

Clinical, epidemiological and bacteriological studies on external caseous lymphadenitis in sheep at Alexandria province

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Abstract

A survey of external Caseous Lymphadenitis (CLA), a bacterial infection in sheep was conducted on sheep flocks in Alexandria governorate. The objective of this survey is to determine the status of CLA infection in sheep. A total of 5 flocks were screened, involving a total of 1470 animals. Clinical results showed that 2.6% of animals were suffering from CLA. On the basis of bacteriological examination only (1.8%) of animals were positive. The prevalence of the disease in animals under one year old was (7.9%) whereas a higher prevalence was recorded in animals of the age group from 1-3 years (71.1%) followed by animals of the age group over 3 years (21.1%). The prevalence of the disease in female was found to be significantly higher (68.4%) than in male (31.6%) *Corynebacterium pseudotuberculosis* was isolated from 27 cases (71%) while other bacteria isolated were *staphylococcus aureus* (6 isolates), *pseudomonas* spp. (1 isolate), *streptococcus pyogenes* (7 isolates), other streptococci (3 isolates), *Cryptococcus* (2 isolates) and *Klebsiella* spp. (4 isolates).

Introduction

Caseous lymphadenitis is a chronic suppurative disease that mainly affects goats and sheep. Its etiological agent is *Corynebacterium pseudotuberculosis* and can cause debility in animals, presenting itself in cutaneous and visceral forms. The disease is distributed worldwide, with cases being reported in Europe, Australia, North and South America, Africa and the Middle East (Dorella et al., 2006). The disease is caused by *Corynebacterium pseudotuberculosis*. It is non-motile pleomorphic rods (0.5–0.6 μm by 1.0–3.0 μm) that are gram positive and tend to show a characteristic palisade or Chinese letter arrangement in smears (Baird and Fontaine, 2007).

Caseous lymphadenitis causes considerable economic losses, which range from condemnation of skins and carcasses, due to abscesses, to expressive losses in reproductive efficiency, as well as in wool, meat and milk production. Subclinical infections are also important, because they allow *C. pseudotuberculosis* to disseminate within and between herds (Paton et al., 1994). Also, caseous lymphadenitis can become a public health problem as it is a zoonosis (Peel et al., 1997; Join-Lambert et al., 2006). Resistance of *C. pseudotuberculosis* to antibiotics and its strenuous perseverance in the environment, associated with the difficulty in detecting infected animals, make caseous lymphadenitis hard to eradicate (Williamson, 2001).

The disease present in two different ways. The external, also known as cutaneous or superficial, form of CLA is characterized by the development of abscesses within the superficial lymph nodes or within the subcutaneous tissue. The typical gross lesion is a discrete abscess distended by thick and often dry,

greenish yellow or white, purulent exudates. The abscess is usually soft and pasty (Schreuder et al 1994). The second form of CLA manifestation is visceral form, characterized by the formation of lesions within the animal, which cannot be observed externally. (Valli and Parry, 1993). Caseous lymphadenitis should be considered as a potential diagnosis for "thin ewe syndrome," in which an adult small ruminant loses condition in the face of adequate nutrition (Laak and Schreuder 1991). Superficial abscesses are widely present in sheep but. The abscesses are generally believed to be due to *Corynebacterium pseudotuberculosis* causing caseous lymphadenitis. The aim of this study was to assess the epidemiology and clinical aspects of caseous lymphadenitis in sheep in some sheep flocks at Alexandria governorates and the bacteria associated with these cases.

Material and methods

Animals:

A total of 1470 animals (native breed sheep "barqi") with different age and sex from different localities in Alexandria governorates distributed in 5 flocks were included in this study.

Clinical examination:

All animals were subjected to careful clinical examination. Externally visible abscesses were palpated to identify their state - early, fully formed or cicatrized, according to Radostits (2000).

Bacteriological examination:

Samples were collected from each lesion either by aspiration from closed lesions or via cotton swabs from open lesions. All samples were taken under complete aseptic conditions and used for both direct smear and isolation of the causative agent by culturing on to 5% sheep blood agar, nutrient agar and MacConkey agar plates then incubated at 37°C for 48 h aerobically. Identification of isolates was based upon bacterial morphology, and in addition culture characteristic and biochemical reaction. (Quinn et al., 1994).

