

Neonatal Listeriosis

Listeriosis is a relatively rare disease caused by the bacterium *Listeria monocytogenes*, which mainly affects newborns, the elderly and immunocompromised individuals. A pregnant woman is typically infected by **ingesting a contaminated food item**. The fetus/newborn can become infected transplacentally or during or after birth (ascending, vertically). It takes place under the picture of sepsis, **pneumonia, or meningitis** and has a high mortality rate. Serious infections can be accompanied by **granulomatosis infantiseptica - microabscesses throughout the body**, especially in the liver and spleen. In addition to meningitis, late-onset infections can also manifest as colitis accompanied by diarrhea or sepsis without meningitis. Late-onset infections have low mortality with adequate treatment. *L. monocytogenes* is shown to be cultured and treated with antibiotics, initially ampicillin with an aminoglycoside.^{[1] [2]}

Etiopathogenesis

Listeria monocytogenes is an **intracellular**, facultatively anaerobic, motile, Gram-positive bacterium that does not form spores and multiplies intracellularly. When phagocytosed, it replicates rapidly within the cytosol, due to its major virulence factor, **listeriolysin O**. It spreads rapidly to neighboring cells without being exposed to extracellular immune mechanisms (antibodies, neutrophils). T-lymphocytes and macrophages in particular play a role in the immune response. Cellular immunity is naturally reduced in pregnancy and early infancy, so the incidence of listeriosis is higher.^[2]

Listeria monocytogenes occurs in nature in **soil, wood, and rotting matter**. A pregnant woman is typically infected by **ingesting some contaminated food**, most often dairy products (soft cheeses, unpasteurized milk), unwashed raw vegetables, meat (meat products, hot dogs), seafood, and uncooked chilled foods. *L. monocytogenes* is able to survive and multiply at temperatures occurring in refrigerators, while being relatively resistant to high temperatures. *L. monocytogenes* is probably eaten relatively often by humans, however, the incidence of clinical disease is relatively low, so it can be concluded that it has a relatively low virulence. However, in the United States, for example, listeriosis is one of the most common causes of death from ingesting a contaminated diet. Ingestion of contaminated food may cause nausea, vomiting, diarrhea, fever, malaise, back pain, and headache. Pregnant women may be asymptomatic carriers of *Listeria* in the gastrointestinal tract or vagina. Transplacental transmission of the infection to the fetus is possible, as well as **vertical transmission** during childbirth or ascending infection during amniotic fluid outflow. Colonization of a pregnant woman's digestive tract and subsequent vaginal colonization can lead to late-onset infection of a healthy mother's baby.^{[3][1][2]}

Clinical Picture

The incubation period for *L. monocytogenes* is less than 24 hours after ingestion, but can range from 6 hours to 3 weeks. *Listeria* cross the intestinal mucosal barrier and cause bacteremia accompanied by flu-like symptoms such as fever, chills, myalgia, arthralgia, headaches, and back pain.^[2] It can also be asymptomatic.^[1]

The clinical picture of fetal and neonatal infection depends on the period and mode of transmission. Abortion, premature birth with chorioamnionitis (with typical brown turbid amniotic fluid), intrauterine death, or neonatal sepsis can occur. Infection of the fetus in utero can lead to dissemination with the formation of granulomas (skin, liver, adrenal glands, lymphatic tissue, lungs, and brain). Aspiration or ingestion of amniotic fluid or vaginal secretions can lead to lung involvement, which manifests itself during the first days of life with respiratory problems and fulminant course. Neonatal infection can manifest early, in the first hours to days after birth, or late, ie several weeks after delivery. Early infection is associated with low birth weight, obstetric complications, and shortly after birth manifests circulatory and/or respiratory insufficiency, usually has a picture of sepsis or meningitis, and has high mortality. Late infection is usually present in full-term, initially healthy neonates and is due to purulent meningitis or sepsis. Listeriosis may be accompanied by organ involvement with the formation of microabscesses and granulomas. Disseminated rash with small, pale granulomatous nodules (granulomatosis infantisepticum) may occur.^{[1][3]}

Diagnostics

Diagnosis in febrile pregnant women: blood culture, cervical smear culture, amniotic fluid culture.

Diagnosis in a sick newborn: **blood culture, cerebrospinal fluid culture**, gastric aspirate, pitch, or infected tissue.

There may be a predominance of mononuclear cells in the cerebrospinal fluid, but there is usually a predominance of polymorphonuclear cells. Gram staining is often negative, but may have the image of pleomorphic, Gram-variable coccobacilli.

In some laboratories, **PCR detection is possible**. Serological testing is not used.^[1]

Therapy

Antibiotic therapy: **ampicillin in combination with an aminoglycoside** (usually gentamicin) for its synergistic effect. Due to the tendency of *Listeria* to survive inside the tissue reservoirs, high doses of ampicillin for 10 to 14 days for invasive infections and 14 to 21 days for meningitis are recommended.^[2]

Ampicillin interferes with cell wall synthesis during multiplication, it has a bactericidal effect. *Listeria* is not sensitive to cephalosporins.^[3]

Prevention

Pregnant women should **avoid risky foods**, which include in particular: unpasteurized dairy products, soft cheeses (Feta, Brie, Camembert, blue cheeses, ...)^[3], raw vegetables, meat products, ready salads, chilled meat spreads, smoked seafood.

If an infection is detected in a pregnant woman, antibiotic therapy is indicated to prevent vertical transmission.^[1]

Links

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External Links

- *Listeria monocytogenes*, a unique model in infection biology (animace) (https://www.youtube.com/watch?v=dlAPOa_QXAo)

References

1. TESINI, B L. *Neonatal Listeriosis* [online]. Merck Sharp & Dohme Corp, [cit. 2018-10-03]. <<https://www.msmanuals.com/professional/pediatrics/infections-in-neonates/neonatal-listeriosis>>.
2. POLIN, Richard - SPITZER, Alan. *Fetal and Neonatal Secrets*. 3. edition. 2013. pp. 353-355. ISBN 9780323091398.
3. ZACH, T. *Listeria Infection* [online]. [cit. 2018-10-12]. <<https://emedicine.medscape.com/article/965841-overview>>.