

LUMPY SKIN DISEASE – A SMALL NODULE, A BIG THREAT

Swayam Mahajan^{*1}, Riya Goswami¹, Dr. Sheetal Dogra²

¹ B.V.Sc. and A.H., ² Assistant Professor, Veterinary Medicine

Division of Teaching Veterinary Clinical Complex, Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu, R.S.Pura, Jammu (J&K) – 181102

*Corresponding author's email: drswayam.vet@gmail.com

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ABSTRACT

Lumpy Skin Disease (LSD) is an important viral disease of cattle and buffaloes that has emerged as a major threat to livestock health and the agricultural economy of the country. This disease, caused by the Lumpy skin disease virus (LSDV) of the genus Capripoxvirus, was largely restricted to Africa but has now progressively expanded to several parts of the world. LSD was first reported in India in 2019, after which there have been many outbreaks of this disease in India. The disease is primarily transmitted mechanically by blood-feeding arthropods and is characterised by fever, lymph node enlargement, oedema and distinctive skin nodules. Diagnosis is based on clinical signs and epidemiological data and confirmed by laboratory techniques. As there is no specific antiviral treatment, the main focus is on supportive therapy. With proper vaccination, early detection of clinical signs, prompt isolation of infected animals, movement control and vector management, this disease can be prevented and controlled. By increasing awareness among farmers and timely intervention by the veterinarians and animal health authorities, we can minimize the economic losses to the farmers and protect livestock-based livelihoods.

Keywords: Capripoxvirus, Cattle, Homeopathic Medicine, Lumpy Skin Disease, Skin Nodules

INTRODUCTION

India is predominantly an agricultural country, and cattle are an important source of milk, meat, draught power and income for millions of livestock-owning farmers. Diseases that potentially reduce livestock productivity can therefore have a direct effect on household income. In recent years, Lumpy Skin Disease (LSD) has emerged as an important viral disease of cattle and buffaloes (WOAH, 2024).

Lumpy Skin Disease (LSD) has become a significant threat to the cattle population. It has gained attention due to its negative impacts on animal health, farm productivity, and the livelihoods of the farmers. Therefore, it is very important to understand the disease and adopt appropriate preventive and control measures to restrict its

spread and to reduce its impact on rural livelihoods.

EPIDEMIOLOGY

The roots of this disease extend back several decades. The disease was first reported in Northern Rhodesia (present-day Zambia) in 1929, particularly in the Mazabuka, Lusaka, and Kafue districts. Due to a lack of knowledge regarding its causative agent at that time, it was believed to be caused by some local factors such as plant poisons, insect bites, or stings. It subsequently spread to several countries of southern and sub-Saharan Africa. During the 1940s, major outbreaks occurred in Botswana and South Africa, contributing to the recognition of the infectious nature of this disease. Over the following decades, LSD expanded beyond southern Africa and gradually reached North

Africa and the Middle East with reports from Egypt in 1988 and Israel in 1989. Subsequently, LSD spread further eastward, reaching Turkey in 2013 and Europe in 2015. In recent years, the geographical distribution of LSD has expanded further into Asia. India and Bangladesh reported their first outbreaks in 2019, after which the disease spread to Nepal, Myanmar, Sri Lanka, Pakistan and Afghanistan (Mazloun *et al.*, 2023).

In India, LSD was first reported in August 2019, with the first documented outbreaks occurring in Odisha. Later on, molecular investigations showed that the viruses detected during these early outbreaks were closely related to Kenyan-like field strains. Following its introduction, LSD spread to other parts of the country and became an important concern for cattle health and livestock production. The large-scale outbreak experienced in India during 2022 highlighted the potential of the disease to cause substantial animal health and economic impacts (Mishra *et al.*, 2024; Sudhakar *et al.*, 2022).

TRANSMISSION

Lumpy skin disease is caused by lumpy skin disease virus (LSDV). It belongs to the genus *Capripoxvirus* within the subfamily *Chordopoxvirinae* of the family *Poxviridae*. LSDV is closely related to sheep poxvirus (SPPV) and goat poxvirus (GTPV). It primarily affects cattle and water buffaloes, but mild infections have also been reported in camels, horses, deer, and Mithun (Reddy *et al.*, 2023).

