



Clinical and serological study of Lumpy skin disease in cattle in Basrah Provence

Ali B. Aldeewan¹, Rahman Kadhum Muhsen²

¹Department of veterinary public health, ²Department of veterinary internal medicine
College of veterinary medicine – University of Basrah

alialdeewan1965@gmail.com

rahmankadhum67@gmail.com

Received date:15 May2019 Accepted:(455) 17 June 2019 page (99-104) Published:30 Juny2019

Summary

This study was conducted in Basrah at period from August 2018 till February 2019. Six hindered (600) blood samples were collected from different fields of cattle suspected infected with LSD according to the clinical examination at Al Mudaina and Al Qurnah town, north of Basrah province to detect the antibodies against LSD (550 females, 50 males, 200 calves less than one year old, and 400 cows aged more than one year). The result revealed that, the overall prevalence of LSD in cattle was 18.66% (112 out of 600), the prevalence of disease in calves was 30% (60 out of 200) ;While in cow was 13% (52 out of 400), and there was significant differences in the prevalence of LSD between calves and cows ($P < 0.05$). The prevalence of LSD in female was 16.3% (90 out of 550), while in male was 44% (22 out of 50), and there was significant differences in prevalence of LSD between males and females. The clinical study revealed that LSD was found in three clinical forms include nodular dermatitis observed in 104 cases (92.8%), arthritis in 20 cases (17.8%) and lymphadenopathy in 3 cases (2.5%).

Key word: Contagious, Lumpy skin, disease, viral, necrotic, ELISA, cutaneous, Arthritis and lymphadenopathy

دراسة سريرية ومصلية لمرض التهاب الجلد العقدي في الإبقار في البصرة

علي بلبول الديوان¹ , رحمن كاظم محسن²

¹ فرع الصحة العامة , ² فرع الطب الباطني

كلية الطب البيطري – جامعة البصرة

الخلاصة:

أجريت هذه الدراسة في البصرة للفترة من اب 2018 ولغاية شباط 2019 حيث جمع 600 نموذج دم من حقول مختلفة يشتبه انها مصابة بمرض التهاب الجلد العقدي اعتمادا على الاعراض السريرية في قضائي القرنة والمدينة شمال محافظة البصرة للتحري عن وجود الاجسام المضادة لمرض التهاب الجلد العقدي وكان توزيع النماذج كالاتي (550 نموذج من الاناث و 50 نموذج من الذكور وكذلك 200 نموذج كانت من العجول الصغيرة بعمر اقل من سنة و 400 نموذج من الإبقار البالغة بعمر اكثر من سنة) . أظهرت النتائج ان النسبة الكلية لانتشار مرض التهاب الجلد العقدي كانت 18.66% (112 / 600) وكانت نسبة الاصابة بالعجول 30% (60 / 200) وهي اعلى معنويا من نسبة الاصابة في الإبقار البالغة 13% (52 / 400) ($p < 0.05$) وكانت نسبة الاصابة في الاناث 16.3% (90 / 550) وهي اعلى معنويا ($p < 0.05$) من نسبة الاصابة في الذكور حيث كانت 44% (22 من 50) . أظهرت نتائج الدراسة السريرية ان مرض التهاب الجلد العقدي يكون على ثلاث اشكال سريرية اهمها التهاب الجلد العقدي حيث سجل في 104 حالة سريرية (92.8%) ثم التهاب المفاصل وسجل في 20 حالة سريرية (17.8%) واخيرا الشكل اللمفاوي حيث سجل في ثلاثة حالات (2.5%)

Introduction:

Lumpy skin disease (LSD) is a contagious and an acute or sub-acute infectious viral disease of livestock. The disease is caused by the LSD virus (LSDV) belongs to the Capripoxvirus of the Poxviridae family [1, 2]. The disease manifests a large variation of clinical pictures include fever, edema, lameness, and skin nodules covering most parts of infected animal body [1, 2]. In most of advance cases, skin nodules may be erupted resulted changing appearance of skin and mucous membranes following inflammatory necrotic lesions that are susceptible to bacterial infection and myiasis [3].

