Turkish Journal of Agriculture - Food Science and Technology, 9(1): 205-209, 2021
DOI: https://doi.org/10.24925/turjaf.v9i1.205-209.3827

Turkish Journal of Agriculture - Food Science and Technology

Available online, ISSN: 2148-127X | www.agrifoodscience.com | Turkish Science and Technology Publishing (TURSTEP)

Outbreak investigation of lumpy skin disease in dairy farms at Barishal, Bangladesh

Md. Ibrahim Khalil[1,a], Mohammad Ferdous Rahman Sarker[2,b], F. M. Yasir Hasib[3,c,*], Sharmin Chowdhury[3,d]

[1]*Veterinary Surgeon, Upzilla Livestock Office, Barishal Sadar, Bangladesh*
[2]*FETP, B fellow (US CDC), Institute of Epidemiology, Disease Control and Research (IEDCR), Mohakhali, Dhaka, Bangladesh*
[3]*Department of Pathology and Parasitology, Faculty of Veterinary Medicine, Chattogram Veterinary and animal Sciences, Khulshi, Chattogram 4225, Bangladesh*
[*]*Corresponding author*

ARTICLE INFO

Research Article

Received : 20/08/2020
Accepted : 28/09/2020

Keywords:
Cattle
Lumpy skin disease
Morbidity
Barishal
Bangladesh

ABSTRACT

Lumpy skin disease is explained as a significant cattle disease affecting cattle of many parts of the world. An outbreak was experienced in different parts of Bangladesh including Barishal for the first time in the last quarter of 2019. This investigation was carried out to know the outbreak scenario of the disease in southern part of Bangladesh. A total of 726 cattle were included in this study covering 50 dairy farms of Barishal region from September 2019 to December 2019. Morbidity rate was found 21% (CI: 18-24%) and mortality was 1% (CI: 1-2%) in the outbreak area. Young animals (24%) and pregnant animals (70%) were significantly more susceptible compared to aged animals (17%) and non-pregnant animals (15%), respectively. Moreover, male and crossbred cattle were slightly more prone to the infection in comparison to their counterparts. About 45% of the affected animals showed nodular and remaining 55% had edematous lesions. Almost 90% of the affected animals were treated with NSAID followed by antibiotics, antihistaminic, steroid drugs and antiviral drugs where only 20% of the affected animals were treated by authorized veterinary personnel. This was the first epidemiological investigation in the mentioned outbreak area which may serve as a baseline for LSD research in the location needed for developing effective control strategy.

[a] *dr.ibrdvm13@gmail.com* *https://orcid.org/0000-0001-5065-860X*
[b] *ferdous48@yahoo.com* *https://orcid.org/0000-0002-7271-5908*
[c] *fmyhasib@gmail.com* *https://orcid.org/0000-0002-6662-7725*
[d] *sharminchowdhury77@gmail.com* *https://orcid.org/0000-0002-8031-5998*

Introduction

Lumpy skin disease (LSD) is an economic viral disease of cattle caused by lumpy skin disease virus (LSDV) under the family *Poxviridae* (El-khabaz, 2014). LSD shows multiple clinical signs as fever, lameness, lacrimation, pain, nodule in skin, arthritis, enlarged lymph nodes etc. (Ince et al., 2016; Sprygin et al., 2019; Tasioudi et al., 2016) The incubation period in natural outbreaks was estimated to be 1–4 weeks (Alemayehu et al., 2013). Mortality and morbidity of this viral disease was recorded approximately 1-3% and 26-40%, respectively (Tuppurainen, E., Alexandrov, T. & Beltrán-Alcrudo, 2017). The World Organization for Animal Health (OIE) identified LSD as a notifiable disease because of the economic impact (Ahmed and Zaher, 2008; Klement, 2018; Mercier et al., 2018). Skin lesions leave permanent scars and decrease the value of hides and restrictions to the global trade of live animals and animal products (El-Kholy et al., 2008; Molla et al., 2017). There were many factors identified as risk factors for LSD. The disease was found more severe in cows in the peak of lactation and causes a sharp drop in milk yield and young animals show usually more severe clinical signs (Ince et al., 2016; Ince and Türk, 2019). Increasing trend in prevalence of LSD was observed during hot and humid environment as the vector responsible for the infection was found more frequently during the mentioned sweaty condition (Klausner et al., 2017). Female *Aedes aegypti* mosquitoes were observed to transmit LSDV from infected to susceptible cattle in 2–6 days post-feeding in experimentally infected animals (Al-Salihi and Hassan, 2015). Experimentally, stable flies were

