Clinical and serological study of Lumpy skin disease in cattle in Basrah Province
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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 الابقار في البصرة
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1فرع الصحة العامة، 2فرع الطب الباطني
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الخلاصة:
أجريت هذه الدراسة في البصرة في الفترة من اب 2018 ولغاية شباط 2019 حيث جمع 600 نموذج دم من حقول مختلفة. تشكلت نماذج مصابا بمرض التهاب الجلد العقدي اعتمادا على الاعراض السريرية في قضاءي 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 أقل من سنة و 400 نموذج من الابقار البالغة بعمر أكثر من سنة). أظهرت النتائج للفترة الطويلة لانتشار مرض التهاب الجلد العقدي كانت 18.66% (112 / 600) وكانت نسبة الإصابة بالعجل 30% (60 من 200) وهي أعلى من نسب الإصابة في الابقار البالغة 13% (52 من 400) (P< 0.05) وكانت نسبة الإصابة في الابقار الفرعي 16.3% (90 من 550) وهي أعلى من نسب الإصابة في الذكور حيث كانت 4% (2 من 50). أظهرت نتائج الدراسة السريرية أن مرض التهاب الجلد العقدي يكون على ثلاث أشكال سريرية اهمها التهاب الجلد العقدي حيث سجل في 104 حالة سريرية (92.8%) ثم التهاب المفاصل وسجل في 20 حالة سريرية (17.8%) وآخرها الشكل النفخاوي 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 LDSV, 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%) (Table 4, Fig.3).

**Table 1: Prevalence of lumpy skin disease**

<table>
<thead>
<tr>
<th>Number</th>
<th>Positive</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>600</td>
<td>112</td>
<td>18.66</td>
</tr>
</tbody>
</table>

**Table 2: Prevalence of LSD according to age group**

<table>
<thead>
<tr>
<th>Age group</th>
<th>Number</th>
<th>Positive</th>
<th>Percentage%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult cow</td>
<td>400</td>
<td>52</td>
<td>18</td>
</tr>
<tr>
<td>Calves</td>
<td>200</td>
<td>60</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td>600</td>
<td>112</td>
<td>18.66</td>
</tr>
</tbody>
</table>

Chi square=25.381  p< 0.00

**Figure 2: Percentage of LSD according to age**

**Table 3: Prevalence of LSD according to gender**

<table>
<thead>
<tr>
<th>Gender</th>
<th>Number</th>
<th>Positive</th>
<th>Percentage%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>550</td>
<td>90</td>
<td>16.3</td>
</tr>
<tr>
<td>Male</td>
<td>50</td>
<td>22</td>
<td>44</td>
</tr>
<tr>
<td>Total</td>
<td>600</td>
<td>112</td>
<td>18.66</td>
</tr>
</tbody>
</table>

Chi square=23.057  P < 0.05

**Figure 2: Percentage of LSD according to gender**

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Table 4: Clinical forms of lumpy skin disease in cattle

<table>
<thead>
<tr>
<th>Clinical form</th>
<th>Number</th>
<th>Percentage%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutaneous</td>
<td>104</td>
<td>92.8</td>
</tr>
<tr>
<td>Arthritis</td>
<td>20</td>
<td>17.8</td>
</tr>
<tr>
<td>Lymphadenopathy</td>
<td>3</td>
<td>2.5</td>
</tr>
</tbody>
</table>

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

### 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%) of 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:


