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Popular Article

Lumpy Skin Disease: A Brief Overview

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Lumpy Skin Disease is an infectious, vector-borne, and host-specific animal disease. The disease is known by various names such as Pseudo-urticaria, Neethling virus disease, Exanthema nodularis bovis, Knopvelsiekte. It is one of the most economically significant viral disease. Has an impact on the meat, dairy, and leather sectors. Losses are primarily brought on by decreased milk production, irreversible harm to hides, sterility, and in certain circumstances, animal mortality.

Etiology

Lumpy skin disease (LSD) is caused by lumpy skin disease virus (LSDV) which has epitheliotrophic property. It is a member of the genus *Capripoxvirus* of the family *Poxviridae*. LSD virus is very similar to the other Capripox species such as Sheep pox and Goat pox virus. The virus has a double-stranded DNA genome of about 151 kbp. It is enveloped, linear, ovoid shaped virion measuring 220-450 nanometer (nm) by 140-266 nm.

Host susceptibility

Cattle (Bos indicus and Bos taurus) and buffaloes (Bubalus bubalis) are most susceptible hosts.

The role of vectors

Ticks have shown transstadial and transovarial persistence of LSDV in *Rhipicephalus decoloratus, Rhipicephalus appendiculatus* and *Amblyomma hebraeum*, and mechanical or intrastadial transmission by *Rhipicephalus appendiculatus* and *Amblyomma hebraeum.*

Transmission

The disease has been observed to manifest itself after the seasonal rains, which are always accompanied by an increase in the population of various arthropod species. Skin lesions or nodules have been reported to be the main source of infection in healthy animals. Additionally, the virus is excreted by infected animals through their blood, saliva, semen, nasal and lachrymal secretions, and milk. The incubation period is ranged between 2 to 5 weeks.

Potential risk factors of Lumpy Skin Disease

Types	Factors	States
Host associated	Species	Cattle are more susceptible than buffalo
		Both are susceptible
	Gender	Young animals are vulnerable than older
	Age	Cross breeds are more susceptible than indigenous
	Breed	
Agent related	Drying and desiccated scabs	LSDV persist as viable
	Icing and thawing	LSDV is stable
	In infectious cattle blood	LSDV persists 8 days
	In semen	LSDV persists approximately 22 days
	In saliva	LSDV persists for 11 days
Environmental and managemental factors	Warm and humid climate	Favours proliferation of mosquitoes, flies and ticks
	Wet seasons	Favours abundance of blood sucking insects

Pathogenesis

The Lumpy Skin Disease (LSD) virus infects the host through the skin or the mucosa of the gastrointestinal system. Virus primary multiplication occurs in nearby lymph nodes, results in lymphadenitis. After the initial febrile reaction, viraemia develops and remains for two weeks. Following viremia, the virus spread via monocytes, localized in the skin, and creates inflammatory

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nodules as a result of its rapid multiplication in the cells. Vasculitis and lymphangitis can occur from LSDV replication inside host cells such macrophages, fibroblasts, pericytes, and endothelial cells in the walls of lymphatic and blood vessels, while thrombosis and infarction can happen in extreme cases. Virus multiplication in cells results in hyperplasia and ballooning degeneration of keratinocytes, the development of epidermal microvesicles, and the influx of inflammatory cells into the dermis. Four to seven days after infection coalescence of epidermal micro-vesicles occur into large vesicle and ulceration of tissue developed.

Clinical Manifestations

Clinical signs of mildly affected cattle include, anorexia, excessive salivation, ocular and nasal discharge, agalactia, and emaciation. Within two days of the onset of fever, there is appearance of one or two lumps or nodules (1 to 5 cm in diameter). On the animal's body, particularly in the skin of the muzzle, nares, back, legs, scrotum, perineum, eyelids, lower ear, nasal and oral mucosa, and tail. Nodular lesions that are painful and hyperemic may be seen. In severe instances that may persist for 7-12 days, persistent high pyrexia (40-41.5°C), depression, anorexia and a characteristic (more than hundreds) nodules and typically uniform in size, all over the animal body is noted. The nodules are hard and slightly raised above the surrounding normal skin from which they are typically separated by a narrow ring of hemorrhage. They involve the epidermis, dermis, adjacent subcutis and musculature. Nodules may disappear, but they may persist as hard lumps or become moist, necrotic, and ulcerated. The sloughed away lesion may create a hole of full skin thickness and characteristic lesion of "inverted conical zone" of necrosis, known as "sit fast".

Diagnosis

Clinical Signs and Post Mortem Lesions

Appearance of very distinctive, 10–50 mm-diameter nodular cutaneous lesions. Other signs include nasal discharge and lacrimation. The prefemoral and subscapular lymph nodes enlarge and are easily palpable. A high fever (>40.50°C) can last for around a week. Sharp decline in milk production.

Cell Culture

LSDV will grow in tissue culture of bovine, ovine or caprine origin. Primary goat testicle (PGT) cells, primary goat kidney (PGK) cells, primary lamb testicle (PLT) cells and Madin-Darby bovine kidney (MDBK) cells.

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Serological Tests

Polymerase Chain Reaction (PCR), Enzyme-linked Immunosorbent Assay (ELISA), Indirect Fluorescent Antibody test (IFAT), Indirect Immunofluorescence test, Virus Neutralization Test (VNT)

Differential Diagnosis

Allergic symptoms like urticaria and bug bites can resemble bovine LSD in some situations. Pseudocowpox, besnoitiosis, demodicosis, vaccinia virus, bovine papular stomatitis, dermatophilosis, vesicular stomatitis, cutaneous tuberculosis, photosensitization, onchocercosis, and ringworm are all deliberated as the differential diagnoses for LSD.

Treatment

Symptomatic and supportive therapy, such as antibiotics to prevent subsequent bacterial infections of skin abrasions and wound care. Therapy with intravenous fluids and anti-inflammatory medications. Literally, there are no precise antiviral medications accessible for the treatment of LSD; therefore, vaccination is the only reliable method of preventing the illness.

Prevention And Control

Prophylactic immunization with homologous (Neethling strain) or heterologous live attenuated vaccine (Sheep/Goat pox vaccine) is the best medical prophylaxis for LSD. Movement control, restricted grazing, the removal of severely affected animals, appropriate disposal of infected carcasses, the use of pest repellents, strict quarantine, and disease awareness campaigns directed at veterinary students and professionals, farmers, herdsmen, animal traders, truck drivers, and artificial inseminators

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