

TOXOPLASMOSIS



“Playtime”, 19th century, oil on canvas, Jules Leroy, (1856-1921).

TOXOPLASMOSIS

Introduction

Toxoplasmosis is an uncommon disease. The predominant concern will be in patients who are immunosuppressed and in pregnancy.

Pathology

Organism:

- Toxoplasma gondii a protozoan organism.
- It is an obligate intracellular parasite.

See appendix 2 below for the life cycle of *Toxoplasma gondii*.

Incubation Period

- The incubation period is uncertain but probably ranges from 5–23 days.

Reservoir

- Members of the cat family are the definitive hosts for the organism.

The main host in Australia is the domestic cat.

Cats acquire the infection mainly through eating small infected mammals including rodents and birds, and rarely from the ingestion of infected cat faeces.

Only young felines harbor the parasite in the intestinal tract, where the sexual stage of the life-cycle takes place resulting in the excretion of oocysts in faeces for 10–20 days.

- Many other intermediate hosts including sheep, goats, rodents, cattle, swine, chicken and birds may carry an infective stage of *T. gondii* encysted in their tissues. This occurs more commonly in muscle and brain. Tissue cysts remain viable for long periods.

Transmission

- Adults most commonly acquire toxoplasmosis by eating raw or undercooked meat infected with tissue cysts.
- Consumption of contaminated, unpasteurised milk has also been implicated.
- Children may become infected by ingestion of oocysts in dirt or sandpit sand after faecal contamination by cats, particularly kittens, or other animals.
- The infection may also be transmitted through blood transfusion and organ transplantation.
- Transplacental transmission may occur when a woman has a primary infection during pregnancy.

Periods of Communicability

- **Toxoplasmosis is not transmitted from person to person spread except in-utero.**
- Oocysts spread by cats sporulate and become infective one to five days later. They may remain infective in water or moist soil for over a year.

- Tissue cysts in meat remain infective for as long as the meat is edible and undercooked.

Susceptibility and Resistance

- About 75% of women of childbearing age are susceptible.
- Immunity is thought to be lifelong however patients undergoing immunosuppressive therapy, in particular for **haematological malignancies, or patients with HIV/ AIDS**, are at high risk of developing illness from reactivated infection.

Clinical Features

1. Toxoplasmosis infection is asymptomatic in 80% of people.
 - Most cases of toxoplasmosis in the immunocompetent host are subclinical or relatively benign.
 - The most severe symptoms occur in the congenitally acquired form and in immunocompromised hosts.
2. The most common signs in symptomatic patients include:
 - Enlarged lymph nodes, especially around the neck.
 - Fever
 - Other non-specific “constitutional” symptoms such as myalgias, lethargy and malaise.
3. Dormant infection persists for life and can reactivate in the immunosuppressed person.
4. Toxoplasmosis in the immunosuppressed:
 - More serious disease can develop or reactivate in immunosuppressed patients.
 - Brain, heart, eye involvement may occur, as can pneumonia and occasionally death.
 - **Cerebral toxoplasmosis or chorioretinitis are frequent complications of AIDS when the lymphocyte CD4 cell count drops below 100 / cu mm.**
5. Toxoplasmosis in pregnancy:

- Acute toxoplasmosis in pregnant women can affect the unborn child. Primary infection in pregnancy is rare although up to one third of these infections result in transplacental spread to the developing foetus.
- Children of mothers with evidence of previous immunity more than six months prior to conception are not at risk.
- Foetal disease:

Primary infection in pregnancy can cause serious foetal disease. Infection in the first trimester results in a low foetal infection rate (15%) but a higher risk of serious disease. Infection later in pregnancy results in a higher infection rate but generally less severe disease.

In early pregnancy brain damage as well as liver, spleen and eye disorders may occur.

Infection in late pregnancy may result in persistent eye infection through life.

