

Congenital listeriosis

Listeriosis is a relatively rare disease caused by a bacterium *Listeria monocytogenes*, which mainly affects newborns, the elderly and immunocompromised individuals. A pregnant woman typically becomes infected by **ingesting contaminated food**.

The fetus/newborn can become infected transplacentally or during or after birth (ascending, vertical). It manifests as sepsis, pneumonia or meningitis and has a **high mortality rate**. Severe infections can be accompanied by *granulomatous exanthema* (granulomatosis infantiseptica) - *microabscesses* all over the body, especially in the liver and spleen. In addition to meningitis, late-onset infections can also be manifested by colitis accompanied by diarrhea or sepsis without meningitis. Late-onset infections have a low mortality with adequate treatment. *L. monocytogenes* is proven by culture 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. If phagocytosed, it rapidly replicates within the cytosol, thanks to its major virulence factor **listeriolysin O**. *It quickly spreads to neighboring cells without being exposed to extracellular immune mechanisms (antibodies, neutrophils). T-lymphocytes and then macrophages are used in the immune response. Cellular immunity is naturally reduced during pregnancy and in the early neonatal period, so the incidence of listeriosis is higher.* ^[2]

Listeria monocytogenes is found in nature *in soil, wood and rotting matter*. A pregnant woman typically becomes infected by eating contaminated food, most commonly dairy products (soft cheeses, unpasteurized milk), unwashed raw vegetables, meat (meat products, hot dogs), seafood, and uncooked refrigerated foods. *L. monocytogenes* is able to survive and multiply at temperatures found in refrigerators, while at the same time it is relatively resistant to high temperatures. *L. monocytogenes* is probably eaten by people quite often, however, the incidence of clinical disease is relatively low, so it can be concluded that it has a relatively low virulence. However, in the USA, for example, listeriosis is one of the most common causes of death caused by eating contaminated food. Nausea, vomiting, diarrhea, fever, malaise, back pain, and headache may occur after ingestion of contaminated food. Pregnant women can be asymptomatic carriers of *Listeria* in the digestive tract or vagina. Transplacental transmission of infection to the fetus is possible, as well as vertical transmission during childbirth or ascending infection during the outflow of amniotic fluid. Colonization of the digestive tract of a pregnant woman and subsequent colonization of the vagina can lead to late-onset infection of the child of a healthy mother. ^{[3][1][2]}

Clinical picture

Incubation period *L. monocytogenes* is less than 24 hours after ingestion, but can range from 6 hours to 3 weeks. *Listeria* penetrate the intestinal mucosal barrier and cause bacteremia with flu-like symptoms such as fever, chills, myalgia, arthralgia, headache, and back pain. ^[2] May be ongoing even asymptotically. ^[1]

The clinical picture of fetal and newborn infection depends on the period and method of transmission. Miscarriage, premature birth with chorioamnionitis (with typical brown cloudy 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 swallowing of amniotic fluid or vaginal secretions can lead to lung damage, which is manifested during the first days of life by breathing difficulties and a fulminant course. Neonatal infection can manifest early, in the first hours to days after birth, or late, i.e. several weeks after birth. Early infection is associated with low birth weight, obstetric complications, and shortly after birth, circulatory and/or respiratory insufficiency manifests itself, it usually has the appearance of sepsis or meningitis, and has a high mortality rate. Late infection usually occurs in full-term, initially healthy newborns and occurs under the guise of purulent meningitis or sepsis. Listeriosis can be accompanied by involvement of organs with the formation of microabscesses and granulomas. A disseminated rash with small, pale granulomatous nodules (granulomatosis infantisepticum) may occur. ^{[1][3]}

Diagnostics

Diagnostics in a febrile pregnant woman: blood culture, cervical smear culture, amniotic fluid culture.

Diagnosis of a sick newborn: *'hemoculture, cultivation of cerebrospinal fluid, 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 show pleomorphic, Gram-variable coccobacilli.

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

Therapy

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

Ampicillin interferes with the synthesis of the cell wall during multiplication, has a bactericidal effect. *Listeria* is not susceptible 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-made salads, chilled meat spreads, smoked seafood.

In case of infection in a pregnant woman, antibiotic therapy is indicated to prevent vertical transmission.^[1]

Resources

Related articles

- Listeriosis • *Listeria monocytogenes*
- Fetus-threatening infections: Congenital syphilis • Congenital toxoplasmosis • HBsAg positive mother and newborn • HIV infection in pregnancy • The importance of chlamydiae and mycoplasmas in perinatology • Congenital cytomegalovirus infection • Adenatal HSV infection
- Infections in the neonatal period

External links

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

Reference

1. TESINI, B L. *Neonatal Listeriosis* [online]. Merck Sharp & Dohme Corp, The last revision 2018-07, [cit. 2018-10-03]. <<https://www.msdmanuals.com/professional/pediatrics/infections-in-neonates/neonatal-listeriosis>>.
2. POLIN, Richard – SPITZER, Alan. *Fetal and Neonatal Secrets*. 3. edition. Elsevier Health Sciences, 2013. 558 pp. pp. 353-355. ISBN 9780323091398.
3. ZACH, T. *Listeria Infection* [online]. Medscape, The last revision 2018-01-09, [cit. 2018-10-12]. <<https://emedicine.medscape.com/article/965841-overview>>.