LISTERIOSIS IS A DISEASE RECOGNIZED WORLDWIDE

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https://doi.org/10.5281/zenodo.11396205

ARTICLE INFO

Qabul qilindi: 20-May 2024 yil
Ma'qullandi: 25- May 2024 yil
Nashr qilindi: 30- May 2024 yil

KEY WORDS

listeriosis, infection, transmission routes, clinic, immunity, bacterial infectious diseases, mortality, epidemiology, emergency medical care, veterinary medicine.

ABSTRACT

The article describes the sources of infection with listeriosis, various routes of transmission of the pathogen, polymorphism of clinical manifestations, high mortality in newborns and people with immunodeficiency. To learn enough about this, you can learn about the development and study of modern laboratory diagnostics.

Listeriosis is a saprozoonotic bacterial infectious disease characterized by multiple sources of infection, a variety of pathogen transmission routes, polymorphism of clinical manifestations, high mortality in newborns and people with immunodeficiencies.

Only Listeria monocytogenes causes disease in humans. Listeriosis is not a widespread infection. However, the severity of the clinical course and mortality, as well as the epidemiological dynamics (from a rare zoonotic infection of livestock farms to a saprozoonotic infection common in developed countries) make this disease relevant, requiring the development of modern laboratory diagnostics to adequately study its epidemiology.

Listeriosis is a naturally occurring infectious disease of humans and animals and represents an urgent medical and veterinary problem.

Resistance to environmental factors. The resistance of the pathogen to various environmental factors is high: soil, manure, water, on plants they remain viable for up to 600 days, on contaminated surfaces of agricultural premises in the summer (9 ... 22 ° C) listeria remains viable for up to 25 days, and in winter (-2 ... -23°C) up to 130 days. Listeria-contaminated water bodies are dangerous from an epizootic and epidemiological point of view.

The duration of Listeria survival in the external environment depends on temperature, pH of the environment, species and quantitative composition of organic or inorganic substances in which the bacteria are located. Listeria have the ability to reproduce even at low temperatures (4 ... 6 ° C), and in ice they can survive for 5.5 months. up to 2.5 years.

Resistance of the pathogen to physicochemical factors in the production of meat products Listeria has high viability to the influence of various factors and techniques used in the production technology of meat and meat products.

Refrigeration of meat up to 17 days. (shelf life of chilled meat) reduces the viability of

the causative agent of listeriosis by 4 orders of magnitude compared with their initial content, but during this period the complete death of listeria does not occur.

The process of storing frozen lamb at -10 ... -28 ° C for 20 days, and pork at -10 ... -20 ° C for 14 months, does not inactivate listeria. When storing frozen beef (-16 ... -18°C) for 9 months, the number of listeria actively decreases in the first 3 months, after which by the end of the storage period of 9 months their number decreases by 4 orders of magnitude compared to the original, and There is no complete loss of viability of the pathogen.

Listeria has high heat resistance within the temperature limits of pasteurization and cooking of sausages. The heat resistance of Listeria decreases with increasing connective tissue content in meat. Thus, in comparison with premium beef, (D70 s = 10.89 min; D72 s = 7.93 min), the DT value for grade I beef (with 6% connective tissue content) is D70 s = 9.93 min; D72 s = 7.6 min, and in grade II beef (with 20% connective tissue content) - D70 s = 9.78 min; D72 s = 6.89 MIN.

Fat has a protective effect on the heat resistance of Listeria. Magnitude

DT in lean pork (with 20% fat content) is D70c= 10.94 min; D72c = 9.26 min, in fatty pork (at 50% fat content) - D70 s = 1-39 min; D72c= 10.89 min.

Cooking tea sausage (heating medium temperature 75-80 degrees C) with a diameter of 35-50 mm inactivates listeria within 75 minutes, and with a diameter of 65 mm - after 90 minutes. When cooking pieces of lamb weighing 1-2.5 kg and 8-10 cm thick, the causative agent of listeriosis dies within 1 hour.

pH values in the range of 7.2; 6.5; 5.5 do not have a significant effect on the viability of Listeria at 4 ... 6 ° C for 5 days.

