



Lumpy Skin Disease Outbreak In

RAJASTHAN

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ABSTRACT

A newly identified 'lumpy virus' is spreading across the globe. Lumpy skin disease is an emerging bovine viral disease most of our work focuses on large problems that cattle has faced for a long time. Large outbreaks of LSD were reported in India in July 2022 from the states of Gujarat and Rajasthan which subsequently spread to 11 other states. Lumpy skin disease causes huge economic losses to the livestock farmers due to significant milk loss, damage of the hide and reproductive problems such as abortion and infertility in affected animals. The causative agent, capripoxvirus, can also induce sheep pox and goat pox. This is largely due to the economic effect of the COVID-19 pandemic and the imposition of crippling sanctions in endemic regions, as well as an increase in the legal and illegal trade of live animals, climate change. The present review is designed to provide existing information on the various aspects of the disease such as its clinicopathology, transmission, epidemiology, diagnosis, prevention and control measures and the potential role of wildlife in the further spread of disease.

KEYWORDS-Lumpy Skin Disease, LSD, Capripox, Epidemiology, Transmission.

I. INTRODUCTION-

Lumpy skin disease (LSD), a major threat to stockbreeding, can cause acute or subacute disease in cattle and water buffalo. All age and breeds of cattle are affected, but especially the young and cattle in the peak of lactation. The reason why the World Organization for Animal Health (OIE) has placed this transboundary disease on the notifiable disease list is due to its significant economic losses and the potential for rapid spread. The recent spread of the disease in disease-free countries indicate the importance of its transmission, as well as control and eradication. Lumpy skin disease virus (LSDV) is a double-stranded DNA containing around 150 kilobase pairs (kbp) with relatively large size [230-260nm], enclosed in a lipid envelope and belongs to

genus capripoxvirus, which is genetically related to the sheep pox (SPPV) and goat pox (GTPV) viruses. This virus is the most economically significant in the Poxviridae family affecting domestic ruminants. The capsid or nucleocapsid of the virus is brick or oval shaped containing the genome and lateral bodies. Extensive DNA and cross-hybridization between species cause serologic cross-reaction and cross-protection among members although capripoxviruses are generally considered to host specific. SPPV and GTPV strains can naturally or experimentally cross-infect and cause disease in host species. In contrast, LSDV can experimentally infect sheep and goats, but no natural infection of sheep and goats with LSDV has been reported.

What Is Lumpy Virus?

Lumpy skin disease is a viral infection of cattle originally found in Africa. It has also spread to countries in the Middle East, Asia and Eastern Europe. Clinical signs include fever, lacrimation, hyperaesthesia and characteristic skin eruptions.

CLINICOPATHOLOGY

The clinical features of the disease include fever, inappetence, nasal discharge, salivation and lacrimation, enlarged lumpy nodes, a considerable reduction in milk production, loss of body weight and sometimes death. Furthermore, the disease is characterized by firm, slightly raised circumscribed skin nodules (Figure 1) that 2-7 cm in diameter and typically appear on the neck, legs, tail and back shortly after the beginning of fever. The necrotic and ulcerative nodules raise the risk of myiasis. Oedema of the legs and lameness was observed in some cases. LSDV can lead to abortion, mastitis and orchitis. However, nodules were not observed in aborted fetuses with necropsy, lung oedema and congestion, nodules throughout the lungs and gastrointestinal tract were often observed. Tissues such as the muzzle, nasal cavity, larynx, trachea, inside of the lips, dental pad, gingiva, oesophagus, udder, teats, uterus, vagina and testes might be



affected the complication of seer disease were reported as keratitis, dysentery lameness, pneumonia, mastitis and myiasis. The histopathological examination of skin nodules may reveal pathognomonic . Eosinophilic

intracytoplasmic inclusion bodies in the keratinocytes, macrophages, endothelial cells and pericytes and are associated with the ballooning degeneration of spinous cells.



Figure-1
Lumpy skin Disease , Raised , Circumscribed Nodular Lesions.

Infiltration of the superficial dermal inflammatory cells such as macrophages, lymphocytes and eosinophils is seen in addition, widespread vacuolitis and severe coagulative necrosis in subcutaneous muscles may be observed in some cases. Pseudo lumpy skin disease, urticarial streptotrichosis, dermatophilus congolensis infection, ringworm, hypodermatitis, bovine infection, photosensitization, bovine papular stomatitis, foot and mouth disease, bovine viral diarrhoea and malignant catarrhal fever are all considered in the differential diagnosis of LSD.