Notably, LSD is responsible for a significant economic burden due to reducing milk production, animal welfare, abortion or stillbirth, and may be infertility [4]. The incubation period of infection ranges between 6 to 10 days in an experimental infection [5] while in natural infection takes between 2 to 4 weeks [6]. Transmission of LSD is believed to be associated with arthropod vectors such as *Aedes aegypti* and stable fly [7]. The LSD mostly occurs in tropical zones where it has been frequently documented in Africa, the Middle East, and Central Asia [8]. The disease was also reported in Cyprus, Greece, and the Russian Federation [9-14]. However, the potential risk factors contribute to LSDV distribution are due to presence of vectors and legal or illegal trades of animals. According to OIE, LSD is a very notifiable viral disease in cattle has an adverse impact on economic animal values [15].

The Laboratory procedures of LSD are very necessary to be performed in order to differentiation from other skin diseases in the cattle. Laboratory diagnosis of LSD can be performed using serological and molecular techniques and by virus

isolation in cell cultures [16]. A virus neutralization test (VNT) and ELISA are broadly recommended tests for detection LSD, with sensitivity 96% and specificity 100% and 95%, respectively [17]. Therefore, the object of this study aimed to investigate the prevalence of LSD in suspected cattle with LSD in Basrah.

Material and methods:**Sample collection**

This study was conducted in Al Mudaina and Al Qurnah town, northern of Basrah Governorate southern of Iraq. The blood samples were collected using plan tube from suspected 600 cattle (550 female and 50 male as 200 calves less than one year old, and 400 cows aged more than one year) from different fields of 2 -10 animals per field. The samples were sending to laboratory of Internal Medicine department, Faculty of Veterinary Medicine, Basrah University, as soon as possible to detect the levels of antibodies against the virus using ELISA. Clinical signs were fever, skin nodules with round shape, rising above the skin, on the skin of the head, neck, udder, genitalia, perineum, and limbs.

Commercial ELISA kit

A commercial ELISA kit was used to detect specific antibodies against LSDV, are Capripox Double Antigen Multi-species was manufactured by,, IDvet, (France). ELISA technique was carried out according to manufacturer's instruction.

Result

The result revealed that the prevalence of lumpy skin disease in cattle estimated of 18.66 % (112 out of 600) (Table1). The study was also reported that the prevalence of lumpy skin disease in calves was 30% (60 out of 200) which was significantly ($P < 0.05$) higher than that reported in adult cows which was 18% (52 out of 400) (Table 2, Fig1). On another hand the result revealed that disease in female was 16.3

% (90 out of 550) which was significantly ($P < 0.05$) lower than that reported in male 44% (22 out of 50) (Table 3, Fig.2). The clinical study revealed that LSD was found in three

clinical forms include nodular dermatitis observed in 104 cases (89%), arthritis in 20 cases (17.8%) and lymphadenopathy in 3 cases (2.5%) (Table4, Fig.3).

Table 1: Prevalence of lumpy skin disease

Number	Positive	%
600	112	18.66

Table 2: Prevalence of LSD according to age group

Age group	Number	Positive	Percentage%
Adult cow	400	52	18
Calves	200	60	30
Total	600	112	18.66

Chi square=25.381 $p < 0.0$

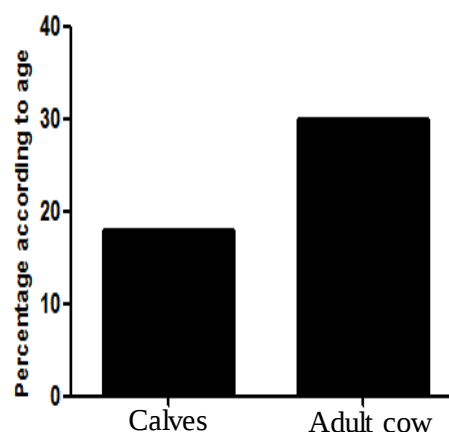


Figure2: Percentage of LSD according to age

Table 3: Prevalence of LSD according to gender

Gender	Number	Positive	Percentage%
Female	550	90	16.3
Male	50	22	44
Total	600	112	18.66

Chi square=23.057 $P < 0.05$

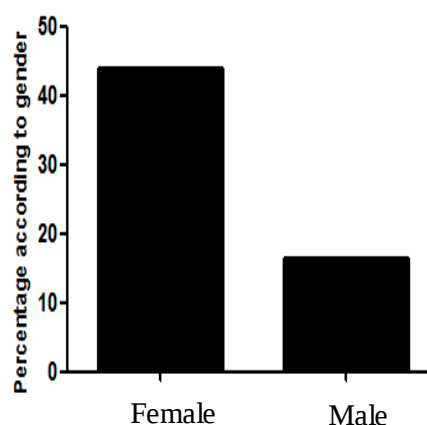


Figure2: Percentage of LSD according to gender

Table 4: Clinical forms of lumpy skin disease in cattle

Clinical form	Number	Percentage%
Cutaneous	104	92.8
Arthritis	20	17.8
Lymphadenopathy	3	2.5