Listeria remains viable in meat peptone broth (MPB) containing 6% NaCI for more than a year, in the organs of infected animals at the same concentration of table salt for up to 2 months, in MPB with 24% NaCI for up to 22 days. In meat stored in 24% brine, listeria remains viable for up to 400 days. NaCI content within 2.5; 4.5; 10% for 5 days at 4 ... 6°C leads to a decrease in the amount of L. monocytogenes by 4 orders of magnitude. A NaCl concentration of 14% reduces the listeria population by 5 orders of magnitude after 5 days. In skins preserved with salt, the causative agent of listeriosis remains viable for up to 62 days. Exposure to dietary phosphate (Polyphan A, 0.3%), sodium nitrite (0.005%)

at 4 ... 6 ° C for 5 days reduces the number of listeria by 1 order of magnitude after 2 days. The use of emulsions (0.005%) of black, red, allspice,

coriander, nutmeg, cardamom, caraway does not cause a significant decrease in the viability of listeria for 15 days at 4 ... 6 ° C. The content of garlic emulsion (0.005%) reduces the number of this type of microorganisms after 5 days by 2 orders of magnitude, after 15 days - by 4 orders of magnitude.

The process of storing sausages at low temperatures above zero and reduces the viability of listeria, but does not completely suppress them. When infected meat from pigs, sheep and rabbits matures, Listeria remains pathogenic.

At 37°C with daily viewing in the first 3-4 days. If there is no growth, the crops are monitored for 2 weeks.

On MPA, Listeria colonies grow in the form of small, round, transparent α colonies when viewed in transmitted light (similar to colonies of the erysipelas pathogen); after a few days the colonies become cloudy. In a smear from an agar culture, Listeria appears as straight,

short (0.3-0.5x1-2 μm) ovoid rods, sometimes almost cocci, located singly or in clusters. The culture of Listeria can be mistakenly attributed to another type of bacteria. On MPA with 1% glucose and 2% glycerol, as well as on liver media, growth resembles colonies of coliform bacteria. On blood agar, Listeria causes α-hemolysis.

At the MPB, listeria causes a uniform turbidity of the medium; when shaken, moiré waves are observed, but rougher than with the growth of erysipelas; within 8-10 days a precipitate is formed, which, when shaken, rises upward in the form of a pigtail.

In young cultures (6-24 hours), Listeria is mobile; their mobility is better visible after cultivation at room temperature; they ferment salicin, glucose, lactose and glycerol with the formation of acid without gas; do not ferment mannitol, dulcite; do not liquefy gelatin; do not change milk; reduce methylene blue.

To differentiate Listeria from the causative agent of swine erysipelas, a catalase test is performed. 1 ml of 10% hydrogen peroxide is added to the test tube with the studied 12-24-hour culture on the MPB: in the presence of catalase, the liquid foams, pig erysipelas bacteria do not form catalase.

A reliable test for distinguishing Listeria from erysipelas is an eye test: 1-2 drops of a daily culture wash with MPA are injected into the conjunctival sac of a guinea pig and thoroughly rubbed into the mucous membrane of the eyelid. Usually after 24 hours, swelling of the eyelid, hyperemia, and lacrimation appear; after 36-72 hours, the eyelids swell and purulent exudate is released from the eye.

For accelerated differentiation of the causative agent of listeriosis from the causative agent of erysipelas pigs use indicator media: with litmus, neutralrot mixed with methylene blue, methylrot, congorot and amido black. After 3-6 hours, Listeria discolors the medium with litmus and the neutralrot medium mixed with methylene blue to the color of MPB, only a colored rim remains at the surface at the border with air. When shaking, the color is partially restored, so the cultures are examined without shaking the tubes. The medium with methylrot becomes discolored after 3-6 hours, but the color of the medium does not recover. Discoloration of media with congorot and amido black occurs at a later date - after 6-48 hours; after bleaching of the medium, the original color is not restored. The causative agent of swine erysipelas does not discolor any of the above indicator media.

