LISTERIOSIS

ETIOLOGY:

Listeriosis is caused by a Gram-positive, facultatively-intracellular rod shaped bacteria ***Listeria monocytogenes***, that leads to 3 main presentations of disease *i.e.* **septicaemia, neurologic disease, and reproductive disease** in a wide range of hosts including **large and small ruminants** as well as wild ruminants as well in lab animals and birds too. It is regarded as a highly consequential human foodborne pathogen.

The organism is called 'monocytogenes' since it causes mononucleosis (increased number of mononuclear leukocytes. in the blood) in rabbits, in the systemic (septicemic) form of the disease.

SPREAD

By Ingestion or contact with broken mucous membranes, conjunctiva, or skin.

Animals are usually asymptomatic carriers, however outbreaks of listeriosis is associated with exposure to high burdens of the bacteria over a short period of time.

PATHOGENESIS

Listeria have the ability to penetrate epithelial cells, such as the conjunctiva, urinary bladder, and intestine. *L. monocytogenes* has on its surface leucine-rich proteins called **internalins,** which is required for penetration of the bacterium into epithelial cells. *L. monocytogenes* can travel from cell to cell without exposure to extracellular fluid to avoid destruction. Septicaemia develops rapidly, typically in 1-2 days, and abortions occur approximately 1 week post-exposure.

Centripetal movement (Le., toward the centre) of organisms within the branches of the trigeminal nerve eventually makes them to reach medulla oblongata. *Listeria monocytogenes* utilises retrograde axonal transport to infect the central nervous system. Encephalitis in domestic ruminants often presents 3-4 weeks after ingesting soiled feed.

SIGNS

Animals are often **found acutely dead** because they typically do not develop clinical signs secondary to septicaemic listeriosis. Uterine infections typically cause abortions in pregnant dams with few other systemic signs.

Encephalitis/ Rhombencephalitis and meningoencephalitis are perhaps the most common and well-recognized presentations of listeriosis. Affected animals become depressed and ataxic. It is manifested by the animal's abnormal posturing (position) of the head and neck, walking aimlessly in a circle ("circling disease"), nystagmus (constant involuntary movement of the eyeball), blindness, and paralysis.

(term "rhombencephalitis" refers to inflammatory diseases of the rhombencephalon. The rhombencephalon or the hindbrain is composed of the pons, cerebellum, and medulla oblongata)

Neurologic signs, such as circling, torticollis and opisthotonos, nystagmus, and **cranial nerve V / VII** deficits can be seen. Paresis may develop in the fore- or hindlimbs; rarely animals may be tetraparetic (quadraparesis; a condition where all four limbs are weak).

LESIONS

Encephalitis/meningoencephalitis

- Cloudy, oedematous or congested meninges
- Microabscesses, diffuse purulent inflammation, or glial nodules

- **Suppurative meningoencephalitis** with microabscesses and microgliosis, primarily in the brainstem and cranial nerve tracts/nucleoli
- Lymphocytic leptomeningitis

Septicaemia

- The most characteristic lesion is **focal necrosis of the liver**.
- **Multifocal areas** of hepatic inflammation and necrosis
- Spleen, lung, kidney, and enteric lymphoid tissue may also be inflamed and necrotic
- **Peritonitis**
- Neonates may have haemorrhagic gastrointestinal lesions

Abortion

- Multifocal areas of **placental cotyledonary necrosis** with intercotyledonary **suppurative placentitis**
- Foetus may have lesions that reflect septicaemia
    - Generalised oedema
    - Serous cavities may contain serosanguinous fluid
    - Focal hepatic necrosis; right half of the liver may reflect more necrotic and inflammatory change than the left
    - 1-3 cm mucosal erosions in the abomasum (variable presence)
    - Spleen and lung may also be necrotic
    - Autolysis may mask lesions

Birds

- If septicaemic: **yellow to yellow-tan areas of necrotising myocarditis**, necrotising hepatitis,splenomegaly, ascites, and petechial haemorrhages on viscera
    - Infrequently, granulomatous and caseous hepatitis, catarrhal enteritis
- If encephalitic: malacia, mixed- and lymphocytic inflammation, perivascular cuffing, and **gliosis**
    - The medulla, cerebellum, and optic lobes are most severely affected
    - Gross lesions due to encephalitis are often lacking, but lesions due to septicaemia may be concurrent in these animals

DIAGNOSIS

- ✓ History, symptoms and lesions
- ✓ Culture on blood agar/broth or nutrient agar which is facilitated using **cold enrichment and low oxygen tension**
- ✓ Loop-mediated isothermal amplification (LAMP)
- ✓ Immunohistochemistry (IHC) and immunofluorescent assays (IFA)
- ✓ Polymerase chain-reaction (PCR)

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