Global Veterinaria 13 (6): 1065-1068, 2014
ISSN 1992-6197

DOI: 10.5829/idosi.gv.2014.13.06.9182

Epidemiological and Histopathological Studies on Caseous Lymphadenitis in Slaughtered Goats in Algeria

Chikhaoui Mira, Benchaib Khoudja Fatima, Smail Fadhela, Khalfa Kada and Tarchid Yacine

Department of Animal Health, Veterinary Sciences Institute,
Ibn Khaldoun University, Tiaret 14000, Algeria

Abstract: Epidemiological study was carried out of 524 animals raised in an extensive system on local breed goat of the Tiaret region (Algeria) during 2 years (2011–2012) to determine prevalence and some pathological aspects associated to caseous lymphadenitis (CL). Clinical examination revealed a prevalence rate of 3.6 %. The most affected superficial lymph nodes were mandibular lymph nodes (36.8 %). CL prevalence was higher in Animals aged 4 years and older (10.3%). Gross examination of 570 carcasses of goats at the abattoir revealed the presence of abscesses in mediastinal lymph node (38.08 %) and lung (26. 5%). Grossly, the most common lesions seen in the affected lymph nodes and extended to internal organs were caseous abscess filled with greenish yellow pus. Microscopic examination at low magnification showed abscess with characterized by multiple focal areas of caseous materials followed by heavy zone of neutrophils, macrophages, lymphocytes, histocytes and surrounded by proliferating connective tissue. In conclusion, the present work revealed a low prevalence of CL in goats at Tiaret region.

Key words: Caseous Lymphadenitis · Prevalence · -Pathology · Goats

INTRODUCTION

Caseous lymphadenitis (CL) is chronic bacterial infectious disease of sheep and goats. It appears sporadically, sometimes enzootic. It is manifested by local inflammation on the place when bacterial germs are being entered and penetrate into lymph nodes than developing abscess lymphadenitis [1]. The dissemination of bacteria is possible through blood consequently with abscess development in lung, liver and kidneys. The cause of this disease is *Corynebacterium pseudotuberculosis* [2, 3].

CL is a contagious disease that spread by cohabitation and by transmission of *Corynebacterium* through skin wounds [4]. In goats the wounds are localized mostly on the head, neck and sternum that is characteristic in goats that browse extensive breeding. Caseous lymphadenitis is responsible for substantial economic losses in goat herds and sheep flocks [5]. Treatment for CL is not curative. Once an abscess has drained, it will tend to recur *C. pseudotuberculosis* is susceptible to penicillin; however, these antibiotics cannot penetrate the wall of abscesses. The best way to control this infection in a flock is not to treat individuals but to cull those showing clinical signs with confirmed diagnosis [6].

In Algeria, the goat's livestock estimated at 2.5 million head is more concentrated in the steppe, mountainous region and oasis. Goat's breed is represented by the Arabic goat which includes two types, the M'Zab goat and the Kabyle goat [7].

The present work was undertaken to study the epidemiological and the pathological aspects of CL in goat, to provide more detailed information about the endemic goat diseases seen in slaughterhouse in Algeria and to determine the prevalence.

MATERIALS AND METHODS

Animals: 524 goats from different ages were examined to detect the localization and the number of lymph node abscess.

At the Abattoir: 570 slaughtered goats were examined to detect lymph node and organ lesions.

Corresponding Author: Benchaib Khoudja Fatima, Cité des 50 logements Universitaires Bloc F2 N°2, Tiaret 14000, Algeria. Tel: +21346425781, +213558674586, E-mail: benchaibb@yahoo.com.

Samples: Infected lungs were removed and fixed in 10 % formalin and sent to the laboratory of pathology.

RESULTS

Epidemiological Study: Out of 524 goats involved in the study 19 (3.6 %) were infected. Animals aged 4 years and older were the most affected (10.3 %), (Table 1).

Histopathological Study

Macroscopic Examination: The most common lesions seen in the affected lymph nodes and to lesser extent in internal organs were caseous abscess filled with greenish yellow pus. When palpated they were soft and pasty but in some findings, the pus was firm and dry on cross sectional cutting. The pus has a characteristic of laminates or "onion ring" appearance while its color was greenish yellow to yellowish white (Fig. 1). The abscesses ranged between 1 and 5 cm in diameter.

