

2.15 Shigellosis

Etiology

Shigellosis is an acute bacterial disease caused by gram negative bacilli in the *Enterobacteriaceae* family. It is the most communicable of the bacterial diarrheas. Some strains produce enterotoxin and shigatoxin (much like the verotoxin of *E. coli* O157:H7). Approximately 40 serotypes are divided into four groups depending on serologic similarity and fermentation reactions:

- Group A - *Shigella dysenteriae*
- Group B - *Shigella flexneri*
- Group C - *Shigella boydii*
- Group D - *Shigella sonnei*

Case Definition

Confirmed Case

Laboratory confirmation of infection with or without clinical illness:

- isolation of *Shigella* sp. from an appropriate clinical specimen (e.g. sterile site, deep tissue wounds, stool, vomit or urine)

Probable Case

Clinical illness¹¹ in a person who is epidemiologically linked to a confirmed case

Clinical Presentation

Shigellosis is unique among bacterial enteropathogens in that a very low dose of the organism readily produces disease in humans. This may account for the high secondary attack rate in families. The severity of the presentation and case fatality rates are functions of the host.

Shigellosis involves the large and distal small intestine. Disease is most commonly characterized by diarrhea (may contain blood and mucus or be watery) accompanied by fever, nausea, and tenesmus. It may be biphasic with an initial period of watery diarrhea and cramps followed by the development of dysentery (blood and mucus). Febrile convulsions may be a significant complication in young children. The illness is usually self-limited lasting between one day and one month with an average of seven days. Some individuals have mild or asymptomatic infections. Bacteremia and pneumonia may occur but are uncommon.

There is a rare fulminant form of bacillary dysentery secondary to a massive small intestine invasion by the bacteria. This may be seen in children. Death early in the infection is common (the “Ikari” syndrome).

¹¹ Clinical illness is characterized by diarrhea, fever, nausea, vomiting, cramps and tenesmus. Asymptomatic infections may occur.

Infection with *S. dysenteriae* is often associated with serious disease and more severe complications. This can include toxic megacolon and hemolytic-uremic syndrome (HUS). It is one of the most common *Shigella* species to occur in developing countries and least common in developed countries.

Some strains of *S. flexneri* can cause Reiter's syndrome (reactive arthropathy) in persons who are genetically predisposed, although Reiter's syndrome can occur with any of the *Shigella* strains. This is a common strain in developing countries but also accounts for approximately one quarter of cases in the US.

S. boydii is not a common isolate in North America but widespread in developing countries.

Infection with *S. sonnei* often results in a short clinical course. Infection may be fatal in immunocompromised individuals.

Diagnosis

Diagnosis is made by the isolation of *Shigella* from feces or a rectal swab. The infection is generally associated with a high number of leukocytes (pus cells) in the fecal matter. *Shigella* remains viable outside the human body for only a short period of time hence, specimens must be processed rapidly after collection, preferable within 24 hours. Use of appropriate media increases the likelihood of organism isolation.

Serological testing is not generally helpful. For confirmation on laboratory specimens go to the public health laboratory web site www.publichealthlab.ca or call 709-777-6583.

Epidemiology

Occurrence

Shigellosis occurs worldwide, a rate of 1.93 per 100,000 was reported in Canada in 2007. There were no reported cases in NL for 2015. There have been five cases reported in 2012.

Reservoir

Humans are a significant reservoir for this disease.

Transmission

Transmission occurs through the fecal -oral route. Predominated modes of transmission include person-to-person contact, contact with a contaminated inanimate object, ingestion of contaminated food or water. Houseflies also can be vectors through physical transport of infected feces. The infectious dose is very low; 10 to 200 organisms can cause an infection.

Incubation Period

The incubation period is typically two (2) to four (4) days (range one to seven days).

Communicability

Transmission can occur as long as the organism is present in feces usually about four (4) weeks from onset of illness.

