuals that may have weakened immune systems, such as individuals receiving cancer or transplant therapy or individuals that are positive for HIV.

Biology

T. gondii is a protozoan parasite that passes one stage of it’s life cycle in the gut of cats, and another stage of it’s life cycle in the tissues of other animals. Humans can be infected by both phases.

Oocysts are produced in the gut of cats that have recently eaten an infected prey animal, such as a mouse.

Cysts are formed in the tissues of warm blooded animals that ingest the oocysts from cat feces.
Cats become infected when they eat raw meat, usually a mouse, infected with T. gondii cysts. Sometime from a few days to 3 weeks after eating an infected animal, the cat will begin to shed oocysts in its feces. The cat will continue to shed oocysts in its feces for 3-15 days, after which time it will stop shedding the organism in its feces and will no longer be a hazard.

If other warm blooded animals, such as cattle, swine or human beings, ingest T. gondii oocysts, the oocysts hatch, multiply in the host, and may invade a variety of tissues. In most individuals this process is symptomless, but in pregnant women or in immunosuppressed individuals, the damage can be significant. After the initial period of multiplication, the cyst are formed, which lie dormant in the tissues and remain there for many years.

The cycle is completed when a mouse bearing cysts is eaten by another cat. In the case of an aberrant host, such as a cow or a person, the cycle is never completed, but the cysts may remain in the host's tissues for the rest of its life.

Humans may be infected by either form of the parasite. Most humans become infected when they eat undercooked meat in which Toxoplasma cysts are present. Humans may also be infected if they ingested oocysts from cat feces.

It's possible to determine if a human has been previously infected by Toxoplasma by testing his or her blood for antibodies. If you're positive for T. gondii antibodies, it's not necessarily bad news; about 30% of all human beings are positive. Negative individuals who are pregnant are actually the individuals who should be most concerned about T. gondii. People who have never been exposed to T. gondii, but who become exposed while pregnant are those whose infants are at the greatest risk.

**Relative Risk**

Most human beings are infected by eating undercooked meat, but exposure to infected cat feces is also a significant hazard, especially for pregnant women. Cat feces can only be infective if the cat has had an opportunity to hunt within the last month. The risk is very low if the research cats have been housed in a rodent-proof facility for a month or more and fed only commercial cat food. If there is a chance that feral mice can find their way into the facility, then the risk is much greater. If the cats have been obtained from a random source within the last month, then there is a much greater possibility that their feces may be infectious.

**Prevention**
The most important step you can take to avoid toxoplasmosis is to avoid eating rare or undercooked meat - this remains the primary route of human exposure. If cats frequent your vegetable garden, then be sure that you peel and wash root crops thoroughly before eating them, or only grow root crops that must be cooked.

In the research facility, be sure that your facility is designed so that no rodents have access to the inside of your buildings.

You should consider that your cats may be at risk if:

- You ever see evidence of rodents in or around your facility.
- The cats are ever fed raw meat.
- The cats have been obtained within the last 30 days from an outside source.
- Routine health screens of your cats ever reveal coccidial oocysts.

Since we can never be 100% certain that a mouse could not have found it’s way into one of our cats, the safest policy is to assume that any cat’s feces may potentially carry toxoplasma oocysts.

Toxoplasma oocysts are not immediately infectious when they are shed, but they may become infectious as early as 24 hours later. Cleaning the litter pan once each day dramatically reduces the chance of infection.

The route of transmission for the oocysts is fecal-oral. In order to avoid any possibility of contact with cat feces, workers changing cat litter should do so in a way that does not stir up dusts and aerosols from the litter pans. Workers should wear gloves while changing litter pans and should wear a mask or face shield if there is any possibility of infectious fecal material being splashed or splattered into their mouth or eyes. Finally, workers should be very scrupulous about thoroughly washing their hands before eating, drinking, or smoking after changing cat litter pans.

Women of Childbearing Age

Women who are of child bearing age, or who are contemplating pregnancy, and who work with cats in a research setting should consult with the occupational health physician at employee health services and discuss the advisability of having their titer to T. gondii measured as a part of their routine prenatal care.

Contact

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More information