

Toxoplasmosis

What is toxoplasmosis?

Toxoplasmosis is an infection caused by the parasite *Toxoplasma gondii* (*T. gondii*). The parasite is transmitted to people through eating undercooked meat, especially pork, lamb, beef, wild meat (deer and so on), or raw shellfish, such as oysters, clams and mussels, contaminated with the parasite. Cats are natural hosts of this parasite, and it may be transmitted to people through inadvertent contact with cat feces.

Toxoplasmosis infection most often causes disease in the brain and spinal cord, although other parts of the body, including the eyes, heart, lungs, skin, liver, and gastrointestinal (GI) tract, can be infected. In North America, toxoplasmosis in HIV-positive people is usually a reactivation of an old infection that did not initially cause disease. When someone is first infected with the parasite, there are usually no symptoms, and the immune system is able to control and contain the infection. However, in untreated HIV infection the immune system degrades and loses the ability to control the parasite. As your CD4 count falls below the 200 cell/mm³ mark, your risk for developing symptoms of toxoplasmosis and other AIDS-related infections increases. HIV-positive people who have been exposed to the parasite and who have less than 50 CD4 cells/mm³ are at greatest risk for toxoplasmosis. Taking HIV treatment (commonly called ART) every day exactly as directed to maintain a high CD4 count helps prevent toxoplasmosis from occurring.

Symptoms

Symptoms of toxoplasmosis can include the following:

- dull, constant headache
- intermittent fever
- confusion

Symptoms may also include focal neurological deficits, such as:

- weakness, or even paralysis, of one side of the body
- speech disorder, especially slurred words
- weakness or loss of sensation in any limb
- loss of an area of vision

Focal neurological deficits are problems caused by disturbances (lesions, tumours, infections, stroke) in a particular area of the brain. They cause a specific loss of sensory or motor function. For example, a toxoplasmosis lesion on the brainstem may cause difficulty swallowing or speaking; a lesion near

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the area of the brain that controls sight can cause the loss of an area of vision.

Diagnosis

The symptoms of toxoplasmosis are similar to those of many other conditions that can affect the brain and spinal cord. Physical examinations, lab tests, and radiological scans (CAT scans and MRI) are necessary to confirm the diagnosis.

A person who has any of the symptoms described above will receive a physical examination, including some general tests of the nervous system. If there seem to be neurological problems, you will be referred to a neurologist (a doctor whose specialty is the brain and nervous system).

Blood samples will be taken and tested to find out if you have been exposed to the toxoplasmosis parasite or to other germs that could cause similar symptoms. Most physicians rely on assessing a combination of symptoms and results of laboratory tests and CT or MRI scans in order to make a diagnosis of toxoplasmosis. However, initially the symptoms of toxoplasmosis may be mild or mimic other conditions and so a consultation with a neurologist may be necessary to help your doctors understand the cause of your symptoms. The neurologist will conduct an extensive physical examination which will assess cognition (ability to think and reason); motor function (including size, strength, and tone of muscles); sensory nerve function (ability to tell the difference between light and firm touch, etc.); coordination (ability to perform certain movements, balance, walk, etc.); and reflexes. This series of tests can allow the neurologist to pinpoint the location of the lesion in the brain. These tests will not confirm the diagnosis of toxoplasmosis, but they can eliminate some other possible diagnoses.

A lumbar puncture (spinal tap) may be done to remove a sample of cerebrospinal fluid (CSF). This fluid will be tested to find out if the patient has been exposed to the parasite or to other germs that could cause similar symptoms. Although antibodies to toxoplasmosis may be found in the CSF, this test cannot confirm the diagnosis of toxoplasmosis, but can eliminate other possible diagnoses.

Images of the inside of the brain and spinal cord can be produced with a CT scan. In a patient with toxoplasmosis, the scan can reveal multiple lesions in the cortex and deep grey-matter structures such as the basal ganglia. However, the CT images can vary widely: there may be single lesions, lesions with diffuse enhancement, as well as non-enhancing lesions.