*15 cases (13.3%) appear multiple, cutaneous and arthritis forms

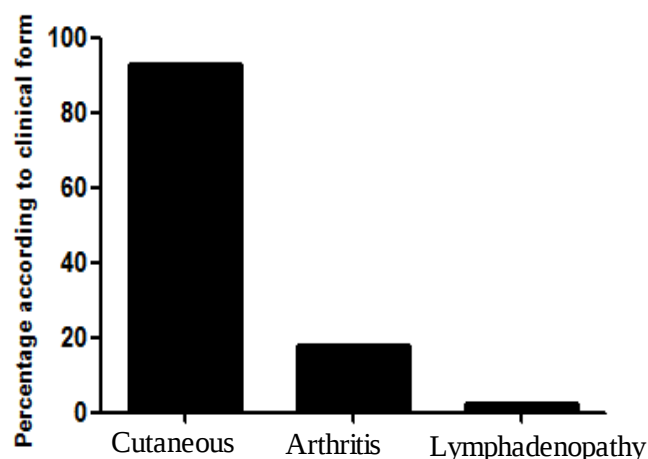


Figure3: Percentage of clinical forms of lumpy skin disease

Discussion

The role of antibodies has been demonstrated in several studies, where animals did not have detectable level of antibodies in their sera, but were resistant to challenge [18, 19, and 20], it is very important to improve diagnostics of LSD by available commercial assays like ELISA. In this study, clinical pictures combined with laboratory test (ELISA) used for confirming identification of LSD occurrence. Our result revealed that; the prevalence of lumpy skin disease in cattle was 18.66 % (112 out of 600) which higher than those which reported by [5, 6, 21] in South Africa and [1] in Kenya which were 10 and 12 % respectively, in 25 clinically infected, 9 fevered and 21 in contact cows. Antibodies against LSDV were detected by ELISA in 56% of clinically infected cows and in one (11,11%) fevered cow. None of in contact cows had antibodies against LSDV [22]. Another significant finding, the LSD in the cattle (females) was estimated at 16.3 % which was lower than that estimated in the cattle males 44%. This finding can be only explained by the

low number of males included in this study [23]. The study also revealed that there was three clinical form of lumpy skin disease, which was cutaneous form 92% (104 out of 112), Arthritis form 17.8% (20 out of 112), and lymphadenopathy 2.6% (3 out of 112). It should be noted that 15 clinical cases (13.3%) appear cutaneous and arthritis forms at the same time. This study however requires additional testing regardless of the fact that effectors of cellular immune response have the dominant role in the development of immune reactivity against LSD, where the antibodies appear 10-14 days after the onset of the disease. It is important to continue comparative testing of infected cattle sera by VNT, and polymerase chain reaction assay (PCR) and by virus isolation.

References:

1. Davies, F.G. (1991). Lumpy skin disease of cattle: a growing problem in Africa and the Near East. *World Anim. Rev.* 68, 37–42.

