TURKISH VETERINARY JOURNAL

Letter to the Editor

Lumpy Skin Disease (LSD): Recent outbreak and threatening Smallholder Cattle farmer in Nepal

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Abstract

Lumpy skin disease (LSD) is an economically significant viral emerging and transboundary disease which mainly affects cattle of all age group and all breed with clinical signs of high fever, firm nodules on skin and enlarged peripheral lymph nodes. Though viral infection has low mortality, it has high morbidity leading to massive drop in milk production and reduces reproductive performance of cattle. Recent outbreak of LSD has threatened the Nepalese cattle farmer and rapid practice and implementation of effective prophylactic measures are due essential.

Received 16 September 2020
Accepted 5 October 2020
Published 30 December 2020

Key words:
Cattle, Disease, Emerging, Nepal,

Cite this article: Paudel U (2020) Lumpy Skin Disease (LSD): Recent outbreak and threatening Smallholder Cattle farmer in Nepal Turk Vet J, 2(2):84-86.

Yumrulu Deri Hastalığı (YDH): Son Salgın Nepal'de Küçükbaş Sığır Çiftçisini Tehdit Ediyor

Yumrulu Deri Hastalığı (YDH), esas olarak yüksek ateş, deride sert şişkinlik ve yayılmış dairesel yumru şişkinlikleri ile klinik belirtileri gösteren, her yaşta sığır ve yavrularını etkileyen, ekonomik olarak belirgin ve sınır ötesi (bulaşıcı) viral etkisi olan hastalıktır. YDH enfeksiyonu düşük mortaliteye sahip olmasına rağmen, yüksek morbidite nedeniyle ciddi süt ve fertilite kaybına neden olur. YDH'ın son salgını Nepal'deki sığır yetiştiricilerini tehdit etmiştir ve etkili koruyucu önlemlerin hızlıca denenmesi ve uygulamaya konması gereklidir.

Lumpy skin disease (LSD) is a severe viral disease with narrow vertebrate host range that mainly affects cattle, both *Bos indicus* and *Bos taurus* among which, *Bos taurus* is more susceptible and vulnerable to clinical disease compare to *Bos indicus*, and also, domestic water buffalo (*Bubalus bubalis*) and responsible for devastating economic and production loss and negative impacts in trade (Farah Gumbe, 2018; Mulatu and Feyisa, 2018). As newly emerged transboundary animal disease (TAD), LSD is spread by live and dead cattle and via its products, furthermore, virus is excreted via blood, saliva, semen, nasal and lachrymal secretions, and milk of infected animals (transmissible to suckling calves) that may be sources of infection to other susceptible cattle (Allepuz et al., 2019; Mulatu and Feyisa, 2018). To date, transmission is most likely occurred by blood-sucking arthropod vectors such as stable flies (*Stomoxys calcitrans*), mosquitoes (*Aedes aegypti),* and hard ticks (*Rhipicephalus* and *Amblyomma species)* by intrastadial, transstadial and transovarial transmission however, new evidence suggests that the ubiquitous, synanthropic house fly, *Musca domestica*, also play significant role in LSDV transmission (Sprygin et al., 2019). The disease is caused by Lumpy skin disease virus (LSDV) which is large, complex double-stranded deoxy-ribonucleic acid (ds DNA) virus whose size range from 230-260nm , with 151 kilobase-pair (kbp) genome, and belongs to Capripoxvirus genus of Poxviridae family (Tulman et al., 2001). Morbidity and mortality rate varies widely depending upon health, immune status of the hosts, animal movements, wind and rainfall patterns affecting populations of blood sucking arthropods vectors, where morbidity range from 3-85% with lower mortality rate of 1-3% may exceeds up to 40% (Al-Salihi, 2014; Sprygin et al., 2019). The disease outbreak can be widespread and difficult to control. The first case of LSD was seen in 1929 in Zambia (formerly Northern Rhodesia), and that time, LSD clinical signs were considered to be the consequence either of poisoning or a hypersensitivity to insect bites (Al-Salihi, 2014). With the same clinical signs, the disease further spread into Botswana by 1943 and then into South Africa as panzootic, where it affected over eight million cattle causing serious economic loss (OIE, 2018). In 1957, LSD entered in east Africa in Kenya and spread north into Sudan in

1970 and by 1974 disease had spread west as far as Nigeria and in 1977, disease further reported from other African countries including Mauritania, Mali, Ghana and Liberia (OIE, 2018). Between 1988 and 1989, disease was confirmed for the first time outside African continent in Egypt and Israel and again reported in 2006 (Brenner et al., 2006). Outbreak of LSD has been reported in the Middle Eastern, European and West Asian regions in past decade (OIE, 2018). Currently, disease is endemic in most of the Africa, parts of Middle East and Turkey and by 2015, disease was entered to most of the Balkan countries, the Caucasus and the Russian Federation making risk of an imminent incursion into other unaffected countries very high. By 2019, periodic outbreak of LSD have been reported by most of the member countries of South and East Asia (OIE, 2020a). First case of LSD have been reported in Nepal by July, 2020 (OIE, 2020b) whereas in India (Nepal's closest border) reported in November 2019 (OIE, 2019). Nepal's borders are however, extremely porous, disease surveillance and monitoring are very weak and quarantine facilities are poor: the risk of disease incursion from neighboring countries is correspondingly high.