able to mechanically transmit capripoxvirus between sheep and live LSDV has been isolated from stable flies after feeding on infected cattle (Chihota et al., 2001). The spread of infection within a region might be compounded by uncontrolled animal movements, communal grazing and nomadism (Rouby and Aboulsoud, 2016; Salib and Osman, 2011). However, transmission did occur when common drinking troughs were used, thus confirming the suspicion that infected saliva might contribute towards the spread of the disease (EFSA, 2015).

LSD infecting mainly African and Asian countries but now identified as a major concern for European nations as cases rising slowly in later mentioned area (Ayelet et al., 2014; Beard, 2016; Zeynalova et al., 2016). In the last quarter of 2019, LSD outbreak happened across Bangladesh for the first time. This study was performed to know the epidemiology of LSD outbreak in southern part of Bangladesh. These findings may form a baseline for further LSD related study in Bangladesh.

Materials and Method

Ethical Approval

No institutional ethical approval was taken as it was a non-invasive observational study rather oral consent from the farm owners was taken.

Study Design and Data Collection

A cross sectional study was conducted on 50 dairy farms in southern (Barishal) region of Bangladesh (Figure 1). Farms having 5 or more cattle were included in this study. All individual animals of the selected farms were identified as sampling unit (N=726). Farms were categorized into small (1-10), medium (11-20) and large (>20) according to their cattle population. Breed (local, crossbreed), age (young, aged), sex (male, female), pregnancy status (pregnant, non-pregnant) along with clinical symptoms related data were collected. If only nodular lesions were observed in naked eye were designated as nodular form of disease; having any other abnormalities including arthritis or swollen brisket were considered as edematous form of disease. All data were collected from the owner's face to face interview. Information on prescribed medicine of the affected animals was collected in this study. Medication was classified as non-steroidal anti-inflammatory drugs (NSAID), antibiotic, antihistaminic, steroidal anti-inflammatory drugs (SAID) and anti-viral drugs. Total 100 prescriptions were analyzed in this study where antibiotics were the main component to watch.

Data Analysis

Data were coded and entered into the excel spreadsheet. Chi square test was performed on StataIC-13 and P value less than or equal 0.05 was considered as significant.

Results

Prevalence of Lumpy Skin Disease

Overall morbidity rate of LSD at animal level in the affected area was found 21% (CI: 18-24%) and mortality rate was 1% (CI: 1-2%) during the outbreak. In case of signs observed during the outbreak, nodular lesions observed in 45% of the cases where remaining 55% showed edematous sign in skin (Figure 2)

Risk Factors Associated with The Disease Occurrence

Several factors such as farm size, age, sex, breed and pregnancy were taken into consideration in the risk factor analysis (Table 1). Age and pregnancy showed significant ($P \leq 0.05$) association with disease occurrence. Twenty four percent of the young animals were affected with LSD compared to 17% of the aged animals. Pregnant animals were significantly ($P<0.001$) more susceptible (70%) than the non-pregnant animals (15%). On the other hand, farm size, sex and breed showed no statistically significant relationship with disease occurrence in χ^2 test. Although analysis showed large sized farms, male animals and crossbreed animals were affected in greater percentage than their counterparts (Table 1).

Figure 1. Location of study area inside Bangladesh. Barishal located inside Bangladesh along the coastal belt

Treatment Practice

NSAID drugs were used in 90% of the cases followed by antibiotics (80%), antihistaminic (65%), steroids (30%) and antiviral drugs (10%) in the outbreak area of this study. This study showed that nearly 90% of the case animals were treated with NSAID drugs that mainly included ketoprofen (45%), paracetamol (25%), meloxicam (20%) and flunixin (10%) (Figure 3). Among 80% animals treated with antibiotics frequently used drugs were ceftriaxone (35%), ceftiofur sodium (25%), streptopenicillin (20%), amoxicillin (10%), oxytetracycline (5%) and gentamycin (5%) (Figure 3). Antihistaminic drugs used 65% of the cases where pheniramine maleate, chlorpheniramine maleate and diphenhydramine were used 60%, 30% and 10% of cases, respectively (Figure 3). Steroidal drugs also used for 30% of the affected animals. Dexamethasone and combination of dexamethasone and prednisolone used 70% and 30% of cases, respectively (Figure 3). Antiviral drugs used 10% of the cases namely acyclovir. On the other hand, in 80% of the cases there was no registered veterinarians prescription rather medication used through communicating with non-authorized personnel.

