Toxoplasma gondii: A Parasite that Causes Toxoplasmosis

Introduction
Toxoplasmosis is the infection caused by the parasite Toxoplasma gondii (Toxo). It is estimated that 60 million people in the United States have the parasite, but exhibit no symptoms of the infection. Cats are the only primary or definitive host for the parasite Toxo; however, most warm-blood animals can become infected. Before deciding to get rid of the pet cat, be aware that humans can be exposed to Toxo from various sources. The good news is there has been a reduction in the number of people in the United States who have been exposed to Toxo in the past 10 years. This is most likely due to improved livestock handling practices and food handling behaviors. Despite improvement in overall exposure, immune-compromised individuals need to be especially diligent with their food handling and environmental practices as they are the most susceptible to the active form of the disease.

Public health concerns
Toxoplasma gondii is only able to reproduce in the digestive tract of cats. However, once the parasite eggs have been released into the environment through cat feces, other animals can consume the eggs and become infected. An animal that consumes the Toxoplasma gondii oocyte, or egg, becomes the intermediate host. Eating soil (for instance, soil on a tomato eaten straight from the garden), drinking contaminated water, or eating an animal that is already infected with Toxo, are routes of infection for an animal or human. Toxo can also be present in the milk of infected animals. There is the potential of infection if milk is consumed when unpasteurized. Humans are intermediate hosts and once exposed can harbor the parasite for the rest of their lives without any negative side effects, as a healthy immune system prevents the parasite from becoming active.

Although the prevalence of Toxoplasmosis is relatively low in the United States—10.8% for those between the ages of 6 and 49—the parasite is more predominant in people in other parts of the world; in some countries 90% of the population has been exposed. Food production, culinary and water treatment practices, climate, terrain, and exposure of soil to cat feces affect the prevalence of Toxo. Therefore, those who travel are very susceptible to Toxo and need to be aware of potential sources of exposure. Other susceptible groups are the immune-compromised or the older adult, pregnant women, those infected with HIV/AIDS, those with cancer, and those who have had an organ transplant. These groups of people have the greatest potential for the active form of the disease. When the immune system is suppressed the parasite transforms from a dormant form to an active form and will affect various parts of the body. The brain, eye, heart, and muscle tissue are all sites where the parasite will reside and proliferate. Pregnant women who are exposed during pregnancy can pass the parasite to their baby resulting in congenital conditions in the child, such as blindness, mental disabilities, and seizures.
What are the symptoms?

For most people, infections with Toxo will show no symptoms. For others, like many other foodborne diseases, the symptoms of Toxoplasmosis can be difficult to distinguish from the flu. People with healthy immune systems that have been exposed to Toxo report having swollen glands, fever, muscle aches, and fatigue. The immune-compromised may experience fever, headaches, confusion and, in extreme cases, encephalitis or pneumonia upon exposure or when the parasite has become reactivated. Infants born with the parasite may not show any symptoms initially, but later develop vision problems, mental disabilities, and or seizures.

There are a number of organisms that can make people sick. It is not possible to determine which pathogen is causing the problem based on symptoms alone. Individuals suffering from serious illness should seek appropriate medical advice.

Understanding the impact

- Prevalence of *Toxoplasma gondii* by age:

<table>
<thead>
<tr>
<th>Age</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>6–11 years</td>
<td>3.6%</td>
</tr>
<tr>
<td>12–19 years</td>
<td>5.8%</td>
</tr>
<tr>
<td>20–29 years</td>
<td>10.1%</td>
</tr>
<tr>
<td>30–39 years</td>
<td>14.3%</td>
</tr>
<tr>
<td>40–49 years</td>
<td>15.7%</td>
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</tbody>
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- 50% of the Toxoplasmosis illnesses in the United States are foodborne.
- 2.6% of persons who have the infection are hospitalized.
- 0.2% (656) of those with the infection die as a result of the infection.

How to prevent exposure

The best form of prevention and thus protection is to wash your hands!

- Cook meat to the proper temperature. Heat will kill the parasite (pork, 160°F; lamb, 160°F; deer, 160°F).
- Do not handle raw meat and then touch your face, especially around your mouth.
- Wash all utensils with hot soapy water before and after handling raw meat.
- Freezing meat to 10°F for at least 4 days will kill the parasite.
- Prevent raw meats from touching other foods in the grocery cart.
- Wash all fruits and vegetables harvested from the garden with running water before eating.
- Consume only pasteurized milk and dairy products.

Protection from environmental exposure

- When working outside, wear gloves.
  —Remember to not touch your face with your dirty gloves.
  —Remember to wash your hands after taking off the gloves.
- Cover children's sandboxes. Cats may use sandboxes for litter boxes.
- Clean the cat litter box daily.
  —*Toxoplasma gondii* eggs take at least 24 hours to become active/infective.
  —It’s a good idea to wear gloves to clean the litter box.
  —Wash your hands immediately after cleaning the litter box.

Protection from exposure from your cat

- Feed commercially produced dry or canned food only.
- Do not feed your cat raw meat.
- Avoid stray cats, especially kittens.
- Keep indoor cats in and outdoor cats out.

Protection when traveling

- Drink water from safe sources.
- Eat foods that have been thoroughly cooked.
- Wash all fruits and vegetables thoroughly with water from a safe source.
- If you are unsure if the water is safe and you have the means, boil water for 1 minute, cool, and then use for drinking or washing fruits and vegetables.
- Do not handle cats and kittens.
What if you wish to get pregnant?

It is not necessary to get rid of your cat. A test can determine if you have been exposed. If you have been newly exposed and you wish to become pregnant, talk to your physician. The most common suggestion is to wait 6 months from the time of exposure before becoming pregnant.

What if you have a healthy immune system and you are symptomatic?

Treatment is available if a person, pregnant or otherwise, is newly exposed and symptomatic. Talk to your physician. Make him/her aware of your activities or exposure to stray cats or kittens, sandboxes, or litter boxes.

What if you have HIV/AIDS, cancer, or other immune-suppressing conditions?

You should be tested for Toxoplasma gondii and undergo treatment recommended by your physician.

References


