



Research Paper

Prevalence of Lumpy Skin Disease in Cattle of Samawah City, Iraq

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ABSTRACT: This paper reports an outbreak of cattle lumpy skin disease (LSD) at Al-Mahdi and Abu-Chwailana villages of Samawah city, Iraq for the first time. Clinicopathological examination of 247 native and crossbred Friesian cattle was conducted in these two villages from May 2014 to June 2014. The examination revealed the prevalence of lumpy skin disease (LSD) in 8% (22/247) but, there was no mortality occurred. Cattle from Al-Mahdi village revealed an infection rate of LSD 8.2% (10/122) while in Abu-Chwailana village 9.6% (12/125) animals had LSD, but the difference in infection rates in both villages was not significant. The effect of age, sex, host cattle breed, and regions on the prevalence of LSD in cattle showed no significant association ($P > 0.05$). Clinically, in the early days of infection, fever occurred and reached 41°C, and the animal showed depression, anorexia, and nasal discharge. Grossly, the disease displayed widespread of round cutaneous nodules ranged from 1-5 cm in diameter over the entire body. The nodular lesions also were seen on the skin of the udder, muzzle and nares, and oral and nasal mucosa. This lesion was frequently associated with marked swelling of superficial lymph nodes. The cutaneous nodules subsequently developed to sit-fasts. Microscopically, the affected skin exposed hydropic degeneration of stratum spinosum and development of eosinophilic inclusion bodies in the cellular cytoplasm. The clinical signs, gross and the microscopic lesions were major diagnostic features that were confirmed by identification of the virus by polymerase chain reaction (PCR) that conducted in the Central Veterinary Laboratories, Baghdad. Long-acting oxytetracycline, antipyretic and rehydration with fluids were effective in saving the life of sick animals.

Keywords: Cattle lumpy skin disease; Samawah city; Iraq

I. INTRODUCTION

Bovine LSD is a serious contagious viral disease caused by Lumpy skin disease virus (LSDV), which belongs to the parapoxvirus genus of capripoxivirus. LSDV causes high morbidity and low mortality rate, decrease in milk production, emaciation, and abortion (Woods, 1988; Salib and Osman, 2011).

LSD is characterized by the appearance of nodules 1 to 7 cm in diameter that occur anywhere on the body of the infected animals; including skin, the digestive, and respiratory systems (Ayre-Smith 1960; Tuppurainen and Oura, 2012). LSD causes significant economic losses by high morbidity rate, poor growth, reduce weight gain, fall in yield of milk, damage to skin, sterility in bulls, and infrequent mortality (Tuppurainen and Oura, 2012).

Over the past few years LSD spread in several African Countries (Morris, 1930; Davies, 1991) and then LSD transferred to Kuwait in 1986-88 (Anonymous, 1988), Egypt in 1988 (Salem, 1989), and then, it affects Asiatic countries; Lebanon, Jordan and Turkey in 2012 and 2013.

In the last part of 2013, LSD spreads in sporadic cases in Baghdad, Ninawa of Iraq (ProMed20131128.2079065) (Fig.1). LSD also has been observed in Iraq's Kurdistan region in 2013 (ProMed20141242228577). Afterward, cattle LSD has been documented in middle and southern provinces of Iraq in the summer month 2014. The disease was diagnosed on the foundation of clinical signs, epidemiological, histopathological features, and by the polymerase chain reaction (PCR) (Al-Salihi and Hassan, 2015; Mansour and Naser 2016; Minnatet al., 2016).

The present study was planned to record the prevalence of the first outbreak of bovine LSD in cattle from Samawah city (Al-Mahdi and Abu-Chwailana villages), and to study the distributions of the disease in the two villages and to examine the effect of sex, cattle breed and age on the LSD prevalence.

II. MATERIALS AND METHODS

The study was conducted from May 2014 to June 2014 in Al-Mahdi and Abu-Chwailana villages that located in western parts of Samawah city, the capital of AL-Muthanna provinces, which is positioned along the western border of the Iraq with the Saudi Arabia (Fig.1). During LSD outbreak, a total of 247 cattle were examined in Al-Mahdi (122 cattle) and Abu-Chwailana (125 cattle) villages. The cattle breeds were indigenous and crossbreeds of Friesian (Table 1). Their sex and age were recorded too. After proper animals restraining, these cattle were examined clinically to detect body temperature and, identified the statuses of superficial lymph nodes. The skin surfaces of the whole body parts of the 247 cattle were examined for the presence of nodular lesions with the use of close visual inspection and skin palpation.

Skin biopsies were collected 10% formalin for 24-48 hours for histopathology and brought to the Department of pathology in College of Veterinary Medicine of Muthanna University, Iraq. Subsequently, the fixed specimens were dehydrated in a series of ethanol solutions of increasing grades (from 70% to 100%). Following the dehydration, the specimens were cleared in two changes of xylene and then embedded in two changes of molten paraffin wax. At last, wax block of specimen sectioned (4-6 micron), and stained with hematoxylin and eosin (H&E).