A B

Figure 2. Lesions observed in naked eye was considered as nodular (A) or edematous form (B) of lumpy skin disease (arrow mark)

Table 1. Association of different categorical variables with the occurrence of LSD in cattle of southern part of Bangladesh tested by Chi square test (χ^2 test)

Variables	Category	Observation	Positive (%)	P value
Farm size	Small (1-10)	119	22 (18.49)	0.23
	Medium (11-20)	433	76 (17.55)	
	Large (>20)	174	41 (23.56)	
Age	Young (≤12 Months)	160	39 (24.38)	0.05*
	Adult (>12 months)	566	100 (17.67)	
Sex	Female	640	120 (18.75)	0.45
	Male	86	19 (22.09)	
Breed	Local	149	27 (18.12)	0.72
	Cross	577	112 (19.41)	
Pregnancy	Pregnant	31	22 (70.97)	<0.001*
	Non-pregnant	695	108 (15.54)	

*Significant (P≤0.05)

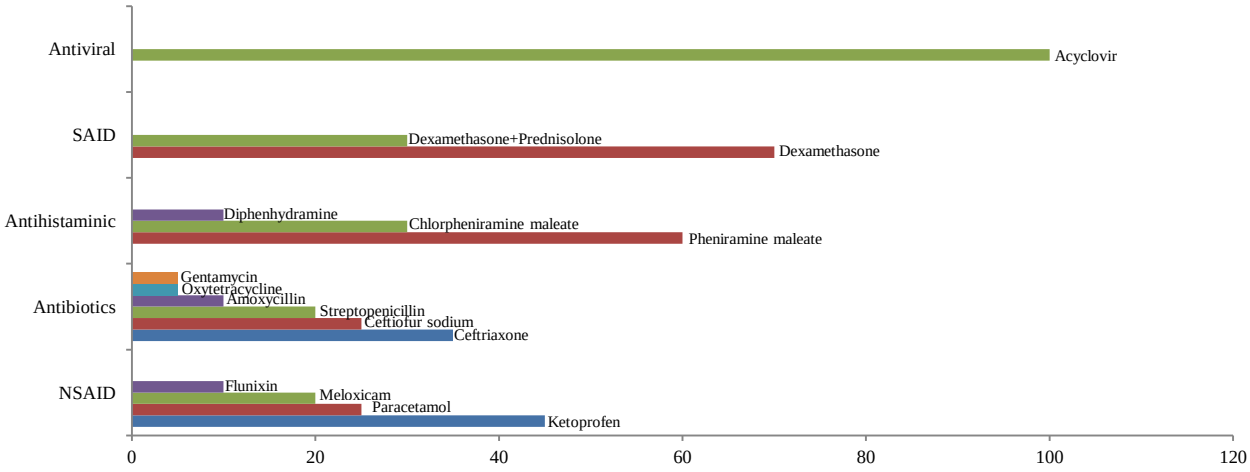

Figure 3. Frequency of medicines used during the outbreak in southern part of Bangladesh

Discussion

In this study we investigated the first outbreak of LSD in southern part of Bangladesh. 50 dairy farms were taken under investigation where 21% morbidity and 1% mortality was recorded. According to the Department of Livestock Services (DLS) of Bangladesh there was an unknown cattle disease spread throughout the regional cattle population with homologous clinical manifestation of LSD in mid-2019 was confirmed by real-time PCR technique as LSD (DLS, 2019). This was the very first time LSD was detected in Bangladesh, a south-east Asian country having around 242 million cattle. Along with Bangladesh, two more Asian countries (India and China) reported the first outbreak during mid-2019 (DLS, 2019). As Bangladesh and China shares a major proportion of border with India, three countries might have contributed spreading the disease to each other. Moreover, Bangladesh is situated in tropical region of the world where the environment is best fitted for different vectors needed for LSD transmission.