- Toxoplasmosis acquired after birth usually results in no symptoms or only a mild illness.
- Diagnosis and treatment during pregnancy appears to reduce the effects on the baby. False positive IgM antibody test (and less commonly IgG) results do occur and treatment should never begin without further testing. Where infection of the mother is confirmed, treatment is indicated.
- Newborns of mothers with primary infection during pregnancy or active infection, and immunosuppressed patients are treated empirically until congenital disease is ruled out. Where infection is confirmed, treatment is continued for 12 months to help reduce long term effects.

Investigations

Toxoplasmosis cannot be diagnosed on purely clinical grounds. The diagnosis needs to be thought of, and then confirmed by investigation.

Serology

Serological results require careful interpretation and should be performed and discussed in consultation with the reference laboratory.

- In general, toxoplasma-specific **IgG** antibody appears two to three weeks after acute infection, peaks in six to eight weeks and often persists lifelong.
- Presence of toxoplasma-specific **IgM** antibody suggests infection within the last two years. False positive IgM results are common and should always be repeated before final interpretation. They are common in autoimmune disease.

- Presence of **IgA** antibodies is said to correlate with acute infection.
- Testing paired sera taken two weeks apart is often helpful as is IgG antibody avidity testing.
- **See also Appendix 1 below.**

PCR

- A specific PCR performed on amniotic fluid may determine if a foetus has become infected.

Microscopy

- Infection may be also diagnosed by visualization of the protozoa in biopsy material.

CT scan

- This may detect ring enhancing lesions.

MRI

- This is considered the best diagnostic imaging technique for toxoplasmic encephalitis.
- It may detect lesions not visualized on CT scan.

Management Issues

1. Specific anti-protozoal treatment may be indicated in:

- Immunosuppressed persons
- Infections during pregnancy
- Where there is eye or other organ involvement.

Specialist advice should be sought.

2. Immunosuppressed persons may also require prophylactic treatment for the duration of their immunosuppression.
3. Infants who acquire an infection before birth may require prolonged treatment to reduce the risk of ongoing active infection.
4. Isolation is not required.
5. Specific treatment:

- Sulfadiazine and pyrimethamine are often used in the treatment of toxoplasmosis, especially in the immunocompromised. **Specialist advice should be sought in all cases on regarding specific anti-protozoal treatment.**

Preventive Measures

Pregnant women and immunosuppressed people

Should be advised to:

- Cook meat thoroughly (until no longer pink) and avoid uncooked cured meat products.
- Not consume unpasteurised milk or its products.
- Wash all raw fruit and vegetables carefully before eating.
- Wash hands thoroughly before meals and after handling raw meat.
- Delegate the cleaning of cat litter trays to others wherever possible and if this is not possible, gloves should be worn during cleaning and hands washed well afterward

With respect to cats:

- Cat litter trays should be emptied daily and regularly disinfected with boiling water to dispose of the oocysts before they become infective.
- Cats should only be fed with dry, canned or boiled food and should be discouraged from hunting and scavenging. However, direct contact with cats is rarely the cause of infection. Cats are generally infected as kittens and only excrete the oocysts for two weeks after their original infection.
- Sandpits should be covered when not in use to stop cats defecating in the pit.

Vaccination

- No immunization is currently available.