III. STATISTICAL ANALYSIS

LSD prevalence was calculated according to the proportion of the infection rates of cattle. Chi-square (χ^2) test was used by Microsoft Excel to compare the prevalence of the infection in both sexes, different ages and villages. When a P value was less than or equal to 0.05 at 95% confidence interval ($P \leq 0.05$), differences were considered statistically significant.

IV. RESULTS

Clinical examination of 122 cattle in Al-Mahdi and 125 in Abu-Chwailana villages revealed infection rates of LSD 8.2% and 9.6% respectively. There was no statistically significant difference ($P > 0.05$) in the prevalence of LSDV infection between the two villages. The overall prevalence of LSD in cattle of Samawah city was 8% and is presented in Table 2. Statistical test showed no significant difference ($P > 0.05$) of LSD among cattle of different age groups. However, the highest prevalence (12.8%) and (11.6%) in the cattle of >3 years age group in Al-Mahdi and Abu-Chwailana villages respectively (Table 3). Similarly, Table 3 shows no significant ($P > 0.05$) difference in the prevalence of LSD between female and males or between crossbreed Friesian and native cattle in both villages.

Clinically, the infected animals revealed presence of a large number of nodular eruptions on the entire parts of the body (Fig.2-8); multiple nodules in different stages were seen on the skin of the muzzle, nares, oral mucosa, teats and mammary glands, scrotum, perineum, tail, and legs. Some nodules suffered necrosis, sloughing, or leaving open sores (sit-fasts). Some nodules were painful and hyperemic. LSDV caused severe sickness in cattle characterized by depression, anorexia, pyrexia of 40 to 41.5 °C, lymphadenopathy (Fig.5), excessive salivation, oculonasal discharge, and emaciation were also noticed. All ages of cattle were affected, but young animals were less sensitive to LSD. Animals' owners complain of decrease milk production.

Microscopically, sections from lumpy skin showed cellular swelling, cytoplasmic vacuolation of the stratum spinosum of the epidermis, ballooning degeneration, some nuclei of the stratum spinosum underwent nuclear changes (pyknosis and karyorrhexis). Both dermal and epidermal layers were infiltrated with lymphocytes and macrophages, which some of them contain intracytoplasmic inclusion bodies. Complicated cases showed infiltration of a large number of neutrophils.

V. DISCUSSION

In Iraq, bovine LSD was first observed in the north part of the country (Ninawa) and then it started in Kurdistan region and Baghdad in the last part of 2013 and 2014. The disease was confirmed by Iraq's Veterinary Services to the OIE (ProMed20131128.2079065) and (ProMed20140124.2228577). In summer months of 2014, bovine LSD has spread to almost all the middle and southern provinces of Iraq. For the instant, the disease was reported and diagnosed in AL-Qadisiya province (Al-Salihi and Hassan, 2015; Mansour and Naser 2016).

In Diyala province, an outbreak of LSD in cattle between 2014-2015. The clinical, PCR, haematological, epidemiological, histopathological aspects of the infection in 150 cattle from different sites were described but the prevalence of the disease was not determined. The report sorted the severity of the infection based on the clinical status into the mild or severe form based on age, sex and breed. (Minnat *et al.*, 2016).

This work reported the occurrence of bovine LSD in Samawah city for the first time based on the clinical, and histopathologicalevaluation. In addition, "The Veterinary Hospital of Samawah"collected skin and blood specimens from infected animals from different regions of Samawah city and sent them to Iraq's Veterinary Services in Baghdad. Andthen, LSD was confirmed by polymerase chain reaction (PCR) and histopathology. The incursions of bovine LSDV in the middle and southern provinces of Iraq was due to relaxation of quarantine program and illegal cattle movements during the course of wars in Iraq.

In this study, LSD was prevalent in both surveyed villages with infection rate at 8.9 % but there was no mortality. This morbidity rate was correlated with that reported in Iraq 9.11%but, it was higher than the morbidity rate in Kenya (1-2%) reported by Ayre- Smith, (1960) and lower than the rate of infections reported in Iran 17.9% (Sameeaet al.,2016), and in Egyptian cattle as30.8%reported by Ali *et al.*(1990) and 22% to 65.4% by Elhaiget al.(2017). However, the morbidity rate for LSD ranges from 5 to45 percent and it approached 90% in Sudan (Ali and Obeid, 1977).

In the current study, there were no significant differences in LSD prevalence among the cattle regarding to age and sex and breed and these findings was consistent with those of Elhaiget al.(2017) and (Tuppurainen&Oura 2012; Ayeletet al., 2014; Sameeaet al.,2016), but inconsistent with findings of Gariet al. (2010) who indicated that males displayed a higher vulnerability to LSD than females and related that to the great stress from heavy work.In the present study, the sensitivity of both cattle breeds to LSD in Samawah villages showed no significant variation. This finding was inconsistent with the finding of Salib and Osman (2011), who found native cattle was less susceptibility to LSD than Friesian cattle. This difference can be explained that pure Friesian breed cattle became very rare in Samawah city and replaced by the crossbreed cattle (Friesian with native ones)because the artificial insemination in Iraq has been faced many challenges due to the course of wars.