2. O.I.E. (2010). Manual of Diagnostic Tests and Vaccines for Terrestrial Animals.
3. Hawsar YA, Heshu SR, Hiewa OD and Hemn HO (2016): Lumpy Skin Disease. Reproductive Immunol Open Acc, 1, 4:25
4. O.I.E. (2004). Manual of diagnostic tests and vaccines for terrestrial animals. OIE Part 2, 1–17.
5. Babiuk, S., Bowden, T., Parkyn, G., Dalman, B., Manning, L., Neufeld, J., Embury-Hyatt, C., Copps, J., Boyle, D. (2008). Quantification of Lumpy skin disease virus following experimental infection in cattle. Transboundary and Emerging diseases 55, 299-307.
6. Barnard, B.J., Munz, E., Dumbell, K., Prozesky, L. (1994). Lumpy skin disease. In: Coetzer, J.A.W., Thomson, G.R., Tustin, R.C. (Eds.), Infectious diseases of livestock. Oxford University Press, Cape Town, South Africa, pp. 604–612.
7. Chihota, C.M., Rennie, L.F., Kitching, R.P., Mellor, P.S. (2001). Mechanical transmission of lumpy skin disease virus by *Aedes aegypti* (Diptera: Culicidae). Epidemiol. Infect. 126, 317–321.
8. F. G. Davies, (1991). Lumpy skin disease of cattle: a growing problem in Africa and the Near East, World Animal Review, vol. 68, pp. 37–42,
9. A. M. Diesel, “The epizootiology of lumpy skin disease in South Africa,” in Proceedings of the 14th International Veterinary Congress, vol. 2, pp. 492–500, London, UK, 1949.
10. J. A. House, T. M. Wilson, S. El Nakashly (1990). The isolation of lumpy skin disease virus and bovine herpesvirus-4 from cattle in Egypt,” Journal of Veterinary Diagnostic Investigation, vol. 2, no. 2, pp. 111–115,
11. I. Yeruham, O. Nir, Y. Braverman (1995). Spread of lumpy skin disease in Israeli dairy herds,” The Veterinary Record, vol. 137, no. 4, pp. 91–93,.
12. S. Wainwright, A. El Idrissi, R. Mattioli, M. Tibbo, F. Njeumi, and E. Raizman, “Emergence of lumpy skin disease in the Eastern Mediterranean Basin countries,” EMPRES Watch, vol. 29, pp. 1–6, 2013.
13. A. Ripani and X. Pacholek, (2015). Lumpy skin disease: emerging disease in the Middle East-Threat to EuroMed countries,” in Proceedings of the 10th REMESA Joint Permanent Committee Meeting, pp. 1–24, Heraklion, Greece, March.
14. The Food and Agriculture Organization of the United Nations (FAO), (2015). Emergence of Lumpy Skin Disease (LSD) in Europe, vol. 33 of EMPRES Watch, The Food and Agriculture Organization of the United Nations (FAO), Rome, Italy,.
15. Tuppurainen ESM, Venter EH, Shisler JL, Gari G, Mekonnen GA, Juleff N, Lyons NA, DeClercq K, Upton C, Bowden TR, Babiuk. S, Babiuk LA: (2017). Review: Capripoxvirus Diseases: Current Status and Opportunities for Control.

- Transbound Emerg Dis, 64(3), 729-745
16. Office International des Epizooties (OIE), (2010). Lumpy Skin Disease, Chapter 2.4.14 OIE Terrestrial Manual, Office International des Epizooties, Paris, France,
 17. Walid SA, Adel KI, Khaled M, Khaled MF, Mervet IAM: (2010) Evaluation of different diagnostic methods for diagnosis of Lumpy skin disease in cows. Trop Anim Health Prod, 42 (4):777–783.
 18. Bowden TR, Coupar BE, Babiuk SL, White JR, Boyd V, Duch CJ, Shiell BJ, Ueda N, Parkyn GR, Copps JS, Boyle DB: (2009). Detection of antibodies specific for sheeppox and goatpox viruses using recombinant capripoxvirus antigens in an indirect enzyme-linked immunosorbent assay. J Virol Methods.,161(1):19-29.
 19. Gari G, Biteau-Coroller F, LeGoff C, Caufour P, Roger F: (2008). Evaluation of indirect fluorescent antibody test (IFAT) for the diagnosis and screening of lumpy skin disease using Bayesian method. Vet Microbiol, 129:269-280.
 20. Seet BT, Johnston JB, Brunetti CR, Barrett JW, Everett H, Cameron C, Sypula J, Nazarian SH, Lucas A, McFadden G: (2003). Poxviruses and immune evasion. Anu Rev Immunol, 21:377-423.
 21. Babiuk S, Wallace DB, Smith SJ, Bowden TR, Dalman B, Parkyn G, Copps J and Boyle DB: (2009). Detection of Antibodies Against Capripoxviruses using an inactivated Sheeppox virus ELISA. Transbound Emerg Dis, 56:132–141.
 22. Tilahun Z, Berecha B, Simenew K, Reta D: (2014). Towards effective vaccine production: A controlled field trial on the immunological response of three lumpy skin disease vaccine strains in dairy farms. Acad J Anim Dis, 3(3):17-26.
 23. Ahmad, W., Zaher, k. (2008). Observation on Lumpy Skin Disease in local Egyptian cows with emphasis on its impact on Ovarian function. African Journal of Microbiology Research 2, 252-257.