Results

The clinical signs of CLA in sheep were in the form of abscessation of superficial lymph nodes with variable sizes and at different sites which may either be closed or opened discharging whitish milky to creamy caseated pus. Hair or wool over the lesion was lost in some cases. There was no systemic reaction observed. Some infected animals showed progressive emaciation. As shown in table 1 of the 1470 sheep that were examined 38 were found with externally palpable abscesses at one time or another (Table 1). The prevalence of disease in different age groups is shown in table 2 where only 3 animals (7.9%) of affected animals was less than 1 year, where the highest percentage was an animal (71.1%) between 1-3 years and 8 animals (21.1%) over 3 years. In the same table it is observed that the disease is more prevalent in females (68.4%) affected animals than in males (31.6%).

As shown in table 3 the lymph nodes of the head were more commonly affected (27 cases) than pre-scapular (9 cases) or pre-femoral (2 cases). The bacteria isolated from the external abscesses are shown in table 4 where *Corynebacterium pseudotuberculosis* was isolated from 27 cases. Other bacteria isolated in low

late were staphylococcus aureus, pseudomonas aerugenosa, streptococcus species, Cryptococcus and klebsiella

Table (1) prevalence of clinical external caseous lymphadenitis in sheep flocks

Sheep flock	1	2	3	4	5	Total
No of animals	360	170	510	290	140	1470
No of affected animals	10	4	11	8	5	38
Percentage of affected animals	2.77	2.35	2.15	2.75	3.57	2.59

Table (2) The effect of age and sex on the prevalence of clinical external caseous lymphadenitis in sheep.

Age of animals	affected animals					
	Female		Male		Total	
	No	%	No	%	No	%
3 – 12 month	1	2.63	2	5.27	3	7.9
1 – 3 year	18	47.37	9	23.70	27	71.1
Over 3years	7	18.40	1	2.63	8	21.1
Total	26	68.40	12	31.6	38	100%

Table (3) Lymphnodes affected with clinical CLA:

Lymphnodes affected	Total (38)	%
Parotid LN	27	71.1
Prescapular LN	9	23.7
Prefemoral LN	2	5.3
Total	38	100

Table (4) bacteria isolated from cases of external CLA in sheep

Bacteria	No of isolates	% to No of clinical cases	% to total isolates
<i>Corynebacterium pseudotuberculosis</i>	27	71	54
<i>Staphylococcus aureus</i>	6	15.8	12
<i>Pseudomonas aerugenosa</i>	1	2.6	2
<i>Streptococcus pyogenes</i>	7	18.4	14
<i>Streptococcus spp.</i>	3	7.9	6
<i>Cryptococcus spp</i>	2	5.3	4
<i>Klebsiella. Spp.</i>	4	10.5	8
Total	50		

Discussion

Caseous lymphadenitis is a worldwide chronic infectious disease of ruminants characterized by formation of pyogranulomas mainly in subcutaneous lymph nodes and rarely in visceral lymph nodes and organs (Paule et al. 2002). This study was designed to investigate the prevalence of external caseous lymphadenitis in sheep in some flocks at Alexandria province. The clinical signs of CLA in sheep in this study were in the form of abscessation of the subcutaneous lymph nodes with variable sizes and at different sites which may be either closed or opened discharging whitish milky to creamy caseated pus. Hair or wool over the lesion was lost in some cases. There was no systemic reaction observed. Some infected animals showed progressive emaciation. Similar signs were reported by Al-Gaabary and El-Sheikh (2002) and Magdy et al., (2009).

The prevalence of CLA in examined animals was 2.6% on the basis of clinical examination and 1.8 % on the basis of bacteriological examination (pseudotuberculosis was isolated from only 27 cases). Similar rates were reported by (Cetinkaya et al.,2002) another in Canada 8% of the examined animals showed typical lesions (Stanford et al.,1998), slightly higher rates were recorded by Musa (1998) and Baird et al. (2001) reported prevalence of 6.35% and 9.93%, respectively. While high prevalence reported in Victoria, Australia 45% (Paton,1997), 75% in Spanish flocks (Girones et al.,1992), was reported by Kuria and Holstad (1989). The variations in the prevalence between different studies may be attributed to the difference in management systems and climatic conditions in each study where, the prevalence of the causative organism in the contaminated environment is greatly affected by ambient temperature. Also, it may be attributed to the endemic nature of the disease which leads to a variation in animal immunity and the degree of susceptibility.