Clinical signs of pyrexia, anorexia, depression and lymphadenopathy with gross development of nodular lesions on the entire animal body especially in the skin of the muzzle, nares, back, legs, scrotum, perineum. In the current study,skin nodules with subsequent sit-fasts were observed (Fig.3). These findings were consistent with LSDV infection encountered in previous works (Ali *et al* 1990; Minnatet al.,2016). These lesions besides the nodular affection of digestive tract and respiratory system, leading to animal weakness and affecting production seriously (Ayre-Smith 1960).In conclusion, the present study identifies LSDto be the major causes of decreased of animal production to small farmers anddamages of and down the grade of hidesto the exporter.

VI. TREATMENT AND CONTROL

There is no particular anti-LSDV treatment existing for cattle infected LSD. However, farmers were advised to confine the infected cattle in a separate space from the herd to prevent sick animals to get a secondary infection and to prevent LSD spreading via insects. Nodular lesions especially those complicated ulcers were dressed withoxytetracycline spray to prevent secondary infections. Systematic oxytetracyclinewas administered as IM injection in a dose rate of 1 ml/10kg body weight to prevent secondary bacterial complication of the skin, gastrointestinal and pulmonary tract lesions that may be fatal. Also, the farmers asked to offer food and water readily. Declofenic sodium injection was used as antipyretic in a dose of 12 ml IM injection per animal daily repeated till fever go back.Movementcattle toother provinces duringLSD outbreak wasbanned. Vaccinationcampaign was applied.

VII. TABLES

Table 1. Distribution of examined cattle according to breed and sex in Al-Mahdiand Abu-Chwailana village at Samawah city, Iraq.

Name of village	Examined cattle						
	Cattle No.	Native cattle			Crossbreed Friesian		
		M	F	total	M	F	Total
Al-Mahdi	122	6	28	34	23	65	88
Abu-Chwailana	125	7	21	28	34	63	97
total	247	13	49	62	57	128	185

Table 2. Prevalence of LSD in cattle according to the surveyed villages at Samawah city, Iraq.

Name of village	No. of examined Cattle	No. Infected cattle	Prevalence
Al-Mahdi	122	10	8.2
Abu-Chwailana	125	12	9.6
Total	247	22	8.0

Table 3. Prevalence of LSD in cattle according to the age, breed, and sexes of cattle in both villages.

Village1	Number of Examined animals	No. of infected animals	(%)	chi sq stat.	df.	P value (0.05)
<1	26	2	7.7			
2 to 3	57	3	5.3			
>3	39	5	12.8	1.271	2	5.991
Native	34	2	5.9			
Crossbreed	88	8	9.1	0.193	1	3.841
Male	29	2	6.9			
Female	93	8	8.6	0.667	1	3.841
Overall	122	10	8.2			
<1	21	2	9.5			
2 to 3	61	5	8.2			
>3	43	5	11.6	1.564	2	5.991
Native	28	3	10.7			
Crossbreed	97	9	9.3	2.058	1	3.841
Male	41	4	9.8			
Female	84	8	9.5	0.514	1	3.841
Overall	125	12	9.6			
Total	247	22	8.9			

Figures



Fig.1LSDV infections in cattle reported in Ninawa (at the north) and then in Baghdad(at the middle) during 2014.



Figure 2.Itshows crossbreed cow with skin nodules covered the forelimb and abdomen.

Figure 3. Iraqi crossbreed Friesian cow infected with LSD lesion. Skin nodules covered the entire body.



Figure 4. Iraqi cow affected with LSD lesion. Skin nodules covered the neck and head

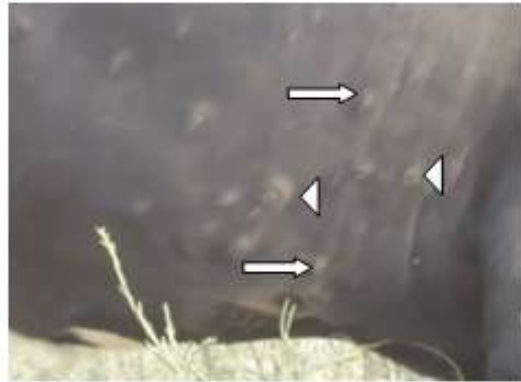


Figure 5; a cow affected with LSD. Note various sized nodules (arrow) and the open sores, Sitfasts (arrow head).



Figure 6. Iraqi cow affected with LSD Skin lumps covered the neck and limbs.



Figure 7;a cow affected with LSD. Theperiscapular lymph node is swollen



Figure 8. Iraqi cow with LS Skin lumps covered the udder

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