The only definitive way to diagnose toxoplasmosis is through a brain biopsy. This involves cutting open the skull and removing a small piece of brain for analysis in the lab. This procedure is so invasive and potentially so dangerous that it is almost never performed.

Treatment

Treatment for toxoplasmosis may be taken at home or in hospital depending on the size, number, and location of the lesions, the symptoms experienced, and the person's ability to tolerate the medications.

Although the drug pyrimethamine is a highly effective part of combination treatment of toxoplasmosis, this drug is not always available, can be expensive, or there may be delays in accessing it. Therefore, some treatment guidelines instead recommend the use of two antibiotics: trimethoprim + sulfamethoxazole.

Co-trimoxazole (trimethoprim + sulfamethoxazole)

The combination of two antibiotics trimethoprim and sulfamethoxazole—this combination is available in pill and intravenous formulations—is called co-trimoxazole. Although co-trimoxazole is available in generic formulations, it is sometimes referred to by the brand names Bactrim or Septra. This combination is now used for both treating and preventing toxoplasmosis (and some other infections and complications such as AIDS-related pneumonia – PCP).

Treatment guidelines from the U.S. Department of Health and Human Services recommend the following doses for people with toxoplasmosis:

- trimethoprim 5 mg/kg and sulfamethoxazole 25 mg/kg given either intravenously or orally twice daily.

Although most people with toxoplasmosis begin to feel better within two weeks of initiating this treatment and CT scans show improvement, these drugs need to be taken for at least six weeks.

Note that after recovery from acute toxoplasmosis, suppression of toxoplasmosis is necessary with maintenance treatment. This is usually one double strength tablet of co-trimoxazole taken twice daily.

Doctors usually begin to initiate ART several weeks after people have begun treatment for toxoplasmosis and are recovering. ART strengthens the immune system and helps to raise CD4+ counts. Once the CD4+ count rises and remains well above the 200 cell/mm³ level for at least six months, *and* the person remains free from symptoms of toxoplasmosis, doctors then consider stopping the use of maintenance treatment.

Pyrimethamine

The most effective treatment is a combination of the oral antibiotic drugs pyrimethamine (50 to 100 mg per day) and sulfadiazine (4 to 8 grams per day), plus folinic acid (10 mg per day). Although improvement in symptoms is usually seen within seven days and on CT scans after 14 days, treatment should continue for at least six weeks.

Pyrimethamine is fairly well tolerated by most people, but its side effects can include nausea, vomiting, and diarrhea in the first few days of treatment. Sulfadiazine can cause skin rashes, itching, sensitivity to light, joint pain, fever, and chills. Both drugs can cause allergic reactions; “sulfa” reactions are common among HIV-positive people. Folinic acid is taken to help protect the bone marrow from the suppressive effects of both drugs.

ART and toxoplasmosis

U.S. treatment guidelines state that most physicians encourage patients with toxoplasmosis to initiate

ART within “two to three weeks after the diagnosis of toxoplasmosis.” ART helps to strengthen the immune system’s ability to control toxoplasmosis and many other germs.

Preventing toxoplasmosis

Taking reduced doses of medicines to prevent another occurrence of toxoplasmosis is called secondary prophylaxis. Once a person has recovered from toxoplasmosis, doctors prescribe suppressive therapy to prevent recurrence.

Cat care

Pets are an important source of companionship and emotional support for people. HIV-positive cat owners may help reduce the risk of developing toxoplasmosis with the following steps:

- using dust-free cat litter
- wearing gloves and a mask to remove feces from the litter box daily
- dust-free litter may help prevent the toxoplasmosis parasite from being inhaled with the dust
- always wash your hands thoroughly after cleaning cat litter
- keep cats indoors and avoid handling stray cats
- feed cats canned or dried commercial food or well-cooked table food

Food safety

Other ways to reduce your risk of exposure to the parasite that causes toxoplasmosis and other germs include the following:

- wash hands after contact with raw meat and after contact with soil
- wash raw fruit and vegetables before eating them
- avoid eating raw or undercooked meats (including beef, chicken, pork, lamb and wild meat) and shellfish

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