

Toxoplasma gondii

Disease Agent:

- *Toxoplasma gondii*

Disease Agent Characteristics:

- Protozoa, 2.5 × 5.0 μm
- Order: Eucoccidiorida
- Family: Sarcosystidae
- Humans harbor only asexual, replicating stages including tachyzoites, which can occur in blood cells and bradyzoites in tissues.
- Obligate intracellular parasite

Disease Name:

- Toxoplasmosis

Priority Level:

- Scientific/Epidemiologic evidence regarding blood safety: Very low
- Public perception and/or regulatory concern regarding blood safety: Very low
- Public concern regarding disease agent: Low, but moderate among pregnant women

Background:

- First discovered in 1908, before known link to disease
- Cosmopolitan and stable distribution worldwide
- Seroprevalence rates increase with age and can exceed 50% in some areas.

Common Human Exposure Routes:

- Exposure to cat feces
- Eating raw or undercooked meat (often pork or lamb)
- Congenital transmission

Likelihood of Secondary Transmission:

- Minimal; congenital transmission if acute infection acquired during pregnancy in a previously unexposed mother

At-Risk Populations:

- In the past, cat owners have been considered at risk, but recent CDC data cast doubt on the relevance of this risk in the US. Risk may be present in individuals who handle feces from infected cats without proper precautions.
- Individuals who eat raw meat
- Immunocompromised patients including those undergoing chemotherapy, taking immunosuppressant drugs, or with HIV/AIDS

Vector and Reservoirs Involved:

- Definitive hosts are felines.

Blood Phase:

- Parasitemia rarely identified other than in severely immunocompromised patients.

Survival/Persistence in Blood Products:

- Survives in citrated whole blood stored at 4°C up to 50 days

Transmission by Blood Transfusion:

- Rare; four cases of transmission associated with granulocyte concentrates from CML donors have been identified.
- There are no known transmissions from RBCs and FFP. One possible case from a platelet transfusion has been reported.

Cases/Frequency in Population:

- US: 22.5% seroprevalence (IgG antibody) in individuals aged 12 years or older as measured by the Third National Health and Nutrition Examination Survey (1988-1994).
- Worldwide: Antibody prevalence ranges from 5% to 95% among adolescents and adults depending on geographic location, population group, living conditions, and occupation.

Incubation Period:

- 1-2 weeks for acute symptoms
- Years for recrudescence of quiescent infections

Likelihood of Clinical Disease:

- Immunocompetent host: Low, as most infections are asymptomatic or benign
- Immunocompromised host, transplant recipients, and fetus: High, with severe or fatal consequences

Primary Disease Symptoms:

- Usually asymptomatic but can include malaise, fever, and cervical lymphadenopathy
- More severe implications in congenital cases or in patients with AIDS, including hydrocephalus and mortality in the fetus and damage to the brain, eyes, or other organs in adults

Severity of Clinical Disease:

- Absent/Low in most people
- High in immunocompromised patients and in the fetus, especially if infection occurs early in pregnancy

Mortality:

- HIV toxoplasmosis encephalitis: 10.8%
- Congenital toxoplasmosis: 1-4%

Chronic Carriage:

- Over 50% of seropositives in the US are chronically infected as demonstrated by the presence of bradyzoites in tissues.
- Parasitemia has been reported to persist as long as 1 year after infection in otherwise well individuals.
- Latent infections are reactivated when individuals become immunocompromised.

Treatment Available/Efficacious:

- Generally treatment is not warranted, but, in some cases, pyrimethamine and sulfonamides are effectively given together.

Agent-Specific Screening Questions(s):

- No specific question is in use.
- Not indicated, based on the low risk of transfusion-transmission.
- No sensitive or specific screening question is feasible.

Laboratory Test(s) Available:

- No FDA-licensed blood donor screening test exists.
- Options for laboratory testing include histological analyses of blood smears and tissues, culture, Sabin-Feldman dye, agglutination, indirect IFA, EIA (IgM and IgG), and NAT. An IgM-positive result alone is not definitive and should be confirmed by a reference laboratory. Rise in IgG titer is diagnostic.

Currently Recommended Donor Deferral Period:

- No FDA Guidance or AABB Standard exists.
- Prudent practice would be to defer donors with acute toxoplasmosis until signs and symptoms are gone and a course of treatment is complete. If no treatment was administered, prudent practice would be to defer for 1 year after resolution of symptoms.

Impact on Blood Availability:

- Agent-specific screening question(s): Not applicable
- Laboratory test(s) available: Not applicable

Impact on Blood Safety:

- Agent-specific screening question(s): Not applicable
- Laboratory test(s) available: Not applicable

Leukoreduction Efficacy:

- Unknown
- May be effective at removing infected macrophages/monocytes

Plasma Reduction Efficacy for Plasma Derivatives:

- No specific data are available.

Other Prevention Measures:

- Crystal violet in whole blood may be efficacious.

Suggested Reading:

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8. Selik RM, Chu SY, Ward JW. Trends in infectious diseases and cancers among persons dying of HIV infection in the United States from 1987 to 1992. *Ann Intern Med* 1995;123:933-6.
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