Control Measures

Management of Case

Investigations

- Obtain a food history.
- Determine the possible source of infection taking into consideration the incubation period, reservoir, and mode of transmission.
- Identify history of international travel (especially to areas with inadequate sanitation, water and sewage treatment).
- Determine history of institutionalization.
- Identify history of residing in areas with poor sanitation including improper water treatment and sewage disposal and include recent immigration.
- Assess for history of similar symptoms in other members of the household.
- Suspected contaminated food may be held to prevent of consumption.
- Suspected contaminated food may be destroyed.

Exclusion

Exclusion (staying away from school or work) should be considered for symptomatic and asymptomatic persons who are:

- Food handlers whose work involves:
 - touching unwrapped food to be consumed raw or without further cooking and/or
 - handling equipment or utensils that touch unwrapped food to be consumed raw or without further cooking.
- Healthcare, daycare or other staff who have contact through serving food with highly susceptible patients or persons, who, in an intestinal infection would have particularly serious consequences, involved in patient care or care of young children, elderly or dependent persons.
- Children attending daycares or similar facilities who are diapered or unable to implement good standards of personal hygiene.
- Older children or adults who are unable to implement good standards of personal hygiene (e.g., mentally or physically challenged).
- Exclusion is patient care until 2 successive fecal samples or rectal swabs are found to be negative.
- Reassignment to a low risk area may be used as an alternative to exclusion.
- Contact precautions should be used in healthcare settings where children or adults have poor hygiene or incontinence that cannot be contained. Otherwise, routine practices are adequate.

Treatment

- Fluids and electrolyte replacement if excessive fluid loss through diarrhea or vomiting.
- Antimotility agents are not recommended as they may prolong the course of disease.
- Treatment is recommended for most symptomatic patients. Use of antibiotics will shorten the period of fecal excretion of the infecting strain and will shorten the clinical course of disease often to a few days.
- Antibiotics are prescribed according to the physician.
- Antibiotic resistance frequently develops after treatment.

Management of Contacts

Symptomatic contacts in child care facilities and in the household of the case should have stool specimens submitted for testing. Information should be given on disease transmission and appropriate personal hygiene.

Management of Outbreaks

An outbreak management team should be established to direct and coordinate the investigation as well as address infection prevention and control measures. If the outbreak is limited to one region the region is responsible to manage the outbreak; if more than one region is involved the outbreak will be managed by the province or in consultation with the province.

Education and Preventive Measures

General control measures include:

- Strict attention to hand hygiene and personal hygiene
- Proper cooking and storage of food
- People with diarrhea should not use recreational water venues (eg.,swimming pools, lakes, rivers, the ocean) for 2 weeks after symptoms resolve
- Breastfeeding provides protection for infants
- Protect, purify and chlorinate public water supplies
- Control flies
- Provide fact sheet available at
<http://healthycanadians.gc.ca/eating-nutrition/risks-recalls-rappels-risques/poisoning-intoxication/poisoning-intoxication/shigella-eng.php>

Reporting Requirements and Procedures

- The laboratory (hospital or public health laboratories) report case/s to the attending physician, the Chief Medical Officer of Health and the Medical Officers of Health (MOH)
- The MOH office will notify, as required, local physicians, nurse practitioners, environmental health officers, community health nurses, communicable disease control nurses (CDCNs) and **infection control practitioners (ICP)**, in the particular region as required for follow-up and case investigation.

- EHO will conduct an investigation of the case under the direction of the MOH and provide case details as per the food history.
- CDCN enters the case details into the electronic reporting system and uses the CNPHI tool, if indicated, for alerts or outbreak summaries.

Provincial Disease Control

- Reports the aggregate case data to Public Health Agency of Canada
- Provides an analysis of the case/s with reports in the Quarterly Communicable Disease Report (CDR), also posted on the Public Health website
- Coordinates the response if an outbreak across RHAs (CMOH will likely coordinate an outbreak across RHAs with input from disease control and environmental health.)

References

Foodborne Pathogenic Microorganisms and Natural Toxins – Shigellosis. US Food and Drug Administration Centre for Food Safety and Applied Nutrition. Bad Bug Book. January 1992. Retrieved June 3rd, 2013, from <http://www.fda.gov/downloads/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/UCM297627.pdf>