Livestock farming is an important sub-sector of Nepalese agriculture and cattle holds second highest percentage of livestock population of Nepal (Poudel et al., 2020). It was estimated that national livestock population was 7.37 million cattle, 5.27 million buffalo, 0.8 million sheep, 11.64 million goat and 1.43 million swine in which cattle, buffalo, goat and swine population increased by 2.8%, 12.76%, 37.42% and 37.5% respectively whereas sheep population decreased by 0.27% within decade (MoALD, 2020; Poudel et al., 2020). Around one third of cattle, buffalo, goats, and sheep are in the Terai region whereas over half are in hilly region. In temperate, sub-alpine and alpine regions; transhumant ruminant production is practiced, however extensive ruminant production prevails at lower altitudes of the mid-hills (900 - 1000 m) utilizing the available forage in and around the villages. Semi-intensive ruminant production is found mainly in the low to mid-hills (400 - 900 m) and in peri-urban areas of Nepal (Brief, 2005). Cattle accounts for milk production only, while buffalo accounts for both meat and milk production. Buffalo holds 53.49 % of total meat productivity and 63.95 % of total milk productivity while, cattle holds 36.05 % of total milk production only (Poudel et al., 2020). Cattle farming represents socio-economic and cultural importance to multiple ethnic groups and there are religious taboos and restrictions on slaughtering and consumption of cattle in Nepal.

Rapid growth in animal numbers in the last two decades contributed a significant proportion to output growth, while productivity levels have not significantly increased and to date are below developing countries' average (Brief, 2005). Animal source foods (ASF) provide nutrients which consists of high-quality protein and different types of micronutrients, such as vitamin A, riboflavin, calcium, iron, zinc, and vitamin B-12, which cannot be obtained in adequate quantities from plant sources essential to child growth and development, pregnant and lactating women who have increased nutrition requirement for fetal development and reduced mortalities among young infants, sick and ill people for speedy recovery. Yet, ASF remains infrequently consumed in rural Nepal, and household livestock ownership is directly related to consumption of livestock products including dairy products, and meat (Broaddus-Shea et al., 2020).

Various factors including inadequately trained staff, weak surveillance, poor biosecurity, poor hygiene in quarantine and porous border favors the entrance of various transboundary diseases like FMD (Foot and Mouth Disease), RVF (Rift Valley Fever), CBPP (Contagious Bovine Pleuro Pneumonia), BSE (Bovine Spongiform Encephalopathy), LSD in Nepal through live animals. Harm from LSD has threatened Nepalese smallholder cattle farmer since outbreak began and damage includes economic (loss of output, income and investment) as well as psychological (shock and panic). Presence of disease in one farm creates threat to adjacent farm and someone distant locals. Furthermore, Nepal have no previous experience in managing them. LSD poses greatest immediate threat to Nepalese cattle farmer. Viral existence in harsh environment and weak arthropods controlling mechanism are further favorable factors for intercountry transmission of LSD. Though there is no physical barrier in India-Nepal national parks and conservation areas the introduction of LSD through sylvan route is almost negligible since virus is highly host specific and under natural conditions, lesions of LSD have not been seen on wildlife (Zeynalova et al., 2016). However, liberal in trade and transboundary of goods and people enhance the threat of LSD.

The Government of Nepal has already banned import of livestock and its products from countries infected with LSD. However, there is still not published information regarding current situation, risk and gap analysis, effect of global climate change regarding abundance and distribution of mechanical vector populations which may have direct role in spread of disease. However, LSD preparedness and

control plans are being formulated in Nepal. Immediate action regarding intensive awareness campaign including biosecurity and prophylactic measure to intense cattle farmer in rural and urban areas and to general public is due essential. Illegal entry of cattle through porous border and movement of animals from lower health status to higher health status potentially spread the disease that needs immediate controlled. LSD could devastate cattle production which results reduced food supply, injure rural economics, lowered incomes, disrupt trade relations and also decrease human welfare throughout the country. There is still no uniform and well accepted approach to control LSD throughout the country although availability of live attenuated vaccine (major prophylactic tool) does not provide each individual with solid protection and still not available in Nepal increases the disease risk and loss. That's why, rapid recognition of the disease is essential for its successful control and eradication at farm level in Nepal.

Conflict of Interest

The author declares no conflict of interest.

Data Sharing Statement

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

Ethical Statement

No ethical approval was required as this is a review article with no original research data.

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