The morbidity and mortality observed by the present study is analogous with previous findings of different countries (Al-Salihi and Hassan, 2015; Body et al., 2012; Kasem et al., 2018). Furthermore, this study revealed effect of some risk factors on the outbreak which has been proved earlier in different regions. Higher attack rate (23%) among the large farms was recorded compared to medium and small scale farms (17-18%). A previous study observed higher morbidity and mortality rate in intensive breeding farms than small scale farms and was described as the effect of difference in management system (Kasem et al., 2018). However, in the present study the association was not statistically significant (P value=0.23) and therefore it can be concluded that all animals of the study area regardless of size of the farm were exposed to the infection equally. Young animals were more susceptible than the aged animals having similarity with the finding of Ahmed and Kawther (2008); yet disagrees with finding of Kasem et al. (2018). Male animals were more prone to LSD according to this study although contradicts with findings of Salib and Osman (2011). Since the effect of sex on the occurrence of disease was not statistically significant (P value=0.45) in this study, caution should be taken in concluding this relationship. Cattle population of Bangladesh is mainly local zebu cattle and crossbred Holstein Friesian or Sahiwal cattle due to her cattle breeding policy. However, no statistically significant (P value=0.72) variation of LSD infection observed in crossbred animals compared to local cattle breed. This finding is concordant with the observation of previous study (Tageldin et al., 2014). Higher morbidity rate of LSD infection in pregnant animals was observed with high significance level (P value<0.001). Stress of pregnancy and compromised immunity during this period might explain this phenomenon.

Prescribed medicine in the outbreak area was investigated in the preset study and it showed that almost 80% of the cases were treated with antibiotics although LSD is a viral disease. The morbidity rate of the study indicates that LSD might become one of the major diseases of cattle in Bangladesh. Therefore, it is necessary to have specific knowledge on effective preventive and treatment strategies. The risk factors identified in the present study might facilitate prevention in future. On the other hand to control an outbreak, a medication guideline might be the ultimate tool for vets and farmers. Use of high percent of antibiotics might be because sometime veterinary doctors choose antibiotics to prevent secondary bacterial infection. However, this practice has serious disadvantages like antimicrobial resistance of environmental pathogens and commensal microbes. It was observed that a remarkable percent of LSD affected patients were treated by the non-authorized person such as quack or pharmacy owners might be because proper law enforcement is not usually in place and lack of awareness. The percent of antibiotic use was higher in those cases which needed a strict control measure to check further public health hazard. However, this study did not follow the cases after treatment to compare the effect of medication therefore conclusion cannot be drown. A national treatment guideline and vaccination strategy to control LSD is highly recommended to prevent further outbreaks. Besides, vaccination with local viral isolates might be needed for effective control of LSD in Bangladesh.

References

Ahmed WM, Zaher KS. 2008. Observations on lumpy skin disease in local Egyptian cows with emphasis on its impact on ovarian function. African J. Microbiol. Res. 2, 252–257.

Al-Salihi KA, Hassan IQ. 2015. Lumpy Skin Disease in Iraq: Study of the Disease Emergence. Transbound. Emerg. Dis. 62, 457–462.

Alemayehu G, Zewde G, Admassu B. 2013. Risk assessments of lumpy skin diseases in Borena bull market chain and its implication for livelihoods and international trade. Trop. Anim. Health Prod. 45, 1153–1159.

Ayelet G, Haftu R, Jemberie S, Belay A, Gelaye E, Sibhat B, Skjerve E, Asmare K. 2014. Lumpy skin disease in cattle in central Ethiopia: outbreak investigation and isolation and molecular detection of the virus, Rev. sci. tech. Off. int. Epiz.

Beard PM. 2016. Lumpy skin disease: A direct threat to Europe. Vet. Rec.

Body M, Singh PK, Hussain HM, Al-rawahi A, Al-maawali M, Al-lamki K, Al-habsy S. 2012. Clinico-histopathological findings and PCR based diagnosis of lumpy skin disease in the Sultanate of Oman. Pak. Vet. J. 32, 206–210.

