Cryptosporidiosis

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Cryptosporidiosis ("Crypto"); Etiological agent- *Cryptosporidium* (1)

**Transmission:**
Transmission occurs via the fecal-oral route when individuals ingest water or food sources contaminated with *Cryptosporidium* or come in direct contact with feces from an infected individual or animal. (1) (5) (7)

**Reservoirs:**
- Infected humans and animals
- Water, food, soil, and fomites contaminated with fecal matter

**General Characteristics:**
“*Cryptosporidium parvum* is an intracellular protozoan parasite of the family *Cryptosporidiidae* and phylum *Apicomplexa.*” (7). Characteristics of *Cryptosporidium* include: complex sexual and asexual lifecycles, the formation of thick spherical walled oocytes found within the lumen of the small intestine, typically 4-6 micrometers in diameter, that release sporozoites that invade and infect surrounding cells. (7)

**Key Tests for Identification:**
To test for the presence of *Cryptosporidium*, a stool sample is collected and tested for the presence of oocysts that have distinct walls that can be visualized using the modified acid-fast stain procedure. The Direct fluorescent antibody (DFA) assay is an additional identification test, but requires additional equipment. (4)

**Signs and Symptoms:**
Symptoms begin to emerge, on average, between 2 to 10 days after a person has become infected with the parasite. The Center for Disease Control (CDC) describes the symptoms as watery diarrhea, stomach cramps or pain, dehydration, nausea, vomiting, fever, and/or weight loss. The most common symptom being watery diarrhea, but there are individuals who reported being asymptomatic. Typically, symptoms will last only about a week, but could last as long as four weeks. Young children, elderly, and those with weakened immune systems could have chronic symptoms or even severe life-threatening symptoms if the disease does not resolve itself and requires medical intervention. (1) (5)

**Virulence Factors:**
*Cryptosporidia* have sporulated thin-walled oocysts that allow the parasite to survive within the gastrointestinal tract. The oocysts also allow the parasite to survive in the external environment, resist many antiparasitic treatments, and protection against chlorine water treatments and UV light 6. *Cryptosporidia* have sexual and asexual lifecycles dependent on the location of the parasite making it adaptable to many environments. The presence of “parasitophorous vacuole bounded by a parasitophorous vacuolar membrane (PVM)” has a protective function and the
feeder organelle membrane allows the passage and uptake of nutrients from the host cytoplasm to the parasite. (10)

**Control/Prevention:**
To control the spread of cryptosporidiosis, the CDC recommends washing hands for at least 20 seconds prior to handling or eating food and after handling any stool whether human or animal. Alcohol-based hand sanitizers should not be used as they do not effectively kill *Cryptosporidium*. *Cryptosporidium* is susceptible to high concentrations of hydrogen peroxide (>6%) and ultraviolet light (7). If swimming in a pool, do not swallow the water. Toilet young children often and check diapers almost every hour. Do not swim for at least two weeks after diarrhea has stopped if you have been diagnosed with cryptosporidiosis (2) (5).

**Treatment:**
People with healthy immune systems will recover from cryptosporidiosis without any medical intervention. To aid in the recovery process, drink plenty of fluids, follow a proper diet, and avoid caffeine and alcoholic beverages. Doctors may prescribe over-the-counter anti-diarrheal medications such as nitazoxanide to control diarrhea. Individuals who are immunosuppressed, immunocompromised, infants, young children, and women who are pregnant should consult their medical provider for additional support. (1) (5)

**Historical Information**
Ernest Edward Tyzzer named the genus *Cryptosporidium*, but it took almost another 70 years for the protozoan to gain any interest in the eyes of researchers. Prior to current research and diagnostic tests, *Cryptosporidium* could only be identified by biopsying infected sections of the intestine and was only classified as “an opportunistic protozoan that caused a few or no symptoms.” (10). To this day, the taxonomy of the parasite remains unclear.

**Local cases/Outbreaks:**
On February 20, 2015 an outbreak amongst Pennsylvania veterinary students was reported after they had handled euthanized calves during an obstetrics laboratory. (3) In Texas: “In a typical year, 200-400 cases of Crypto are reported in Texas. Outbreaks do occur with much higher numbers of cases reported. In 2008, there were multiple Crypto outbreaks that resulted in 3,342 cases reported over the year.” (8)
Global Cases/Outbreaks:
Global distribution map of cryptosporidiosis cases reported in the literature (1998–2008) (6). The color-coded map depicts the various methods of transmission based on each individual country.

References:


8. Texas Department of State Health Services, Cryptosporidiosis- Emerging and Acute Infectious Disease Control, September 02, 2015, https://www.dshs.state.tx.us/idcu/disease/cryptosporidiosis/, retrieved December 2, 2015
