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Short communication

Caseous lymphadenitis in sheep and goats: Clinical, epidemiological and preventive studies

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ABSTRACT

This study was carried out on 1466 animals (977 sheep and 489 goats) during the period from January 2008 to December 2008 to determine some epidemiological, clinical and preventive measures associated with caseous lymphadenitis (CLA). The prevalence was 19.23% on the basis of clinical examination and 17.32% on the basis of bacteriological examination. The prevalence was 23.33% in sheep and 11.04% in goats on the basis of clinical examination whereas it was 22.10% in sheep and 7.77% in goats on the basis of bacteriological examination. The disease prevalence was significantly higher in females (19.67%) than in males (12.42%). Higher prevalence was recorded in animals of the age group from 1 to 2 yeas (47.36%) followed by animals of the age group over 2 years (18.69%) and lastly of the age group under 1 year (3.07%). The clinical picture appeared in the form of enlargement and abscessation of the superficial lymph nodes. Parotid lymph nodes were the most commonly affected nodes in sheep whereas superficial cervical lymph nodes were the most commonly affected nodes in goats. The superficial lymph nodes of the anterior body half showed the highest infection rate. *Corynebacterium pseudotuberculosis* was detected in 90.07% of the clinically infected cases. The disease was significantly higher in private flocks (45.52%) than in governmental flock (1.59%). Control measures using penicillin at day zero of shearing in addition to disinfection of shearing instrument and wounds greatly reduced the disease occurrence.

1. Introduction

Caseous lymphadenitis (CLA) is an infectious disease caused by *Corynebacterium pseudotuberculosis* (*C. 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 is manifested clinically in two forms, external and internal. Loss of fertility, gradual emaciation and condemnation of carcasses at abattoir are probable consequences of CLA that undoubtedly results in severe economic losses (Conner et al., 2000).

In sheep the presence of abscesses in superficial lymph nodes is highly suggestive of CLA particularly if several animals in a group are similarly affected whereas confirmatory diagnosis of the disease is mainly based on culture and identification of *C. pseudotuberculosis*. It is possible to isolate the organism from lesions of all ages, although the number of viable bacteria present in chronic abscess may be low and apparently sterile lesions are occasionally encountered (Baird and Fontaine, 2007).

Shearing, abrasions or wounds appeared to play an important role in spreading the disease among the animals (Zaitoun and Bayoumi, 1994).

CLA is recognized as a significant cause of financial loss to the sheep industry in a number of countries where

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the disease is endemic. The major cause of these economic losses lies in the condemnation and down grading of affected carcasses at slaughter and meat inspection (Baird and Fontaine, 2007).

C. pseudotuberculosis can become endemic in a herd and is difficult to eradicate by virtue of its poor response to therapeutics, its ability to persist in the environment and the limitation in detecting subclinically affected animals (Hard, 1975; Michael and Douglas, 1998). The aim of the present work was to study the epidemiology and clinical aspects associated with caseous lymphadenitis. In addition, some trials for disease prevention were evaluated.

2. Materials and methods

2.1. Animals

A total of 1466 animals (977 sheep and 489 goats) with different ages and sex at different localities in Gharbia and Kafr El-Sheikh governorates were used in this study (941 belong to governmental flock and 525 belong to private flocks). Some of these animals suffered from superficial abscesses in one or more lymph nodes of animal body. Moreover, two flocks which had a history of previous infection were used in evaluation of two control measures. The first consisted of 50 sheep whereas the second consisted of 30 sheep.

2.2. Epidemiological investigations

Epidemiological parameters were estimated according to Martin (1987).

2.3. Clinical examination

All animals were subjected to careful clinical examination according to Rosenberger et al. (1979).

2.4. Bacteriological examination

Double 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 onto 10% sheep blood agar, nutrient agar and MacConkey's agar plates then incubated at 37 °C for 48 h aerobically as well as in CO_2 incubator for the first isolation according to the method described by Bailey and Scott (1990). Also the ability of microorganisms to grow on Hoyle's tellurite media were done by inoculating the microorganisms onto Hoyle's tellurite lysed blood agar plates and incubated at 37 °C for 48 h according to Hoyle (1941) and Jellard (1971). The resultant colonies were subjected to catalase, nitrate reduction, urease, gelatin liquefaction and fermentation of the following sugars (glucose, sucrose, maltose, lactose and xylose) according to the method described by Cruickshank et al. (1975).

2.5. Control measures

Two flocks located in the same area and exposed to the same risk and conditions were used in evaluation of the control measures. The first flock (50 sheep) was subjected to Penicillin G Benzathin (Durapen, Nile Co.) injection at the day of shearing, wound disinfection using betadyne solution and sterilization of the shearing instrument by autoclaving. The second flock (30 sheep) was left as control. These flocks were followed up for 6 months. Evaluation of the efficacy of the control measures was done on the basis of the appearance of the new cases within 6 months post management.

2.6. Statistical analysis

The obtained data had been analyzed statistically using chi-square.

3. Results and discussion

Caseous lymphadenitis is a worldwide chronic infectious disease of small ruminants characterized by formation of pyogranulomas mainly in superficial lymph nodes and rarely in visceral lymph nodes and organs (Batey et al., 1986; Paule et al., 2004).

The clinical signs of CLA in sheep and goats were in the form of abscessation of the superficial lymph nodes with variable sizes and at different sites which may be either closed or opened discharging whitish milky to creamy caseated pus (Fig. 1). 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).

The prevalence of CLA in examined animals was 19.23% on the basis of clinical examination and 17.32% on the basis of bacteriological examination (*C. pseudotuberculosis* was isolated from only 254 cases). Similar results were recorded by Pepin et al. (1994). Higher rate (90%) was reported by Kuria and Holstad (1989) whereas Musa (1998) and Baird et al. (2004) reported prevalence rates of 6.35% and 9.93%, respectively.

Among the 977 sheep examined, 228 were clinically affected with CLA representing a prevalence rate of 23.33%. *C. pseudotuberculosis* was isolated from only 216 cases representing a prevalence rate of 22.10%. Similar rate was reported by Zaitoun and Ali (1999). Zaitoun and Bayoumi (1994) and Paton et al. (2003) reported prevalence rates of 30.17% and 26%, respectively. Lower rates (1.6–13.36%) were reported by Kuria and Nagattia (1990), Mubarak et al. (1999) and Al-Gaabary and El-Sheikh (2002).

Among the 489 goats examined, 54 animals were clinically affected with CLA representing a prevalence rate of 11.04%. *C. pseudotuberculosis* was isolated from only 38 cases representing a prevalence rate of 7.77%. Similar rates were reported by Kuria and Nagattia (1990) and Al-Gaabary and El-Sheikh (2002). Higher rates were reported by Menzies and Muckle (1989) and Ural et al. (2008) who reported prevalence rates of 13.5% and 100%, respectively. Lower rates were recorded by Nuttall (1988) and Mubarak et al. (1999) who reported prevalence rates of 0.2% and 4.81%, respectively. The variations in the disease frequency between different studies may be attributed to the differences in the management systems and climatic conditions in each study where, the viability 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 animal susceptibility.

Prevalence of CLA was significantly higher ($P < 0.001$) in sheep than in goats. Similar results were obtained by Nuttall (1988) and Al-Gaabary and El-Sheikh (2002). But Menzies and Muckle (1989), Kuria and Nagattia (1990) and Ural et al. (2008) reported higher prevalence in goats than in sheep. The higher morbidity in sheep than goats may be attributed to the process of shearing which is the main risk factor for occurrence of CLA.

A gender difference was noticed in the prevalence of CLA in both sheep and goats. Based on clinical examination,