Chihota CM, Rennie LF, Kitching RP, Mellor PS. 2001. Mechanical transmission of lumpy skin disease virus by Aedes. Epidemiol. Infect. 126, 317–321.

DLS, 2019. Situation Report: Lumpy skin disease in Bangladesh.

EFSA, 2015. Scientific Opinion on lumpy skin disease. EFSA J. 13, 3986.

El-khabaz KAS. 2014. Rapid Laboratory Diagnosis of Lumpy Skin Disease By Using Pcr Technique. Assiut Vet. Med. J. 60, 37–41.

El-Kholy AA, Soliman HMT, Abdelrahman KA. 2008. Polymerase chain reaction for rapid diagnosis of a recent lumpy skin disease virus incursion to Egypt. Arab J. Biotechnol. 11, 293–302.

Ince ÖB, Çakir S, Dereli MA. 2016. Risk analysis of lumpy skin disease in Turkey. Indian J. Anim. Res. 50, 1013–1017.

Ince OB, Türk T. 2019. Analyzing risk factors for lumpy skin disease by a geographic information system (GIS) in Turkey. J. Hell. Vet. Med. Soc. 70, 1797–1804.

Kasem S, Saleh M, Qasim I, Hashim O, Alkarar A, Abu-Obeida A, Gaafer A, Hussien R, AL-Sahaf A, Al-Doweriej A, Bayoumi F, Hodhood A, Abdelatif M. 2018. Outbreak investigation and molecular diagnosis of Lumpy skin disease among livestock in Saudi Arabia 2016. Transbound. Emerg. Dis. 65, e494–e500.

Klausner Z, Fattal E, Klement E. 2017. Using Synoptic Systems' Typical Wind Trajectories for the Analysis of Potential Atmospheric Long-Distance Dispersal of Lumpy Skin Disease Virus. Transbound. Emerg. Dis. 64, 398–410.

Klement E. 2018. Economic impact of lumpy skin disease. In: Lumpy Skin Disease. Springer International Publishing, pp. 7–9.

Mercier A, Arsevska E, Bournez L, Bronner A, Calavas D, Cauchard J, Falala S, Caufour P, Tisseuil C, Lefrançois T, Lancelot R. 2018. Spread rate of lumpy skin disease in the Balkans, 2015–2016. Transbound. Emerg. Dis. 65, 240–243.

Molla W, Jong D, Gari G, Frankena K. 2017. Economic impact of lumpy skin disease and cost effectiveness of vaccination for the control of outbreaks in Ethiopia. Prev. Vet. Med. 147, 100–107.

Rouby S, Aboulsoud E. 2016. Evidence of intrauterine transmission of lumpy skin disease virus. Vet. J. 209, 193–195.

Salib FA, Osman AH. 2011. Incidence of lumpy skin disease among Egyptian cattle in Giza Governorate, Egypt. Vet. World 4, 162–167.

Sprygin A, Pestova Y, Wallace DB, Tuppurainen E, Kononov AV. 2019. Transmission of lumpy skin disease virus: A short review. Virus Res.

Tageldin MH, Wallace DB, Gerdes GH, Putterill JF, Greyling RR, Phosiwa MN, Al Busaidy RM, Al Ismaaily SI. 2014. Lumpy skin disease of cattle: An emerging problem in the Sultanate of Oman. Trop. Anim. Health Prod. 46, 241–246.

Tasioudi KE, Antoniou SE, Iliadou P, Sachpatzidis A, Plevraki E, Agianniotaki EI, Fouki C, Mangana-Vougiouka O, Chondrokouki E, Dile C. 2016. Emergence of Lumpy Skin Disease in Greece, 2015. Transbound. Emerg. Dis. 63, 260–265.

Tuppurainen E, Alexandrov T, Beltrán-Alcrudo, D., 2017. Lumpy skin disease – A manual for veterinarians [WWW Document]. Food Agric. Organ.

Zeynalova S, Asadov K, Guliyev F, Vatani M, Aliyev V. 2016. Epizootology and Molecular Diagnosis of Lumpy Skin Disease among Livestock in Azerbaijan. Front. Microbiol. 7, 1022.