Based on clinical examination the prevalence of CLA was significantly higher in female than male animals, where, 26 females and 12 males were clinically affected. Similar results were obtained by Nadim and Farid (1997), Ghanbarpour and Khaleghiyani (2005). Batey et al. (1986) and Zaitoun et al. (1999) reported a higher prevalence in female than in male animals. On the other hand, Zaitoun and Bayoumi (1994) reported no differences between the prevalence of CLA in both females and males. The higher prevalence of CLA observed in our study may be attributed to the results obtained which are attributed to the fact that ewes; the females are usually kept for milk production compared to males which are slaughtered at a young age. Due to the nature of CLA, the disease may be more prevalent in female. (Magdy et al., 2009)

Concerning effect of age, CLA was significantly different among different age groups where, only 3 animals under 1 year were affected clinically, the highest percentage was in animals between 1-3 years and decreased in animals over 3 years. Similar results were recorded by Zaitoun and El-Sheikh (1994) and Chirinozarraga et al. (2006). On the other hand our results were different from those obtained by Menzies and Muckle (1989), Pepin et al. (1994), and Ali (1999) and Al-Gaabary and El-Sheikh (2002). The lower prevalence in animals under 1 year may be attributed to the passive transfer of maternal immunity where increase in the age group from 1 to 2 years was an indication of active immunity.

losing this immunity. Moreover, the decreasing in the disease prevalence in animals over 2 years is an indication for the development of age-related immunity. Concerning the distribution of the affected superficial lymph nodes, the anterior body half (head) was the most commonly affected site where 27 (71.1%) out of 38 sheep affected where prescapular lymph node was affected in 9 cases and prefemoral in 2 cases. Similar results were reported by Mubarak et al. (1999) and Pandey et al. (2007). These results disagree with what was obtained by Burrell (1981), Pepin et al. (1994) and Abd El-Ghani et al. (1998) who reported that the commonly affected superficial sites were subiliac (precrural), mammary (udder), mandibular, and superficial cervical (prescapular) lymph nodes.

Out of 38 cases showing lesions of CLA, *C. pseudotuberculosis* was isolated from only 27 cases representing 71% isolation rate. *C. pseudotuberculosis* was isolated as a sole pathogen from few cases while it was isolated as mixed infection with *Staphylococcus aureus*, *Pseudomonas*, *Streptococcus*, *Cryptococcus* and *Klebsiella*. Similar isolation rate (79.36%) was reported by Kuria and Nagattia (1990). While higher isolation rate (90%) was reported by Magdy et al., (2009). Ben Said et al 2002 isolated *Staphylococcus* from cases of CLA. These differences in the isolation rates may be attributed to the differences in methods and the nature of the lesions being chronic or acute. Moreover, presence of staphylococci may overcome the presence of the highly sensitive *C. pseudotuberculosis*.

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الملخص العربي

دراسة إكلينيكية ووبائية وبكتريولوجية حول مرض التهاب الغدد اللمفاوية التجبني الخارجي في الأغنام في محافظة الإسكندرية

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أنجزت الدراسة خلال مسح ميداني تم إجراءه على خمس قطعان للأغنام في محافظة الإسكندرية بهدف تحديد مدى انتشار وتوزيع خرايج مرض التهاب الغدد اللمفاوية التجبني في الأغنام إضافة إلى تحديد أهم المسببات البكتيرية للخرايج في الحيوانات المصابة حيث تم فحص عدد ١٤٧٠ من لاكتشاف وجود الخرايج وتم تسجيل عدد القطعان ونوع وجنس الحيوانات التي تم فحصها بالإضافة إلى تسجيل سن الحيوانات المصابة ومكان الخرايج وقد تم أيضا جميع ٢٨ عينة قيح من الاغنام ، لفحصها بكتريولوجيا.. وقد أوضحت نتائج المسح نسبة الإصابة العامة في الأغنام ٢٠.٥٩% كذلك أشارت النتائج إلى وجود فوارق معنوية في نسب الإصابة بين ذكور وإناث الأغنام حيث كانت النسبة لأعلى في الإناث كما وجدت الدراسة وأن الأغنام والماعز بعمر ١-٣ سنوات أكثر إصابة من غيرها من الأعمار كذلك أظهرت النتائج تركيز ظهور الخرايج في الغدد الليمفاوية في منطقة الرأس (الغدة النكفية والغدة تحت الفك ومن الناحية البكتريولوجية فقد عزلت سبعة أنواع من البكتيريا، وكانت أعلى نسبة عزل لجرثومة وتديات السل الكاذب (*Corynebacterium pseudotuberculosis*) حيث شكلت ٥٤% تليها المكورات السبحية *streptococci* و المكورات العنقودية *Staphylococcus aureus* كما تم عزل أنواع أخرى من البكتيريا مثل *Klebsiella. Spp* و *Cryptococcus spp* و *Pseudomonas aeruginosa*