LSDV is mainly spread from one animal to another by blood-feeding flies and ticks. Stable flies (*Stomoxys calcitrans*), mosquitoes (*Culex* and *Aedes*), and ticks (*Rhipicephalus* and *Amblyomma*) can act as vectors, but their individual contribution varies. The unchecked movement of infected animals is an important mechanism of long-distance spread, whereas arthropod transmission, particularly by stable flies, contributes to local as well as short-distance transmission. The virus may also be shed

through skin lesions, blood, saliva, nasal and ocular secretions, semen and milk. Contamination of feeding or watering equipment and other fomites may contribute to transmission, although direct contact is generally considered less efficient than vector-borne transmission. Intrauterine transmission has been reported, while the presence of LSDV in semen has important implications for natural mating and artificial insemination; prolonged viral shedding in semen has been documented for several weeks after infection (Reddy *et al.*, 2023; Sprygin *et al.*, 2019).

RISK FACTORS

The occurrence and spread of Lumpy Skin Disease (LSD) depend on a variety of factors related to the animal, environment and management of cattle. Important factors include weather conditions, communal grazing, sharing of water sources and the movement of animals from one place to another. These factors may increase the chances of disease spread from infected areas to healthy areas. LSD incidence generally increases during the rainy season, when the abundance and activity of biting flies and other vectors increase, and tends to decrease in dry and colder periods. Cattle (*Bos indicus* and *Bos taurus*) and water buffaloes (*Bubalus bubalis*) are susceptible, with cattle being more susceptible. Exotic cattle are considered more susceptible to clinical disease than indigenous cattle. Cattle of all age groups can become infected with LSD; however, the severity of the disease may vary between animals and can be greater in very young and older animals (Reddy *et al.*, 2023).

CLINICAL SIGNS

LSD is a non-zoonotic disease and does not infect humans. However, it has been classified as an important notifiable disease because of its potential for international spread and economic impacts (WOAH, 2026).

The incubation period varies from 2–5 weeks. Initial symptoms include high fever lasting for several days, followed by profuse nasal and ocular discharge and a marked

reduction in milk production. Enlargement of subscapular and pre-femoral lymph nodes along with facial and brisket oedema may also be seen. The most characteristic sign is the development of firm, raised skin nodules measuring about 1–5 cm. These nodules commonly occur on the head, neck, udder, genitalia, perineum, limbs and other parts of the body, ranging from a few lesions in mild cases to numerous lesions covering the entire body in severe cases. The nodules may become necrotic and develop into hard, firmly attached scabs, commonly known as ‘sit-fast’ lesions. Healing is slow and may leave deep scars.

Complications include secondary bacterial infections, pneumonia, mastitis, corneal ulcers and blindness. Lesions may attract flies and become complicated by fly strike, further delaying recovery. Reproductive problems, including abortion, prolonged anoestrus and temporary infertility in bulls, may occur. Some animals may remain subclinically infected without obvious clinical signs (Gupta *et al.*, 2020; Reddy *et al.*, 2023).

DIAGNOSIS

Diagnosis of LSD based solely on clinical signs is not confirmatory, as many other diseases can produce similar types of skin lesions and clinical signs. A tentative diagnosis of this disease is generally made based on history, epidemiological data, management history and particularly the characteristic skin nodules. However, laboratory confirmation is essential. Real-Time polymerase chain reaction (qPCR) is widely used for laboratory confirmation of LSD because of its high sensitivity and specificity. Other diagnostic methods are virus isolation and various serological tests such as ELISA and immunofluorescence assay. Samples collected from skin nodules or scabs are particularly useful for molecular detection of LSD. Newer diagnostic approaches like recombinase polymerase amplification, LAMP and lateral flow assays are also being explored for rapid on-farm diagnosis (Bhat *et al.*, 2025; Reddy *et al.*, 2023).

