

Overview of Lumpy Skin Disease

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ABSTRACT

Lumpy skin disease (LSD) is a highly infectious and economically devastating viral disease of cattle. It is caused by Lumpy Skin Disease Virus (LSDV) belonging to the genus *Capripoxvirus* and family *Poxviridae*. The transmission of the virus occurs mainly through direct contact with infected animals or by insect vectors like *Stomoxys*, *Culicoides*, etc. The disease is characterised by firm, well-defined skin nodules ranging from few to multiple, depending on the severity of the case. The deep skin nodules may extend into tissue and muscles, leading to vasculitis, edema, congestion, haemorrhage. It may also cause bronchopneumonia, enlargement of lymph nodes and also affect other internal organs. This disease results in reduced milk yield, abortions, infertility, hide damage, and even death, all of which cause significant economic losses to farmers. Hence, widespread vaccination with indigenous homologous LSD vaccine along with restriction of livestock movement, vector movement and strict biosecurity measures should be followed to reduce the transmission of lumpy skin disease.

INTRODUCTION

Lumpy skin disease (LSD) is an economically important disease which has been placed on notifiable disease

list is due to its significant economic losses and potential for rapid transmission. It poses a significant threat, leading to acute or subacute

illness in cattle and water buffalo. The causative agent, lumpy skin disease virus (LSDV), is a double-stranded DNA virus belonging to the genus *Capripoxvirus* of the *Poxviridae* family. The recent emergence of LSD in previously disease-free countries highlights the importance of its transmission, as well as control and eradication measures (Namazi et al. 2021).

Transmission

The transmission of the virus occurs mainly through direct contact with infected animals via blood, oculonasal discharges, saliva, semen, which serve as the primary sources of LSD transmission. In addition, it can also be spread through insect vectors such as *Stomoxys*, *Tabanidae*, and *Culicoides*. Although animals of all ages are susceptible, young animals as well as cows at peak lactation tend to develop more severe clinical symptoms (Abdulqa et al. 2016)

Clinical signs

The incubation period of LSD ranges from 2 to 5 weeks. The disease occurs in acute, subacute, and chronic forms, typically beginning with a biphasic fever. In mild cases, one or two nodules appear within 2–3 days of fever onset, along with signs of weight loss, ocular discharge, and reduced milk production. As the disease progresses, painful, hyperemic nodules develop on various body regions.

These nodules are firm, slightly raised, and encircled by a haemorrhagic ring, later progressing into papules, vesicles, pustules with exudation, and eventually scabs. Healing is slow, and lesions may also appear on the mucous membranes of the nostrils, respiratory tract, mouth, and vulva. After 2–3 weeks, skin lesions often harden and become necrotic, causing pain and reluctance to move. Sloughed lesions may form deep “sitfasts,” subsequently leading to fly invasions and bacterial infections that can lead to septicemia. Swelling

of lymph nodes is also a common finding. In addition, it may also lead to abortion and sterility of both male and female animals (Gupta et al. 2020).

Postmortem lesions

In post-mortem findings in case of severe cases, deep skin nodules extend into subcutaneous tissue and adjacent muscles, leading to vasculitis, edema, congestion, hemorrhage. Lesions may also be present on the mucous membranes of the oral and nasal cavities, pharynx, tongue, trachea, lungs, testicles, and urinary bladder. Affected cattle often show enlarged superficial lymph nodes along with bronchopneumonia. In severe cases, infection is marked by pulmonary edema, focal lobular atelectasis in the lungs, pleuritis and enlargement of mediastinal lymph nodes (Abdulqa et al. 2016).

Economic importance

The economic impact of lumpy skin disease is primarily linked to morbidity rather than mortality, as mortality rate is generally low. Major significant losses arise from hide damage, severe emaciation, infertility in both male and female, mastitis, decreased milk yield, and abortions. The decline in the quality of animal negatively affects the trade of live animals and animal-derived products, resulting in substantial financial losses for the meat, milk, leather, and other livestock-related industries (Gupta et al. 2020).

Diagnosis

Although LSD can be initially diagnosed through clinical signs, confirmation is achieved using conventional PCR. Molecular diagnostic methods are considered more accurate, dependable, and faster compared to other approaches. In addition, electron microscopy, virus isolation, virus neutralization, and various serological assays are also employed for detecting LSDV.

Among the serological tests, the virus neutralization test is currently the only validated method (Namazi and Khodakaram, 2021).

Prevention and control

Effective prevention and control strategies are therefore essential, which include:

- a) **Restriction of animal movement:** The transport of LSD-infected animals must be strictly prohibited especially to prevent transboundary disease spread. Within a country, animals showing lesions should be quarantined to monitor and limit rapid transmission.
- b) **Restriction of vector movement:** Since vectors may spread the disease through prevailing winds, vector control is necessary and therefore, the use of insecticides and vector traps can help minimize transmission (Gupta *et al.* 2020).
- c) **Vaccination:** The indigenous homologous LSD vaccine, Lumpy-ProVacInd, was created using a field strain isolated from the 2019 Ranchi outbreak. This vaccine has been commercialized and is currently being used for vaccination of cattle in India. Previously, a heterologous Goatpox virus-based vaccine strain was used for LSD control and outbreak management (Smaraki *et al.* 2024).

CONCLUSION

It is necessary to strengthen and upgrade the existing and alternative strategies to combat the disease in order to limit its spread and its economic impact. Therefore, it is very important to devise and implement strict biosecurity measures at national level and enhance existing platforms to stop outbreaks at early stage, before they escalate into epidemics or pandemics.

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