DIAGNOSIS

Pseudo lumpy skin disease is a milder disease than true lumpy skin disease but differentiation depends essentially on isolation or identification of the causal virus. Despite a primary clinical diagnosis of LSD, the diagnosis is confirmed

by using conventional PCR. A real time PCR technique has also been established, differentiating among LSDV, sheep and goat poxvirus for differentiating virulent LSDV from the vaccine strain, restriction fragment length polymorphism (RFLP) has also been used. Furthermore, electron microscopy, virus isolation, virus neutralization and serological techniques have been utilized for LSDV detection as shown in table 1 (Ole, 2018). It is stated that molecular methods are more precise, reliable and rapid compared with other methods among serological techniques, the virus neutralization test is other method among neutralization tests, which is slow and costly with high specificity and low sensitivity is the specificity and low sensitivity is the only currently valid test.

PATHOGENESIS

Following LSDV infection, virus replication, viremia, fever, cutaneous localization of the virus and development of nodules occur.



Experimentally, after intradermal inoculation of the virus the following events were reported.

4.to.7 days post – infection (dpt); localized swelling as 1-3 cm nodules or plaques at the site of inoculation

6 to 18 dpt; viremia and shedding of the virus via oral and nasal discharge. 7 to 19 dpt ; regional lymphadenopathy and development of generalized skin nodules.

.42 days after fever; presence of virus in semen

Intracellular replication of the virus in fibroblasts , macro phages , pericytes and endothelial cells leads affected tissues

It seems that young calves , lactating cows and underweight animals are more susceptible to natural infection , probably due to impairment of humoral immunity . Animals that have recovered from natural infection by the virus have shown lifelong immunity . Calves from their infected dams are resistant to clinical disease for approximately 6 months because of the acquired maternal antibodies .affected animals clear the infecting and no carrier state has known for lsdv yet.

TRANSMISSION

Lumpy skin disease can affect cattle ,water buffalo and wild ruminants. It seems that sheep and goats are not infected by the virus (el-nahas et al.,2011 ;lamien ,le goff, et al.,2011). Lsdv can remain viable for long periods in the environment at ambient temperatures, especially in dried scabs . It is reported that the virus persists in necrotic skin nodules for up to 33 days or longer ,in desiccated crusts for up to 35 days and for at least 18 days in air-dried hides. The virus can be inactivated at a temperature of 55^oc for 2 hr and 65^oc for 30 min (mulatu& feyaisa ,2018).the main sources of infection are considered to be skin lesions as the virus persists in the lesions or scabs for long periods the virus in also excreted via the blood ,nasal and lachrymal secretions, saliva ,semen and milk (transmissible to suckling calves).

The lsdv is transmitted through arthropods particularly blood sucking insects [chihota, rennie ,kitching ,& mellor,2001, 2023;maclachlan &dubovi ,2011], contaminated feed and water and direct transmission in the later stages of the disease via saliva ,nasal secretions and semen {annandale et al .,2005;tuppurainen, venter,et al., 2014; chihota et al.,2001 ironset al.,2005; tuppurainen, venter , et al., 2017}. Same studies showed no positive correlation between cattle density and infection rates,indicating low importance of direct virus

transmission ,at least in the early stages of the disease, compared with the higher significance of indirect transmission {can &kitching ,1995;magori-cohen et al.,2012} as most lsd outbreaks have occurred in the summer when ar –thropods are most active , it may indicate the involvement of various vector species , especially blood – feeding insects ,in virus spread [kahana – sutin et ., 2017 ; sptying et al ., 2018].

Several studies have suggested a possible role of hard ticks in virus transmission [lubinga et al., @)2015; tuppurainen et al ., 2011, 2013] . Lumpy skin disease virus and viral antigen were found in the salivary glands and midgut in saliva and different organs of ticks, including the haemocytes ,salivary glands and midgut in saliva and different organs of ticks such as haemocytes , salivary glands and midgut [lubinga et al .,2013 , 2014] . Furthermore , the transstadial and mechanical transmission of the virus by ticks was proved based on molecular evidence [tuppurainen & oura , 2012] . However, their prolonged attachment to the host does not explain the rapid occurrence of extensive epidemics. Therefore , it seems that ticks may be acting as reservoirs for the virus [kahana – sutin et al ., 2017] . *Aedes ggypti* is the sole dipteran to be able to fully transmit the virus to susceptible cattle [chihota et al. 2001] . Mosquitoes such as *Culiseta inornata* and *Anopheles stephensi* were not able to transmit the virus {chihota et al. , 2003 } . Although *Stomoxys calcitrans* has been seen in lsd outbreaks and has transmitted the capripox virus to sheep and goats { baldacchino et al., 2013 ; yeruham et al., 1995 } . The transmission of lsdv to susceptible animals has failed { chihota et al.,2003 since lsdv has been detected in *Culiseta punctatipes* , it may play a role in virus transmission {sevick &dogan, 2017} . It is also stated that the ratio of