Notification

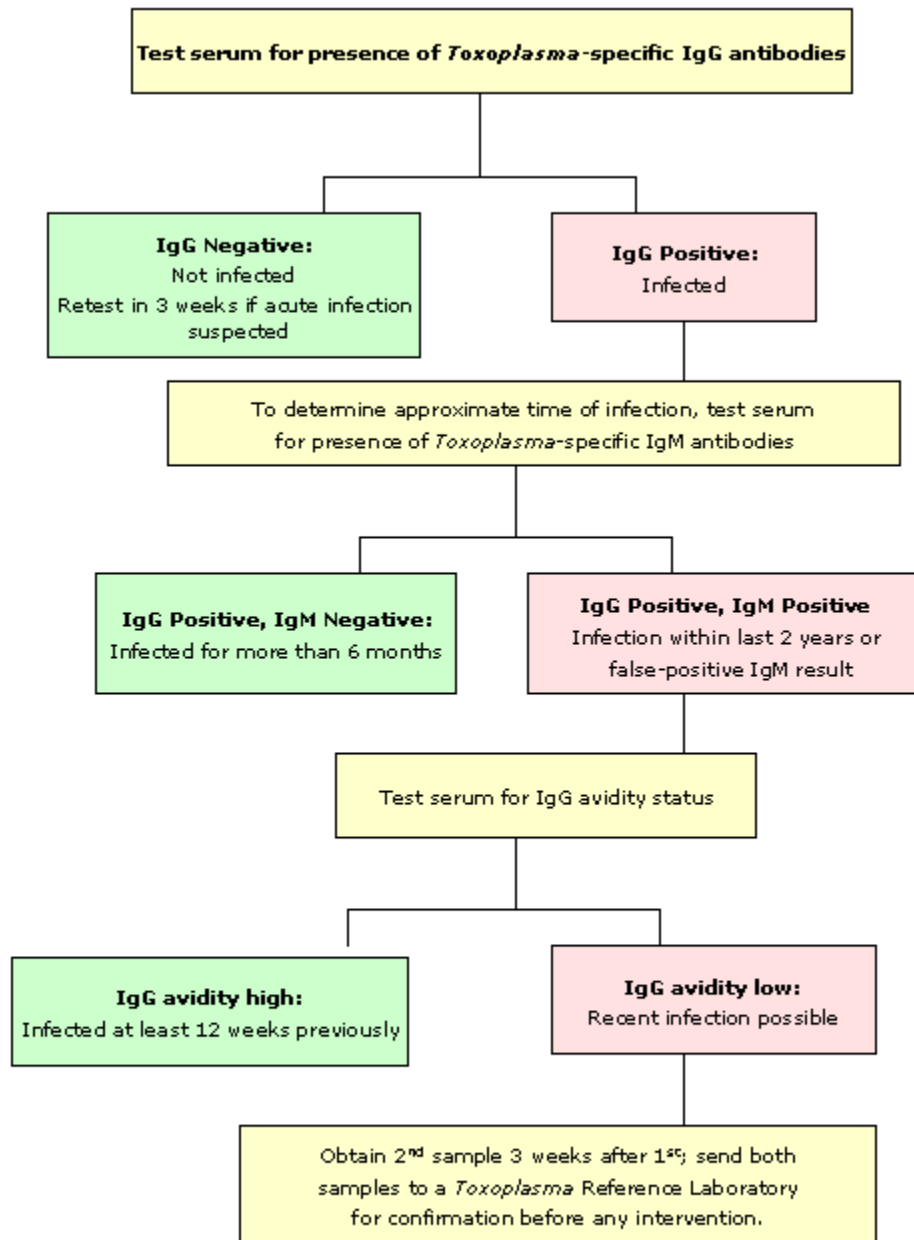
- Notification is not required.

School exclusion

- School exclusion is not required.

