2.9 Listeriosis

Etiology

Listeria monocytogenes are small gram-positive, non-spore forming, aerobic bacilli. Human infections are usually caused by serogroups 1/2a, 1/2b, and 4b. The bacteria survive well in soil, water, food, and feces. They are able to grow at low temperatures (3^{o} C to 45^{o} C) and are resistant to freezing and drying.

Case Definition

Confirmed Case

Laboratory confirmation of infection with symptoms:

- isolation of Listeria monocytogenes from a normally sterile site (e.g. blood, cerebral spinal fluid (CSF), or joint, pleural or pericardial fluid).

OR

- in the setting of miscarriage or stillbirth, isolation of L. monocytogenes from placental or fetal tissue (including amniotic fluid and meconium).

Probable Case

Clinical illness[7] in a person who is epidemiologically linked to a laboratory-confirmed case or to a confirmed source.

Clinical Presentation

Listeriosis is a bacterial infection. The clinical manifestations of infection range from mild (gastroenteritis) to severe. Typical symptoms include fever, muscle aches, and on occasion, nausea and vomiting. The bacteria may infect the brain and the membrane lining the brain causing meningoencephalitis. The onset of meningoencephalitis may be sudden with fever, intense headache, nausea, and vomiting. Complications include endocarditis, and internal and external abscesses. Direct contact with infectious material or soil contaminated with infected animal feces can result in papular lesions on hands and arms. Asymptomatic fecal carriage occurs in approximately 10% of cases.

Infected pregnant women may have minimal symptoms typically characterized by a mild flu-like illness. She may unknowingly pass the illness to her unborn child. Infection during pregnancy may lead to premature delivery, infection of the newborn or stillbirth. The infant may develop meningitis. Thirty per cent of newborn infections are fatal. The case-fatality rate is 50% if the onset if illness occurs within the first four days of life.

Diagnosis

The diagnosis is confirmed by isolation of the bacteria from CSF, blood, amniotic fluid, placenta, meconium, lochia, gastric washings, and other sites of infection**.** For confirmation on laboratory specimens go to the public health laboratory web site www.publichealthlab.ca or call 709-777-6583.

[7] Invasive clinical illness is characterized by meningitis or bacteremia. Infection during pregnancy may result in fetal loss through miscarriage, stillbirth, neonatal meningitis or bacteremia.

Epidemiology

Occurrence

Listeriosis occurs worldwide. Illness is rare and most infections are asymptomatic. Typically infection occurs sporadically; however, outbreaks can occur in all seasons. In Canada, listeriosis has been reportable since 1990. On average, in Newfoundland and Labrador there are one to 2 cases of listeriosis per year and generally it occurs in those over the age of 65. Although healthy people can be infected, the disease generally affects:

- Pregnant women – they are about 20 times more likely than other health adults to get listeriosis. About one-third of cases happen during pregnancy.
- Newborns – Newborns rather than the pregnant women themselves suffer the serious effects of infection in pregnancy.
- Immunocompromised persons, for example those with HIV/AIDS, cancer, chronic renal disease or chronic liver disease, diabetes, and those on immunosuppresive medication
- The elderly – the risk increases with age.

Reservoir

Listeria monocytogenes is very common in the environment. The primary reservoirs of Listeria monocytogenes are soil and decomposing organic matter and may also be found in dust, water and foods. Animal reservoirs include infected domestic and wild mammals, birds, and man. Asymptomatic fecal carriage is common in humans (up to 10%) and animals.

Seasonal use of silage as feed is frequently followed by increased incidence of listeriosis in animals.

Transmission

Cases of listeriosis have been reported in association with ingestion of raw or contaminated milk, soft cheeses, vegetables, and ready–to-eat meats, such as cold cuts and pate. Person to person transmission is rare other than in neonates when transmission may occur from mother to fetus in utero or during the passage through the infected birth canal. A substantial proportion of sporadic cases result from foodborne transmission. Vegetables and fruit may become contaminated from the soil or from manure used as fertilizer.

Incubation Period

The incubation period is not known with certainty but probably ranges from three to seventy days with an estimated median incubation period of three weeks.

Communicability

Mothers of infected newborns can shed the agent in vaginal discharges and urine during and up to seven to ten days after delivery. Infected individuals can shed the organism in their stool for several months.

Control Measures

Management of Case

Investigations

Determine the possible source of the infection taking into consideration the incubation period, reservoir, and mode of transmission. Assessment may include:

- Obtain a detailed food history focusing on foods potentially contaminated with *L. monocytogenes* such as unpasteurized cheese, milk, yogurt, deli meats, raw or undercooked wieners, fresh unwashed garden vegetables, and paté.
- Collecting food samples for culture if available.
- Determine a history of contact with infective materials such as aborted animal fetuses on farms, sick or dead animals (especially sheep with encephalitis), animal feeds, animal compost, and manure.
- Determine history of daycare or hospital exposure.
- Identify potentially contaminated water source.
- Identify others who may have been exposed to the same source.
- Suspected contaminated food may be held to prevent consumption.
- Suspected contaminated food may be destroyed.

Treatment

- Immediate treatment is essential.
- Routine practices for hospitalized individuals.
- Prophylactic antibiotics should be administered to asymptomatic newborns if they have short gram-positive rods in meconium.
- Supportive treatment.

Management of Contacts

- No public health intervention is required as person to person transmission rarely occurs.
- Symptomatic and asymptomatic contacts should be investigated if a common source is suspected.

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 recommendations:

- Thoroughly cook raw food from animal sources (e.g., beef, pork, and poultry).
- Wash raw vegetables and fruit before eating.
- Keep uncooked meats separate from vegetables, cooked foods, and ready-to-eat foods.
- Avoid consumption of unpasteurized milk or foods made from raw milk.
- Wash hands, knives, and cutting boards after handling uncooked foods.
- Additional recommendations for persons at high risk (previously defined) include:
  - avoid unpasteurized cheeses (this does not apply to pasteurized cheeses, cream cheese, cottage cheese or yogurt).
  - do not eat refrigerated pates or meat spreads.
  - do not eat refrigerated smoked seafood, unless it is contained in a cooked dish such as a casserole.
  - reheat leftovers of ready-to-eat foods should be steaming hot before eating.
  - do not eat luncheon meats or deli meats unless they are reheated until steaming hot.
- Educate veterinarians and farmers to take proper precautions in handling aborted fetuses, and sick or dead animals.
- Avoid the use of untreated manure on vegetable crops.
- Investigate clusters for a possible common source.
- Take care to note food recalls by Canadian Food Inspection Agency (CFIA).
- Provide a fact sheet available at http://www.health.gov.nl.ca/health/publichealth/envhealth/listeriosis_aug2008.pdf

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

Guide to Services. Provincial Laboratory for Public Health (Microbiology) and Capital Health Medical Microbiology