Shigellosis

Summary

Shigellosis is a diarrheal disease caused by a group of bacteria called Shigella. Illness is often characterized by diarrhea, fever, and sometimes vomiting and cramps. Mild and asymptomatic infections can occur. Stools may contain blood and mucus. Most infections are acquired by fecal-oral transmission from an infected person or from fecal contamination of water or food. Laboratory diagnosis is made by stool culture or culture independent testing (CIDT), such as a PCR panel. Antimicrobial treatment will shorten duration of illness and reduce shedding of the organism.

Symptomatic cases should be excluded from food handling, and from direct care of infants, elderly, immunocompromised, hospitalized and/or institutionalized patients; infected children or staff in a childcare center should also be excluded. Antimicrobial treatment should be considered for these people. A symptomatic case who performs these duties may return to his/her usual duties when the diarrhea has ceased, and they have two consecutive negative fecal samples or rectal swabs collected at least 24 hours apart, and at least 48 hours after completion of antibiotic therapy. The fecal samples may be tested by culture or by molecular methods.

Agent

Shigellosis is caused by of any of the four species of the Shigella bacillus: Group A, *S. dysenteriae*; Group B, *S. flexneri*; Group C, *S. boydii*; or Group D, *S. sonnei*. In the United States, Group D (*sS. sonnei*) is the most common species; Group B (*S. flexneri*) accounts for most of the remainder of cases.

Transmission

Reservoir**:**

The only significant reservoir is humans, although other primates may be infected.

Mode of transmission:

- Modes of transmission include: person to person contact, contact with a contaminated inanimate object, ingestion of contaminated food or water, and sexual contact. Foodborne or waterborne epidemics have occurred from direct fecal contamination of communal sources. Houseflies can transfer organisms from infected feces to uncovered food items. The infective dose of Shigella is small (10 to 200 organisms).

Period of communicability:

- Shigella bacilli are shed during the acute phase of the illness and usually ceases stops within four weeks of onset of illness illness onset. Asymptomatic carriers may shed the organism for up to one month., and Chronic carriage is uncommon. Secondary attack rates in households are high, up to 40%. Outbreaks commonly occur under conditions of crowding and poor sanitation, such as in correctional facilities, daycares, crowded camps, and aboard ships.

Clinical Disease

Incubation period:

Usually 1-3 days, with a range of 1-7 days.

Illness:

Shigellosis is an acute bacterial disease involving the large and small intestine. Illness is characterized by diarrhea, sometimes accompanied by fever, malaise, vomiting and cramps. Stools can contain blood and mucus, although mild infections consisting only of watery diarrhea may also occur. Seizures can be a complication, particularly in children. Although illness is usually self-limited, lasting an average of 4-7 days, severe infections may occur in young children, the elderly, and in people with poor nutritional status. Rare complications include bacteremia, reactive arthritis (formerly Reiter's Syndrome) (with *S.flexneri*), toxic megacolon and hemolytic-uremic syndrome (with *S. dysenteriae*).

Laboratory Diagnosis

Diagnosis of shigellosis is established via a stool culture or CIDT using fresh feces or a rectal swab, preferably collected within four days of symptom onset. Please note, culture confirmation of CIDT-positive specimens is ideal, although it may not be possible in all instances.

A stool smear stained with methylene blue often demonstrates numerous polymorphonuclear leukocytes, indicative of colitis but not specific to Shigella diagnosis.

Advanced molecular characterization (such as whole genome sequencing) of Shigella isolates can improve outbreak detection and control. An enzyme immunoassay (EIA) for shiga-toxin can be useful for rapid detection of *S. dysenteriae*, type 1, often associated with more serious disease and complications.

Treatment

Antimicrobial therapy is effective for shortening the duration of diarrhea and eradicating organisms from feces. Empiric treatment should be used in patients with severe symptoms (such as dysentery) or patients with underlying immunosuppressive conditions. For patients with mild illness, treatment may be indicated to prevent the spread of the organism (such as in a childcare setting or for food handlers). Because multidrug resistance is common among Shigella, antimicrobial susceptibility testing should be performed. Antimicrobial therapy should be administered for five days. Anti-motility or antidiarrheal medications are contraindicated for children and their use discouraged in adults. Treatment decisions should be made in conjunction with the patient's health care provider.

Surveillance

Case Definition:

***Confirmed Case**:* A case that meets confirmed laboratory criteria for diagnosis. When available, O antigen serotype characterization should be reported.

Probable Case: A clinically compatible case that is epidemiologically linked to a confirmed case, OR a case that meets the supportive laboratory criteria for diagnosis.

