TRICHINELLOSIS
(Trichiniasis, Trichinosis)

REPORTING INFORMATION

- **Class B:** Report by the close of the next business day after the case or suspected case presents and/or a positive laboratory result to the local public health department where the patient resides. If patient residence is unknown, report to the local public health department in which the reporting health care provider or laboratory is located.
- Reporting Form(s) and/or Mechanism:
    - The Ohio Disease Reporting System (ODRS) should be used to report lab findings to the Ohio Department of Health (ODH). For healthcare providers without access to ODRS, you may use the Ohio Confidential Reportable Disease Form (HEA 3334, rev. 1/09 http://www.odh.ohio.gov/pdf/forms/hea3334.pdf)
    - The Centers for Disease Control and Prevention (CDC) Trichinosis Surveillance Case Report (CDC 54.7, rev. 9/02) is required. Information collected from the form should be entered into ODRS **and** faxed to ODH – Outbreak Response & Bioterrorism Investigation Team 614-564-2456. The mailing address for this form is: ODH Outbreak Response & Bioterrorism Investigation Team (ORBIT), 246 N. High St., Columbus, OH 43215.
- Key fields for ODRS reporting include: import status (whether the infection was travel-associated or Ohio-acquired), date of illness onset, and all the fields in the Epidemiology module.

AGENT

Larvae of *Trichinella spiralis*, a small filiform nematode.

CASE DEFINITION

Clinical Description

A disease caused by ingestion of *Trichinella* larvae, usually through consumption of *Trichinella*-containing meat—or food contaminated with such meat—that has been inadequately cooked prior to consumption. The disease has variable clinical manifestations. Common signs and symptoms among symptomatic persons include eosinophilia, fever, myalgia, and periorbital edema.

Laboratory Criteria for Diagnosis

Human Specimens

- Demonstration of *Trichinella* larvae in tissue obtained by biopsy, OR
- Positive serologic test for *Trichinella*.

Food Specimens

- Demonstration of *Trichinella* larvae in the food item (probable).

Epidemiologic Linkage

Persons who shared the implicated meat/meal should be investigated and considered for case status as described above.

Criteria to Distinguish a New Case from an Existing Case

Serial or subsequent cases of trichinellosis experienced by one individual should only be counted if there is an additional epidemiologically compatible exposure. Because the duration of antibodies to *Trichinella* spp. is not known, mere presence of antibodies without a clinically-compatible illness AND an epidemiologically compatible exposure

may not indicate a new infection especially among persons with frequent consumption of wild game that is known to harbor the parasite.

Case Classification

Suspect: Instances where there is no clinically compatible illness should be reported as suspect if the person shared an epidemiologically implicated meal, or ate an epidemiologically implicated meat product, and has a positive serologic test for trichinellosis (and no known prior history of *Trichinella* infection).

Probable:

- A clinically compatible illness in a person who shared an epidemiologically implicated meal or ate an epidemiologically implicated meat product, or
- A clinically compatible illness in a person who consumed a meat product in which the parasite was demonstrated.

Confirmed: A clinically compatible illness that is laboratory confirmed in the patient.

Comments

Epidemiologically implicated meals or meat products are defined as a meal or meat product that was consumed by a person who subsequently developed a clinically compatible illness that was laboratory confirmed.

Negative serologic results may not accurately reflect disease status if blood was drawn less than 3-4 weeks from symptom onset.

SIGNS AND SYMPTOMS

Many infections are asymptomatic. Symptomatic cases result from the ingestion of a large number of larvae. Three phases are recognized: intestinal, larval migration and convalescence.

Intestinal: nonspecific gastroenteritis, with anorexia, nausea, vomiting, abdominal pain and diarrhea

Larval Migration: occurs 7-11 days after ingestion. Signs of muscular invasion begin, with edema of the upper eyelids, myalgia, headache, fever, sweating, chills, weakness and marked eosinophilia. Usually lasts 10-30 days.

Convalescence: involves muscular pain, which sometimes persists for several months.

DIAGNOSIS

The most specific diagnostic test is a muscle biopsy of the deltoid, biceps or gastrocnemius muscle. Contact the ODH Laboratory at 614-728-0544 (Monday – Friday; 8 AM – 5 PM) for the Centers for Disease Control and Prevention (CDC) specimen submission criteria.

EPIDEMIOLOGY

Source

Many domestic and wild animal species harbor the parasite. Swine are the primary source of infection in humans and human infection is usually the result of eating inadequately cooked pork or wild game, especially bear meat.

Occurrence

Worldwide, but is most common in areas where raw or undercooked pork or wild game

meat are eaten.

