ISSN:2582-8388

LUMPY SKIN DISEASE –A REVIEW

Neelam Godara[1], Pooja Prajapat[2]
[1]Veterinary officer (VO) , Animal Husbandry Department
[2]Veterinary officer (VO) , Animal Husbandry Department

The World Organization for Animal Health (OIE) officially designates lumpy skin disease (LSD) as a notifiable disease, making it a matter of great concern for the livestock sector due to its profound economic impact. Among the devastating consequences of LSD are reduced milk production, loss of draught power, skin damage, trade limitations, compromised body condition, occurrences of abortions, fertility issues, and the significant cost of veterinary care.

The discovery of LSD traces back to 1929 in Zambia, and since then, it has traversed from central Africa to regions across the Middle East, Europe, and Asia, showing remarkable acceleration in its spread since 2013. India faced its first LSD outbreak in 2019, specifically in the state of Odisha, and neighbouring countries such as Bangladesh, China, Nepal, Bhutan, Myanmar, Sri Lanka, and Pakistan have also dealt with the disease's outbreaks.

India's vast population of cattle and buffaloes remains highly vulnerable to the dreadful impact of this disease. Though predominantly affecting cattle, LSD has also been reported in Asian water buffaloes and certain African antelope species. Notably, Bos taurus displays greater susceptibility to clinical manifestations than Bos indicus, as reported by OIE in 2018.

In light of the ongoing challenges posed by lumpy skin disease, effective surveillance, preventive measures, and control strategies are essential to safeguard the livestock industry and public health. By proactively addressing the issue, we can curtail its further spread and protect vulnerable regions from its adverse effects.

Symptoms

1. High fever,
2. sharp drop in milk yield,
3. discharge from the eyes and nose,
4. salivation,
5. loss of appetite, depression, damaged hides, emaciation (thinness or weakness) of animals,
6. infertility and abortions.
7. Pneumonia due to secondary bacterial infection is a common sequela.
8. Ulcerative lesions may also appear in the cornea of the one or both eyes, leading to blindness in some cases.
9. Skin nodules usually start to appear within 48 hours of the onset of fever. They are most commonly found at head, neck, udder, genitalia (Fig.2D), perineum and lateral parts of ribcages. Silent or subclinical infections can occur up to one third of infected cattle which do not show any clinical sings although all might have viraemia.
10. The morbidity and mortality depending the control measures adopted after detection of first case. During the typical course of disease, cattle die several weeks after infection. Thus, the outbreak is likely to have been going on for a minimum of 2-3weeks and probably longer.

Incubation period- The incubation period or the time between infection and symptoms is about 28 days according to the FAO, and 4 to 14 days according to some other estimates.

Pathogenesis & Lesions: Lumpy skin disease (LSD) manifests with distinctive nodular lesions affecting both the skin and mucous membranes, accompanied by lymphadenopathy. Histopathological examination of affected tissue reveals several characteristic features, including ballooning degenerations of the epidermis, infiltration of mononuclear inflammatory cells,

vasculitis, and intracytoplasmic eosinophilic inclusion bodies. Additionally, RT-PCR analysis confirms the presence of LSDV DNA in skin biopsies, confirming the virus's role in the disease.

The pathogenesis of LSD involves the virus infecting the host through either the skin or the mucosa of the gastrointestinal system (Sanz-Bernardo et al., 2020). After entering the body, the virus undergoes primary multiplication, causing lymphadenitis as it invades the local lymph nodes. Subsequently, viremia occurs following an initial febrile reaction and persists for approximately two weeks. During this phase, the virus spreads through monocytes and localizes in the skin, leading to the formation of inflammatory nodules due to its rapid multiplication within the host cells.

LSDV specifically replicates inside various host cells, including macrophages, fibroblasts, pericytes, and endothelial cells in the lymphatics and blood vessel walls. This replication process contributes to the development of vasculitis and lymphangitis. In severe cases, thrombosis and infarction may also occur. Additionally, the virus's multiplication within cells leads to hyperplasia and ballooning degeneration of keratinocytes, formation of epidermal microvesicles, and infiltration of inflammatory cells into the dermis.

In summary, lumpy skin disease's pathogenesis involves a series of intricate steps, from initial infection to viral replication within specific host cells, resulting in the characteristic lesions observed in affected animals. Understanding these processes is crucial for devising effective control and prevention measures against LSDV.