TREATMENT AND PREVENTION

Attenuated virus vaccines may help control spread.

The spread of lumpy skin disease in recent years beyond its ancestral home of africa is alarming . Quarantine restrictions have proved to be limited use. Vaccination with attenuated virus offers the most promising method of control and was effective in halting the spread of the disease in the balkans, administrations of antibiotics to control secondary infection and good nursing care are recommended but the large number of affected animals within a herd may preclude treatment .

LUMPY VIROUS AND CLIMATE CHANGE



Lumpy skin disease spreads through blood feeding insects. It can also spread through flies that sit on the eye and nasal discharge of infected animals. Usually, the numbers of cases rise during monsoons, when the number of vector also increase. Climate change is also believed to play a part in the spread of lsd. There are reports of international transport of disease because of changes in wind velocity and directions a part of climate change. When the winds changed the insects carrying the virus are believed to have been redistributed to previously uninfected countries.

LUMPY SKIN DISEASE AFFECTS IN RAJASTHAN

Nearly 94,000 cases of the viral infection that affects cattle have been reported, which was initially detected in cattle in districts adjoining Gujarat the epicenter of the disease, but has spread rapidly to northern Rajasthan as well. Nearly 70,000 of the infected cattle have been treated. The official said the government is considering banning cattle movement from other states and has sought reports from district to make a final assessment. The government is also inclined to impose restrictions or cancel the upcoming animals fairs due to infections according to the state governments data five districts have reported the majority of the deaths; Ganganagar (840), Barmer (830), Jodhpur (730), Jalore (580) and Bikaner (527), the infection has also been reported from Jaisalmer; Pali, Sirohi, Churu, Hanumangarh, Ajmer, Nagaur, Jaipur, Sikar, Jhunjhunu and Udaipur.

IS IT SAFE TO CONSUME THE MILK OF AFFECTED CATTLE.?

Studies say that it has not been possible to ascertain the presence of viable and infectious lsdv virus in milk derived from the infected animals. FAO notes, however that a large portion of the milk in Asia is processed after collection and is either pasteurized or boiled or dried in order to milk powder, this process ensures that the virus is inactivated or destroyed. It is safe to consume milk from the infected cattle. There is no problem in the quality of milk even. If you have it after boiling or without boiling.

WHAT ARE THE ECONOMIC IMPLICATION

In Rajasthan, which is witnessing the worst impact of lumpy skin disease it has led to reduced milk production, which lessened by about three to six

lakh liters a day. So in Rajasthan farmers suffered a lot of financially by lumpy virus.

RAJASTHAN GOVT STEPS UP EFFORTS TO CONTROL SPREAD OF LUMPY SKIN DISEASE -

The Rajasthan government is going all out to control the spread of lumpy skin disease caused by a virus in cattle which has affected 23 of the states 33 districts. So far. Chief Minister Ashok Gehlot said the state government was committed of the protection and promotion of livestock and that there would be no shortage of funds for medicines, doctors and ambulances, the CM has given approval to fill 500 posts of veterinary doctors and staff and has directed officials to complete the process soon. The state has also decided to ban animal fairs to curb the spread of the disease.

II. CONCLUSIONS-

The recent spread of the disease into disease-free areas indicates its epidemiological and economic significance considering the extensive boundaries of affected areas of Rajasthan, animals movements among these areas should be attentively controlled by veterinary authorities, furthermore paying close attention to the different aspects of the disease, such as transmission and epidemiology and the implementation of effective preventive measures. Such as vaccination, could result in better disease control, therefore, accurate and timely diagnosis in endemic areas, vaccination in endemic areas, vaccination with the homologous strain of the lsdv, vector control, animals movement restriction and lsdv testing of bulls used for breeding are highly recommended as tools to control further spread.

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