Preparation of indicator media:

- Litmus medium: add 1 ml to 100 ml of MPB or Hottinger broth

litmus tinctures. The color of the environment is lilac;

- Neutralrot medium mixed with methylene blue: add 1 ml of 0.1% solutions of neutralrot and methylene blue to 100 ml of MPB and Hottinger broth. The color of the medium is greenish-bluish or green. Media with litmus and neutralium mixed with methylene blue are poured into test tubes with cotton plugs and sterilized at 0.1 MPa 3Omin;

- Medium with methylrot: in a test tube with 10 ml st.

Personal prevention measures

When working with animals, slaughtering and cutting up carcasses of sick or suspected animals with listeriosis, workers and veterinary personnel must strictly observe the rules of personal hygiene and prevention.

Workers are provided with sanitary clothing, rubber gloves, shoes and other protective equipment. If workers have abrasions, cuts or other skin damage on their hands, they are

allowed to work wearing rubber gloves, having previously treated the wound site with iodine tincture and bandaged it or covered it with BF-6 glue.

It is strictly prohibited to allow persons under 18 years of age, pregnant and lactating women, to care for, slaughter animals and process carcasses and raw materials obtained from them. Before admission to the care and slaughter of animals that react positively to listeriosis and the processing of carcasses and raw materials from them, all workers are familiarized with the rules for preventing infection with listeriosis. Before starting work, workers thoroughly wash their hands, put on sanitary and protective clothing, shoes and other protective equipment.

It is prohibited to leave the workshop in sanitary clothing. Employees hand over sanitary and special clothing and footwear for disinfection at the end of the work shift, disinfect their hands and take a shower.

The procedure for sanitizing premises, equipment and other objects At meat processing plants, disinfection is carried out in cases of detection of sick animals during pre-slaughter housing and detection of lesions in slaughter products characteristic of listeriosis.

If a sick animal with listeriosis is found at a cattle depot, then after placing it in an isolation ward, disinfection is carried out only in the appropriate room or pen with a bleach solution containing 2% active chlorine at the rate of 1 liter of solution per 1 m2 of area (exposure 4 hours). Beforehand, in order to prevent the spraying of the listeriosis pathogen during cleaning, the area to be disinfected is irrigated with a bleach solution containing 2% active chlorine.

After being irrigated with disinfectant solutions, the premises of the quarantine department, isolation ward and sanitary slaughterhouse are cleaned of contaminants, washed with hot water and disinfected with a 2% hot solution of caustic soda (exposure 3 hours) or a solution of bleach containing 2% active chlorine, or a 2% solution of formaldehyde (4 h). After disinfection, the premises are ventilated and, if necessary, washed with hot water.

When listeriosis is detected in the slaughterhouse, sanitary treatment is carried out primarily in the pre-slaughter rooms, stunning boxes where animals with listeriosis were located, and other production facilities where infected slaughter products were exposed, and all technological equipment and inventory located in the premises. Disinfection is carried out in the same way as in a sanitary slaughterhouse. To destroy the causative agent of listeriosis, the premises and equipment of the slaughterhouse are generously irrigated with a 2% solution of caustic soda, heated to 70°-80°C, then thoroughly washed with hot water and irrigated again with either a 4% hot solution of caustic soda (exposure 3 hours), or 16% solution of soda ash at a temperature of 70-80°C (exposure 4 hours), or a solution of bleach containing 2% active chlorine (exposure 4 hours). After such disinfection, the premises are washed with hot water.

For disinfection, equipment, animal care items, and instruments are boiled for 30 minutes or immersed for 1 hour in a solution (15-20°C) of bleach containing 2% active chlorine, or for 2 hours in a 10% solution (15-20 %) soda ash.

Sanitary clothing is disinfected by boiling in a 1% solution of soda ash, and hands are treated in a chloramine solution containing 0.2% active chlorine. Sanitation is carried out by workers who have no medical contraindications for this work, who have undergone training and instructions on the safety of working with disinfectants and detergents and disinfectants.

Wastewater from the quarantine department, isolation ward and sanitary slaughterhouse, as well as water after washing the adjacent territory, before being released into the external sewer network, is disinfected using chlorine, which is dosed using chlorinator devices at the rate of 35 mg/l of chlorine for at least 1 hour. The sediment is mixed with bleach in a ratio of 5:1 and taken to a specially designated place and buried in the ground.

Manure is disinfected biothermally. For meat industry enterprises, chemical and steam jet methods are most suitable.

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