RISK FACTORS ASSOCIATED: Various factors influence the susceptibility to lumpy skin disease (LSD) in animals. Here are some significant risk factors:

1. Species:
   - Cattle have higher susceptibility to LSD compared to buffaloes.
2. Sex:
   - Both male and female animals are equally susceptible to the disease.
3. Age:
   - Very young and old animals are more vulnerable to LSD than adult animals.
4. Breed:
   - Crossbreeds show higher susceptibility to LSD when compared to native Indian breeds. However, native breeds tend to exhibit stronger reactive responses.
5. Pathogen Stability/Viability:

   The viability of the LSD virus varies in different biological samples. For instance:
   i. In blood, the virus remains viable for 5-16 days.
   ii. In skin nodules, the virus can persist for up to 39 days.
   iii. Scabs may harbour the virus for several years.
   iv. In semen, the virus can remain viable for 22-42 days.
6. Environment:
   a. Temperature: LSDV can survive in both cold and warm conditions. However, it is easily inactivated by heat.
   b. pH: The virus is sensitive to both acidic and alkaline pH levels.

Understanding these risk factors is essential for implementing targeted prevention and control measures to effectively manage lumpy skin disease in susceptible animal populations.

Season

- Incidence is more in wet and humid seasons due to abundance of vector population.
- Incidence is less during the dry and cold seasons.
- Incidence is more during migratory season and livestock fairs or sales or ritual/festivals.

Lumpy skin disease in India has occurred in distinct waves

- First wave (2019-2020): Outbreaks in Odisha and neighboring southern states with mild dermal form.
- Second wave (2020-2021): Affecting most southern and central states, mainly dermal form, higher mortality in Maharashtra.
- Third wave (2021-2022): More virulent, with respiratory form prevalent, high mortality in northern India, comorbidities in animal shelters.

Immunity: Young calves and malnourished animals more severe due to impaired humoral immunity. Recovered animals develop lifelong cell-mediated immunity, and calves have maternal protection for around six months.

Diagnosis: Early lab diagnosis crucial, using virus isolation, ELISA, and PCR.

Gross and Histopathological Findings: Widespread skin nodular lesions, respiratory system lesions, and upper respiratory tract necrotic pock lesions observed.

Treatment

- Specific treatment for Lumpy Skin Disease is currently unavailable, so supportive care is essential.
- Suspected or affected animals should be separated and isolated.
- Symptomatic treatment can be administered based on available medicines and local experience.
- Feeding management should include easily digestible and preferably liquid feed/food, along with succulent green fodder.
- Herbal preparations with proven or indigenous knowledge can be used for wound and dermatitis treatment, as immunomodulators, antioxidants, and fly repellents.

Prevention and Control

1. Animal movement restriction: Ban animal movement in and out of infective zones, and consider stopping live animal markets, fairs, gatherings, and migrations if feasible.
2. Preventive vaccination: Implement ring vaccination (within a 5km radius) for all healthy cattle and buffaloes above 4 months of age using goat pox vaccine (100 TCID50) as per government guidelines.
3. Biosecurity measures: Regularly practice and monitor quarantine, isolation, disinfection of premises, deworming, disposal of farm waste and carcasses, people movement, insemination, and maintain health records.
4. Vector control: Apply insecticides or repellents to control biting vectors and reduce breeding grounds in farm premises.
5. Awareness creation: Use various media channels such as radio, TV, press releases, posters, newspapers, digital media, social media, webinars, and workshops to create awareness among stakeholders.
6. Develop SOPs at state/regional level.
7. Prepare and train rapid response teams.
8. Maintain networking with line departments for better and quicker response.
9. Monitor and conduct surveillance, especially in unaffected areas.
10. Monitor and conduct surveillance, especially in unaffected areas.

Reference

Anonymous. (2022). Title not specified. The Hindu. Retrieved from www.thehindu.com/news/national

Anonymous. (2022). Title not specified. ICAR-National Institute of Veterinary Epidemiology and Disease Informatics (NIVEDI), Bengaluru, Karnataka.

Manjunatha Reddy, G. B.*, Awadhesh Prajapati, Sanjeevakumar Lalasangi, Viveka Prabhu, Chethan Kumar, H. B., Yogisharadhya R, and Shivasharanappa, N. (2022). Title not specified. [DOI: 10.1186/s12917-022-03403-4]