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A Review on "The Lumpy Skin Disease"

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ABSTRACT:
Lumpy skin disease is a high-consequence disease in cattle caused by infection with the poxvirus lumpy skin disease virus (LSDV). The virus is endemic in most countries in Africa and an emerging threat to cattle populations in Europe and Asia. Skin lesions are the major sources of infection; although the virus is evacuated via different body secretions and excretions including semen. Thus, susceptible hosts contract the virus principally by mechanical means from hematophagous arthropods, including biting flies, mosquitoes and ticks. Transstadial and transovarial persistence in varies species of ticks is also possible. Following infection, characteristic lumpy skin disease lesions may explode from 7 to 14 days post infection under experimental conditions whereas in natural cases it takes 2 to 5 weeks. Subsequently, milk production lesion abortion, temporary or permanent sterility, damage to hide and deaths will occur which further contribute to a momentous economic loss in cattle producing countries. Therefore, large-scale vaccination combined with other appropriate control measures are the most effective way of limiting the spread and economic impact due to lumpy skin disease. This review is designed with the aim of providing, latest information on the biology of lumpy skin disease virus, mechanism of spread, clinical and pathological features of lumpy skin disease.

KEYWORDS:
Lumpy skin disease, cow, poxvirus, Europe

I. INTRODUCTION:

Capripoxvirus (CaPVs) is one of the eight genera within the Chordopoxvirinae subfamily of the Poxviridae and is comprised of Lumpy Skin Disease Virus (LSDV), Sheep Pox Virus (SPPV), and Goat Pox Virus (GTPV) These viruses are responsible for most economically significant diseases of domestic ruminants in Africa and Asia [1]. The disease is known by various names such as "LSD", "Pseudo-urticaria", "Neethling virus disease", "exanthema nodularis bovis", and "knopvelsiekte"[2].

Natural infection of sheep and goat has not been reported even in close contact with infected cattle and buffaloes but skin lesions have been seen after experimental infection in sheep, goat, giraffe, Giant gazalles, impalas [3] Overall, it affects the economic value of animal as it will affect the meat and milk production, hide quality, draft power of animals and reproductive efficiency (abortion and infertility) [4]. In recent years, LSD has been reported from countries neighbouring India like China and Bangladesh. Therefore, understanding the epidemiology of exotic diseases becomes necessary for timely planning the effective disease management.

CAUSATIVE AGENT:

Lumpy skin disease is caused by lumpy skin disease virus (LSDV) for which Neethling strain is the prototype. The principal method of transmission is mechanical by arthropod vectors [5] LSDV has a limited host range and does not complete its replication cycle in non-ruminant hosts [6] The causative agent is a member of the Capripoxvirus genus in the Poxviridae family.

STRUCTURE:

Like other viruses in the Poxviridae family, capripoxviruses are brick-shaped. Capripoxvirus virions are different than orthopoxvirus virions in that they have a more oval profile, as well as larger lateral bodies. The average size of capripoxvirions is 320 nm by 260 nm

SYMPTOMS:

LSD symptoms in cattle are mild to severe; characterized by fever, multiple skin nodules covering the neck, back, perineum, tail, limbs and genital organs, the mucous membranes; the lesion may also involve subcutaneous tissues and sometimes musculature and internal organs. Affected animals also exhibit lameness, emaciation and cessation of milk production. Edema of limbs and brisket, and lymphadenitis are highly prominent and sometimes affected animals may die. In addition, pneumonia is a common sequel in

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animals with lesions in the mouth and respiratory tract [7]

GENOME:

The virus has a 151-kbp genome, consisting of a central coding region which is bounded by identical 2.4 kbp-inverted terminal repeats and contains 156 genes [8] There are 146 conserved genes when comparing LSDV with chordopoxviruses of other genera [8] The nucleotide composition is 73% A+T and is uniformly distributed. As seen for other poxviruses, the LSDV genome contains a central coding region bounded by two identical inverted terminal repeat (ITR) regions which contain at least 2,418 bp at both termini.