TREATMENT

As LSD is a viral disease, there is no specific antiviral treatment available. Management of this disease is mainly supportive and aims to reduce clinical signs, prevent complications and promote recovery. The management includes appropriate antibiotics to treat secondary bacterial infection, antipyretics and/or anti-inflammatory medicines to reduce fever, pain and inflammation, immune-supportive therapy, proper cleaning and dressing of skin lesions with suitable antiseptic ointments and use of fly repellent sprays to prevent fly infestation. Alternative and ethnoveterinary medicine can be used as supportive and adjunctive care to help manage symptoms, speed up wound healing and reduce the risk of secondary infection in cattle. Because LSD is a viral disease with no specific commercial antiviral treatment, management mainly focuses on supportive care and symptom relief. Homeopathic medicines such as Solution *Hepar sulphur 30 CH* potency and Solution *Variolinum 30 CH* potency in drinking water daily for 10–15 days have also shown positive outcomes, with increased healing and faster recovery. Herbal preparations containing ingredients such as neem, turmeric, garlic and other medicinal plants can also be used for management of LSD-associated skin wounds (Chouhan *et al.*, 2022).

PREVENTION AND CONTROL

Prevention and control of LSD revolve around a combination of vaccination, biosecurity, early detection, movement control and vector management.

Vaccination: Vaccination of susceptible animals is one of the most important measures to reduce the spread and impact of LSD. Proper vaccination using either Heterologous Goat pox vaccine or Homologous Live attenuated LSD vaccine – Lumpi-ProVacInd should be done according to the veterinary guidelines (Kumar *et al.*, 2023; Reddy *et al.*, 2023).

Biosecurity Measures: Infected animals should be identified first and isolated from other animals.

- Personnel handling the sick animals should use appropriate protective clothing, gloves and footwear.
- Use different equipment while dealing with healthy and sick animals.
- Disinfect equipment and materials used for handling sick animals.
- In case of mortality, the carcass should be disposed of by the deep burial method.

Control on movement of animals: The movement of the infected/suspected animals to and from the affected areas should be restricted according to the veterinary guidelines. Even the movement of personnel/equipment between infected and healthy herds should be minimised. Avoid common grazing grounds or water sources. New animals should be examined first and quarantined before adding to the herd.

Vector control: Use of vector traps and insecticidal sprays should be used in the premises of infected animals, as it helps to reduce the transmission of the disease.

Hygiene measures: Proper disinfection of the premises of affected animals should be carried out using an appropriate approved disinfectant/ chemical.

CONCLUSION

India's livestock industry faces a significant threat from Lumpy Skin Disease (LSD), a serious viral illness of cattle. Since the disease was first introduced to the nation, it has negatively impacted the health and productivity of cattle and caused significant financial losses for livestock owners due to decreased milk output, reproductive issues, treatment costs and, in extreme situations, fatality. Once established in a population, LSD is particularly challenging to manage due

to its effective dissemination through blood-feeding vectors, animal movement, and favourable weather conditions. Early suspicion can be supported by the distinctive skin nodules and related symptoms like fever, oedema, lymph node enlargement, decreased milk production, and reproductive problems; however, a conclusive diagnosis still requires laboratory confirmation, especially with qPCR. As there is currently no specific antiviral treatment for LSD, management is mainly supportive and focused on lowering fever and pain, preserving nutrition and hydration, treating secondary bacterial infections, avoiding fly infestation, and preventing other complications. Herbal remedies and ethnoveterinary medicines such as Solution *Hepar sulphur 30 CH* potency and Solution *Variolinum 30 CH* potency are examples of alternative medicines and have shown positive outcomes. Early detection and timely treatment of affected animals can enhance recovery and lessen the severity of consequences, but prevention is still considerably more successful than treating an infection after it has already occurred.

Therefore, the main pillars of LSD prevention and control include vaccination of susceptible cattle, early diagnosis and isolation of suspected cases, suitable biosecurity, animal movement limitation, good hygiene and disinfection, and efficient control of biting flies and other vectors. Farmers should remain vigilant, particularly during periods favourable for vector multiplication, and immediately seek veterinary assistance when characteristic clinical signs are observed. A coordinated approach involving farmers, veterinarians and animal health authorities is essential for protecting livestock, safeguarding farmers' livelihoods and strengthening preparedness against future outbreaks.

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