Clinical description: An illness of variable severity characterized by diarrhea, fever, nausea, cramps, and tenesmus. Asymptomatic infections may occur.

Laboratory Criteria:

Confirmed laboratory evidence: Isolation of Shigella from a clinical specimen.

Supportive laboratory evidence: Detection of Shigella spp. or Shigella/enteroinvasive E. coli (EIEC) in a clinical specimen using CIDT.

Epidemiologic Linkage: A clinically compatible case that is epidemiologically linked to a case that meets the supportive or confirmatory laboratory criteria for diagnosis.

Criteria to Distinguish a New Case from an Existing Case: A case should not be counted as a new case if laboratory results were reported within 90 days of a previously reported infection in the same individual. When two or more different serotypes are identified in one or more specimens from the same individual, each should be reported as a separate case.

Reporting:

Report all suspected or confirmed cases to the Epidemiology and Response Division (ERD) at 505-827-0006. Information needed includes: patient's name, age, sex, race, ethnicity, home address, home phone number, occupation, and health care provider.

Case Investigation:

Use the Foodborne Surveillance Investigation Form to complete the investigation. Information should also be entered into NM-EDSS per established procedures.

Control Measures

Control measures for CIDT cases that tested positive for more than one condition should be prioritized as follows: Vibrio> STEC> Cryptosporidium> Salmonella> Shigella> Campylobacter> Cyclospora> Giardia.

For a summary of work and daycare exclusion criteria for all enteric pathogens see Appendix 8.

1. Case management

1.1 Isolation: Exclude symptomatic persons from food handling, and from direct care of infants, elderly, immunocompromised, and hospitalized or institutionalized patients. Antimicrobial treatment should be considered for these people. They may be allowed to resume usual duties when diarrhea has resolved and there are two consecutive negative fecal samples or rectal swabs, collected at least 24 hours apart, and at least 48 hours after completion of antibiotic therapy. General public do not need to isolate but should maintain strict hand hygiene and refrain from water-related activities.

1.1.a For hospitalized patients, contact precautions, in addition to standard precautions, should be used.

1.2 Prophylaxis: Not applicable.

2 Contact management

2.1 Isolation: Ill contacts of shigellosis patients should also be excluded from food handling, and from direct care of infants, elderly, immunocompromised, hospitalized and/or institutionalized patients. Contact should not resume until diarrhea ceases and two consecutive fecal samples or rectal swabs, collected at least 24 hours apart and at least 48 hours after completion of antibiotic therapy, are negative.

2.2 Prophylaxis: Not applicable.

3 Prevention

3.1 Emphasize good hand hygiene practices (i.e., proper hand washing after using the toilet, changing diapers, and before and after handling food or beverages).

3.2 Follow general guidelines for preventing foodborne illness including:

3.2.a Thoroughly cook raw food from animal sources.

3.2.b Wash raw vegetables.

3.2.c Minimize contamination of food and surfaces by houseflies.

3.2.d Wash hands, knives and cutting boards after handling uncooked foods.

3.3 Immunization: Not applicable.

3.4 Symptomatic cases should consider avoiding recreational water usage for two weeks after the resolution of diarrheal illness to decrease waterborne transmission of Shigella.

Management of Shigellosis in Child Care Centers

1. Outbreaks of shigellosis in childcare centers do occur and can be difficult to control, particularly among groups of young children who are not yet toilet trained.

2. Management of isolated cases

2.1 When a case of shigellosis occurs among a childcare center attendee or staff member, stool specimens from other symptomatic attendees and staff members should be cultured. Stool specimens from household contacts who have diarrhea should also be cultured.

2.2 All symptomatic persons who have Shigella isolated or detected from their stool should be given antimicrobial therapy to prevent further transmission. They also should be excluded until the diarrhea has resolved, and there are two consecutive negative

fecal samples or rectal swabs taken at least 24 hours apart, and at least 48 hours after completion of antibiotic therapy.

2.3 Per childcare licensing regulations, a center should notify parents or guardians in writing of a case of Shigella in the facility (Subsection D of 8.16.2.20 NMAC). See Appendix 7 for a template of a notification letter.

2.4 The childcare center should review its infection control protocols with staff, and emphasize the following:

2.4.a Standard precautions should be followed to include strict hand washing routines for staff and children, and routines for handling fecal contaminated materials. Wash hands with soap and water. Waterless hand sanitizers with at least 60% alcohol are acceptable if hands are not visibly soiled.

2.4.b Frequently mouthed objects should be cleaned and sanitized after each use. Items should be washed with dishwashing detergent and water, then rinsed in freshly prepared (daily) household bleach solution (dilute 1 cup bleach in 9 cups of water).