Appendix 1

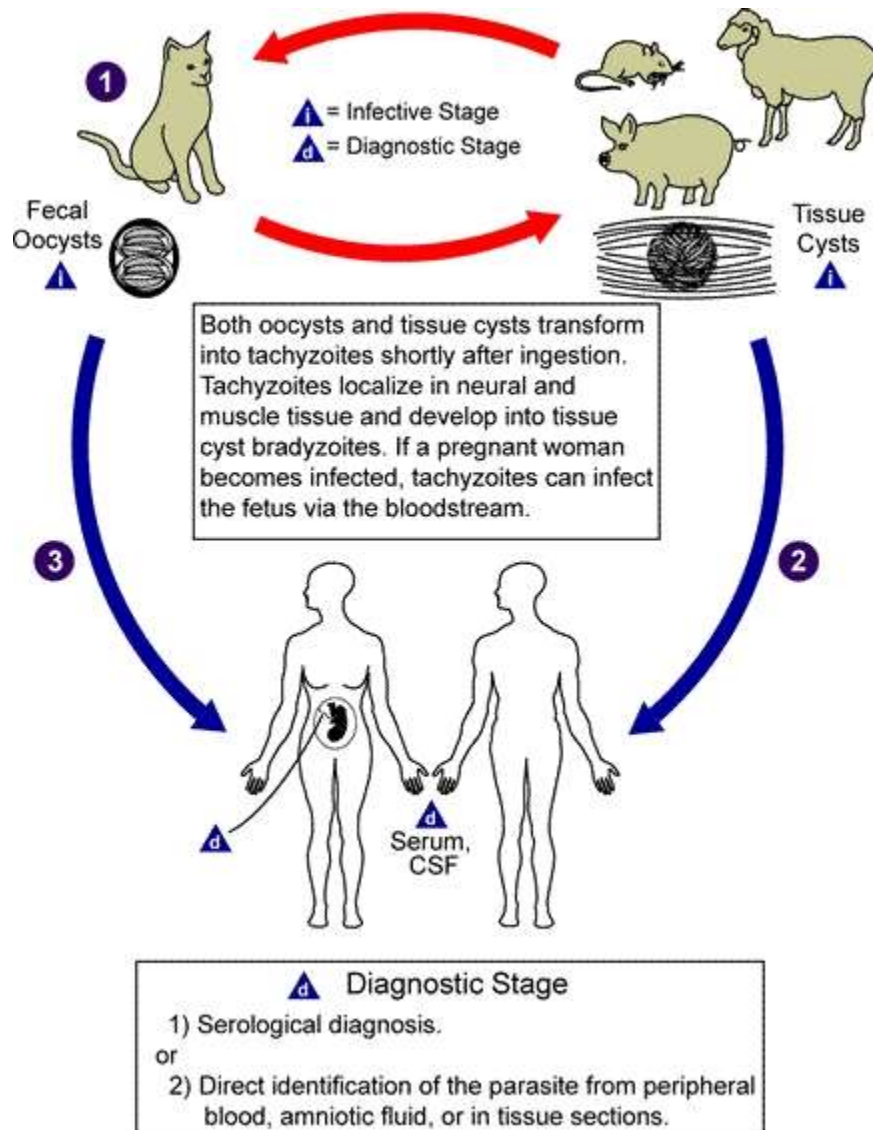
Interpretation of Toxoplasma Serology



(From CDC Website, February 2007)

Appendix 2

Life cycle of *Toxoplasmosis gondii*:



(From CDC Website, February 2007)

Members of the cat family (Felidae) are the only known definitive hosts for the sexual stages of *T. gondii* and thus are the main reservoirs of infection.

Cats become infected with *T. gondii* by carnivorousism (1).

After tissue cysts or oocysts are ingested by the cat, viable organisms are released and invade epithelial cells of the small intestine where they undergo an asexual followed by a sexual cycle and then form oocysts, which are excreted.

The unsporulated oocyst takes 1 to 5 days after excretion to sporulate (become infective). Although cats shed oocysts for only 1 to 2 weeks, large numbers may be shed.

Oocysts can survive in the environment for several months and are remarkably resistant to disinfectants, freezing, and drying, but are killed by heating to 70°C for 10 minutes.

Human infection may be acquired in several ways:

- Ingestion of undercooked infected meat containing *Toxoplasma* cysts (2)
- Ingestion of the oocyst from fecally contaminated hands or food (3)
- Organ transplantation or blood transfusion;
- Transplacental transmission;
- Accidental inoculation of tachyzoites. The parasites form tissue cysts, most commonly in skeletal muscle, myocardium, and brain; these cysts may remain throughout the life of the host.

References

1. The Blue Book Website, 12 April 2006.
2. Antibiotic Guidelines 13th ed, 2006
3. Gilbert, G. "Infections in pregnant women" MJA, 2002 vol. 176, pp. 229–236.

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1 June 2007