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Origin and Transmission of Lumpy Skin Disease in Cattle

Sagar Patel*

Department of Veterinary Medicine, University of Texas, Texas, USA

Opinion Article

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***For Correspondence:**
Sagar Patel, Department of Veterinary Medicine, University of Texas, Texas, USA

E-mail: sagar_pa-tel@med.unc.edu

DESCRIPTION

The Neethling virus, a member of the *Poxviridae* family of viruses, causes Lumpy Skin Disease (LSD), an infectious disease that affects cattle. The illness is characterised by a high fever, swollen superficial lymph nodes, and many nodules on the skin and mucous membranes that measure 2 centimetres to 5 centimetres (including those of the respiratory and gastrointestinal tracts). Additionally, infected cattle may experience edematous swelling in their limbs. Because the virus often results in permanent skin damage in animals, lowering the market value and it has substantial economic consequences. In addition, the illness frequently causes chronic weakness decreased milk production, stunted growth, infertility, abortion and even death. Nearly a week after virus infection, fever starts to develop. This initial fever could reach 41°C (106°F) or higher and last for a week. All of the superficial lymph nodes enlarge at this point. Seven to nineteen days after virus inoculation, the disease's distinctive nodules start to show up.

Discharge from the eyes and nose turns mucopurulent at the same time as the nodules emerge. The dermis and epidermis are both affected by the nodular lesions but they may also spread to the subcutis underneath or even to the muscle. These lesions occurring all over the body (but mainly on the head, neck, udder, scrotum, vulva and perineum) may be either well-circumscribed or they may merge. Cutaneous lesions can disappear quickly or they can stay as solid masses. The lesions can also become sequestered leaving behind deep ulcers that are frequently suppurating and packed with granulation tissue. When the nodules first appear, they are creamy grey to white in appearance and may ooze serum when cut open.

After around two weeks, a cone-shaped central core of necrotic material may form within the nodules. Additionally, the nodules on the mucous membranes of the eyes, nose, mouth, rectum, udder and genitalia quickly ulcerate, assisting in transmission of the virus. The clinical signs and lesions of LSD are frequently mistaken for Bovine

Herpesvirus 2 (BHV-2) also known as pseudo-lumpy skin disease in moderate cases. However, BHV-2 infections only cause more superficial lesions. Additionally, BHV-2 has a milder effect than LSD and a shorter course. Contrary to LSD's intracytoplasmic inclusions, BHV-2 is characterised by intranuclear inclusion bodies. High temperatures and high humidity are related with LSDV outbreaks. These outbreaks are typically more common in the wet summer and fall months especially in low-lying locations or close to water bodies but they can also happen in the dry season. Insects that feed on blood including flies and mosquitoes serve as mechanical carriers for the disease. A single species vector has not been found. Instead, the virus has been isolated from the species of *Culicoides*, *Tabanidae*, *Glossina*, *Biomyia fasciata* and Stomoxys. It is still being determined how each of these insects specifically contributes to LSDV transmission. Outbreaks of lumpy skin disease tend to be sporadic since they are dependent upon animal movements, immunological condition and wind and rainfall patterns which affect the vector populations.

The virus can spread through saliva, semen, nasal discharge, lacrimal secretions and blood. Suckling calves can also contract the illness from milk that has been contaminated. LSDV was discovered in saliva 11 days after the onset of fever in experimentally infected cattle in semen 22 days later and in skin nodules 33 days later. Urine or faeces do not contain the virus. The LSDV can persist infected tissue for more than 120 days just like other pox viruses which are well known for being very resistant.

There have been two alternative methods for LSDV vaccination. The Neethling strain of the virus was initially weakened by 20 passes on the chorio-allantoic membranes of hen eggs in South Africa. It has been demonstrated that the vaccine made from sheep pox viruses or goat pox viruses gives cow immunity in Kenya. However, the level of attenuation required for safe use in sheep and goats is not sufficient for cattle. Since live vaccinations could serve as a source of infection for susceptible sheep and goat populations, sheep pox and goat pox vaccines are only permitted in nations where the diseases are already widespread. Most cattle develop lifetime immunity after recovery from a normal illness. Additionally, calves of immunological cows receive maternal antibodies and are resistant to clinical illness until about 6 months of age. Calves under 6 months of age whose dams were naturally infected or immunised should not get vaccinations to prevent disruption of maternal antibodies.