2.4.c Food handling and diaper changing areas should be physically separated and cleaned after each use.

2.4.d Diaper changing surfaces should be nonporous and cleaned with a freshly prepared (daily) household bleach solution (dilute 1 cup bleach in 9 cups of water). Cleaning of diaper changing surfaces after each use is required; soiled diapers should be disposed of properly. If available, gloves should be worn when changing diapers and discarded immediately after use.

2.4.e For all childcare programs, although diaper changing logs are not required by regulation, maintaining them is best practice and are recommended whenever a day care attendee is diagnosed with an enteric pathogen. At a minimum, diaper logs should document the quality (e.g., formed, loose, watery, blood present, mucus present) and time of each diaper change. The log should be reviewed each day with the center director, or their designated personnel, and personnel from NMDOH who are being consulted and/or investigating individual cases, clusters, or outbreaks at the center. The purpose of the log is to assist in the identification of potential new cases, to prioritize testing recommendations, and assist in determining if exclusion of the infant or child is necessary until infection can be ruled out.

2.4.f Access to shared water play areas should be suspended during an outbreak.

2.4.g Animals in the childcare center with diarrhea should be isolated from children and taken to a veterinarian for diagnosis and treatment.

Managing Shigellosis Outbreak in School-Age Children

Shigella outbreaks in K-12 schools control measures (exclusions of cases, hand washing, and environmental cleaning) are very similar to Shigella outbreaks in daycares. However, the ability of children to correctly and consistently wash their hands will vary greatly, especially those in elementary schools. Control measures should be adapted and appropriate to the developmental ability of the child (i.e. a kindergarten student should be managed differently than a high school student).

1. Exclude laboratory confirmed or symptomatic cases (staff or student). Cases may not return to school for 48 hours after symptoms resolve.

    1.1 Laboratory confirmation includes PCR and culture testing.

    1.2 Symptoms for Shigella include diarrhea, fever, and sometimes vomiting, cramps, and toxemia (blood poisoning from toxins produced by the bacteria). Stools may contain blood and mucus.

2. Symptomatic or confirmed cases should also be excluded from afterschool programs. Cases may not return to afterschool programs for 48 hours after symptoms resolve.

3. Identify symptomatic (potential source or secondary) cases in the school. A daily line list is preferred; contact foodborne epidemiologist for electronic template.

4. Reinforce and improve hand washing.

    4.1 Students and staff must wash their hands after each visit to the restroom and before eating.

    4.2 If the laboratory-identified case is in a younger grade, hand washing should be supervised.

4.3 Toys and high touch surfaces should be routinely cleaned. Activities where students touch each other or activities that share non-cleanable materials should be suspended for the duration of the outbreak.5. Increase cleaning of high contact surfaces in the affected rooms using EPA-registered disinfectant.

6. Meet with school staff to ensure knowledge of means of transmission and prevention/control measures for shigellosis.

    6.1 Ensure that the school has an adequate stock of hand washing supplies and appropriate environmental cleaning products.

    6.2 Bathrooms should be monitored for cleanliness and cleaning should be increased.

7. Notify community health care providers. Clinicians should be aware of the following:

    7.1 There is currently an outbreak in their community.

    7.2 Appropriate control measures

7.3 Laboratory testing requirements for diagnosis and readmission

7.4.1 Antibiotics help to shorten the duration of shedding, and thus may help stop the spread of the outbreak.

7.5 Potential need to adapt choice of antibiotic to susceptibility of the outbreak strain.

Managing Institutional Shigellosis Outbreaks

Outbreaks in residential institutions with housed adults who are unable to care for themselves (e.g., people with special needs or skilled nursing facility residents) can be difficult to control and control measures are similar to those in other high-risk settings. Recommended control measures are:

1. Use a cohort system (i.e., housing symptomatic residents in same rooms).
2. Emphasize and supervise consistent hand hygiene for residents and staff.
3. Screen staff and other residents for symptoms and follow contact management measures as stated above.
4. Use appropriate antimicrobial therapy as directed by a healthcare provider.
5. Prophylaxis of asymptomatic contacts is not recommended.
6. Keep new admissions separate from symptomatic residents.

If an outbreak of shigellosis (i.e., two or more cases) is suspected in a residential facility, the Epidemiology and Response Division should be notified immediately at **505-827-0006**. Epidemiology and Response Division can assist in coordination of all control measures.

References

American Academy of Pediatrics. In: Kimberlin, DW, et al eds. Red Book: 2018 Report of the Committee on Infectious Diseases. 31st ed. Itasca, IL: American Academy of Pediatrics; 2018.