TRANSMISION:

It is transmitted by blood-feeding insects, such as certain species of flies and mosquitoes, or ticks. It causes fever, nodules on the skin and can also lead to death, especially in animals that that have not previously been exposed to the virus. Control options include vaccinations and culling of infected animals. The incubation period for lumpy skin disease is between 4 and 14 days post-infection. After an initial period of high fever (41°C) and swollen lymph glands, the animal may develop large, firm nodules that are up to 5 cm in diameter in the skin. In experimentally infected cattle, LSDV was found in saliva 11 days after the development of fever, in semen after 22 days, and in skin nodules after 33 days. The virus is not found in urine or stool. Like other pox viruses, which are known to be highly resistant, LSDV can remain viable in infected tissue for more than 120 days. [9]

ECONOMIC IMPACT:

Significant losses are due to severe emaciation, hide damage, infertility in males and females, mastitis, drop in milk production, and abortions. Due to the reduction in the quality of the animals, the effect can be seen in the overall trade of live animals and animal products. The morbidity and mortality rate of LSD varies widely, depending on the presence of insect vectors and host susceptibility. Generally high milk-producing European cattle breeds are highly susceptible and severely affected compared to indigenous African and Asian animals. The annual financial cost included the average production losses, due to morbidity and mortality arising from milk loss, beef loss, traction power loss, and treatment and vaccination costs at the herd level. The average financial cost in infected herds was estimated to be 6.43 USD per head for local zebu and 58 USD per head for Holstein Friesian or crossbred cattle.[10]

PREVENTION:

The Lumpy Skin Disease can be prevented by following the below measures which can be helpful for cattles that are infected by this virus.

1. Segregate sick animals.
2. Stop all animals, animal products, vehicles and persons coming in or out of farm.
3. Avoid grazing in common place.
4. Ban all visitors to the farm.
5. Call a veternian for advice, adopt containment vaccination.

By following these measures it will not fully prevented but the disease can be control from spreading in large amount.

TREATMENT:

No specific treatment is available chronic lesions are harmless, strong antibiotic therapy prevents secondary infection. Virus spreads rapidly therefore restriction of animal movement and quarantine restrictions are of limited use.

VACCINES:

There is not a specific vaccine has been created for lumpy skin disease worldwide but in India there is indigenous vaccine has introduced in order to cure this disease.

The name of this indigenous vaccine is LUMPY-PROVAC (Ind) has been developed to protect the livestock from lumpy skin disease. The vaccine has been developed by the National Equine Research Centre, Hisar (Haryana) in collaboration with the Indian Veterinary Research Institute, Izzatnagar (Bareilly).

CONTROL:

The disease can be controlled by vaccination, slaughter campaigns and management strategies, quarantine of infected animals. Control plans vary between countries and so advice should be sought from the relevant authorities and veterinarians.

II. CONCLUSION:

Lumpy skin disease is one of the most economically significant transboundary, viral diseases of domestic cattle. It is economically significant in animals because of chronic debility, decreased milk production and weight, damaged skins, abortion, and mortality.

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IMAGES OF SOME INFECTED CATTLES:

BIBLIOGRAPHY:

[1]. CFSPH (2008) Centre for food security and public health Iowa state university, lumpy skin disease accessed on july 17 2017.

[2]. Al-Salihi K (2014) lumpy skin disease: Review of the literature mirror Res Vet Sci Ani 3 (3): 6-23.

[3]. Davis GF (1991) lumpy skin disease of cattle : A growing problem in Africa and near east world Ani Rev 68(3): 37-42.

[4]. RGBEH (2014) lumpy skin disease (LSD): outbreak investigation, isolation and molecular detection of lumpy skin disease in selected areas of Eastern Shewa, Ethiopia, doctoral dissertation AAU, 72.P

[5]. Tuppurainen E Oura C (2012) Review lumpy skin disease , an emerging threat in Europe the middle east and Asia trans bound Emerg Dis 59,40,48.

[6]. Shen YJ, Shephard E, Douglass N, Johnston N, Adams C, et al. (2011) A novel candidate HIV vaccine vector based on the replication deficient Capripoxvirus, Lumpy skin disease virus (LSDV). Virol J 8: 265.

[7]. Tageldin MH, Wallace DB, Gertdes GH, Putterill JF, Greyling RR, et al. (2014) Lumpy skin disease of cattle: an emerging problem in the Sultanate of Oman. Trop Anim Health Prod 46: 241-246.

[8]. Tulman, E. R.; Afonso, C. L.; Lu, Z.; Zsak, L.; Kutish, G. F.; Rock, D. L. (1 August 2001). "Genome of Lumpy Skin Disease Virus". Journal of Virology. 75 (15): 7122–7130. doi:10.1128/JVI.75.15.7122-7130.2001. ISSN 0022-538X. PMC 114441. PMID 11435593.

[9]. Coetzer, J.A.W. (2004). Infectious Diseases of Livestock. Cape Town: Oxford University Press. pp. 1268–1276.

[10]. Gari G, Bonnet P, Roger F, Waret-Szkuta A (2011) Epidemiological aspects and financial impact of lumpy skin disease in Ethiopia. Prev Vet Med 102: 274-283.