Mode of Transmission
Humans are infected from eating raw or undercooked meat from infected animals, primarily pork products.

Period of Communicability
Trichinosis is not transmitted by person-to-person contact. Animals remain infective for months. Meat from infected animals remains infective for considerable periods unless it is properly cooked, frozen or irradiated.

Incubation Period
Incubation period is usually 8-15 days, with a range of 5-45 days, and seems to be related to the number of larvae ingested.

PUBLIC HEALTH MANAGEMENT

Case

Investigation

Investigation is directed toward determining the source of uncooked meat and identifying other exposed persons.

Treatment

Medications are available that are safe and effective, such as Mebendazole, with albendazole as an alternative is used for treatment. Steroids are sometimes used for infections with severe symptoms.

Isolation and Follow-up Specimens

None

Contacts
Trichinosis is not passed from person-to-person.

Prevention and Control
The best way to prevent trichinellosis is to cook meat to safe temperatures. A **food thermometer** should be used to measure the internal temperature of cooked meat. Do not sample meat until it is cooked. USDA recommends the following for meat preparation:

- **For Whole Cuts of Meat (excluding poultry and wild game)**
  - Cook to at least 145° F (63° C) as measured with a food thermometer placed in the thickest part of the meat, then allow the meat to rest* for three minutes before carving or consuming.
- **For Ground Meat (including wild game, excluding poultry)**
  - Cook to at least 160° F (71° C); ground meats do not require a rest* time.
- **For All Wild Game (whole cuts and ground)**
  - Cook to at least 160° F (71° C).
- **For All Poultry (whole cuts and ground)**
  - Cook to at least 165° F (74° C), and for whole poultry allow the meat to rest* for three minutes before carving or consuming.

*According to USDA, "A 'rest time' is the amount of time the product remains at the final temperature, after it has been removed from a grill, oven, or other heat source. During the three minutes after meat is removed from the heat source, its temperature remains constant or continues to rise, which destroys pathogens."

Freezing may not kill all worms in the case of game meats.

REFERENCE

CDC Trichinellosis information: http://www.cdc.gov/parasites/trichinellosis/index.html

What is trichinellosis (trichinosis)?
Trichinellosis, also called trichinosis, is caused by a worm called Trichinella. Trichinellosis is acquired by eating raw or undercooked meat of animals infected with trichinella. Swine are the primary source of infection in humans, but trichinellosis can also be contracted by eating undercooked meats of wild feline (such as a cougar), fox, dog, wolf, horse, seal, or walrus, and particularly bear.

Once very common, trichinellosis is now relatively rare. CDC reports an average of 12 cases per year. Between 2000 and 2012, Ohio reported 3 cases (2000, 2004, 2005).

How does infection occur in humans and animals?
When a human or animal eats meat that contains infective Trichinella cysts, the worms mature and breed in the intestines. Eggs develop into immature worms, travel through the arteries, and are transported to muscles. Within the muscles, the worms curl into a ball and encyst (become enclosed in a capsule).

Trichinellosis is not contagious, infection only occurs by eating contaminated meat.

What are the symptoms of a trichinellosis infection?
Many infections cause no ill effects and go undiagnosed. Problems are more likely to develop in those who consumed many larvae. The initial signs include lack of appetite, nausea, vomiting, diarrhea, and abdominal pain. After the first seven days signs may change as the larvae migrate through the body. These symptoms may include headache, fever, sweating, weakness, and swelling of the upper eyelids. Muscle pain, fatigue, and weakness may last for several months.

How soon after infection will symptoms appear?
Abdominal symptoms can occur 1-2 days after infection. Further symptoms usually start 2-8 weeks after eating contaminated meat.

How is trichinellosis infection diagnosed?
A blood test or muscle biopsy can diagnose trichinosis.

Can trichinellosis be treated?
Yes, several safe and effective prescription drugs are available. The decision to treat is based upon symptoms, exposure to raw or undercooked meat, and laboratory test results.

How can I prevent trichinellosis?
- Cook meat products until the juices run clear or to an internal temperature of 170°F.
- Freeze pork less than 6 inches thick for 20 days at 5°F to kill any worms.
- Cook wild game meat thoroughly. Freezing wild game meats, unlike freezing pork products, may not effectively kill all worms.
- Do not allow hogs to eat uncooked carcasses of other animals, including rats, which may be infected with trichinosis.
- Clean meat grinders thoroughly if you prepare your own ground meats.
- Curing (salting), drying, smoking, or microwaving meat does not consistently kill infective worms.

For more information please visit the following website:
CDC Trichinellosis: http://www.cdc.gov/parasites/trichinellosis/index.html.