Table 1: Prevalence of abscess according to age of goat

Age(year)	Animals (n)	Prevalence (%)
≤ 0.5	115	2(1.7)
0.5- 1	65	1(1.5)
1-2	98	4(4.08)
2-3	113	4(3.5)
3-4	75	2(2.6)
>4	58	6(10.3)
Total	524	(3.6)

The most affected superficial lymph nodes were the mandibular (36.8%) and the parotid (31.5%), (Table 2)

Table 2: Distribution of abscess according to the localization

Lymph nodes	PrevalenceN (%)
Mandibular	7(36.8)
Parotid	6(31.5)
Mammary	3(15.7)
Prescapular	2(10.5)
Femoral	1(5.2)
Popliteal	0(0)
Total	19 (100)

Gross examination: Out of 570 carcasses of goat at the abattoir revealed the presence of abscess on 21 carcasses (3.6 %). Mediastinal lymph node (38.09%) and lung (26.5 %) were the most affected, (Table 3)

Table 3: Distribution of abscess according to the localization in slaughtered animals

Lymphe nodes /organs	Prevalence n (%)
Mediastinal	8(38.09)
Tracheobronchial	3(14.2)
lung	6(26.5)
Others localizations	4(19.04)
Total	21 (100)

Fig. 1: Grossly affected lymph node showing characteristic onion like apparence with greenesh caseated pus exudates in cut section

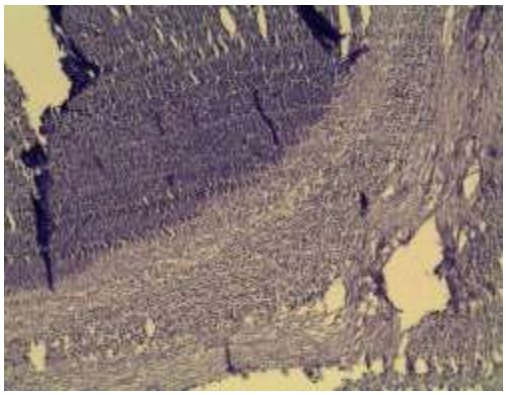

Fig. 2: Lymph node of affected animal showing necrosis area surrowded by inflammatory cells and by fibrosis (H and E x 40)

Microscopic Examination: Histopathological examination of lung tissues sections showed granulomatous lesion with caseous necrosis in center of lesion. The granulomatous lesion in the pulmonary tissue of infectedgoats,consisted of a collection of inflammatory cells (Lymphocytes and macrophages) within the infected tissue (Fig. 2). Also microscopical examination showed infiltration of third line of inflammatory process is epitelioid cells. The accumulation of living and dead macrophages, lymphocytes, multinucleated giant cells, bacteria and tissue cells around caseous necrosis in center comprises a granuloma. A thick fibrous capsule may form around this granuloma.

DISCUSSION

CL has been reported in many countries worldwide [8]. This disease is characterized by abscesses formation in lymph nodes, lung and other visceral organs and is

caused by *C pseudotuberculosis*. It spread following rupture of affected lymph nodes, commonly at shearing. Infection enters through skin wounds at shearing, crutching and other wounds [9].

In the present work, an epidemiological study involved 524 goats. Nineteen (3.6%) presented LC lesions, the number of goats studied is low because in our country breeding sheep is favored than goat. Goat is raised in small numbers by some farmers or nomads and the consumption of goat meat is less appreciated than sheep meat. The obtained finding was lower than the results recorded by Sanouci *et al.* [10] in Sudan, (12%) and Al-Gaabary *et al.* [11] in Egypt, 7.7%.

Mandibular (36.8 %) and parotid (31.5 %) lymph nodes were the most affected. These results agree with those of Burrell [12] and Mubarak *et al.* [13].

Injuries increases significantly with age, it is the highest in animals older than 4 years, this result is in agreement with Paton *et al*. [14].

The superficial lymph nodes affected by CL are related to the entrance of the bacterial germ, than to the type of farming (Thorny grazing), Tamrat and Asfaw [15].

At the abattoir, prevalence rate of abscesses was 3.6 %. Our results are lower than those reported by Musa [16] in Soudan, 7.05%, Al Gaabary *et al*. [17] in Egypt, 10.7% and Brown and Olander [1] in U.SA, 13.9%. Low prevalence rates were reported by Alloui and Kaba [18] in Algeria (Batna), 1.6%; Cetinkaya *et al*. [19], 1.1%; Ghanbarpour and Khaleghyan [20], 1.83% respectively.

This might be due to the environment and management system in which the animals are not sheared and the most slaughtered animals are between 6 months and 1 year old. At this age, animals receive passive transfer of maternal immunity.

Mediastinal lymph nodes are the most affected, 38.09%, followed by the lungs, 26.5%, These results are in agreement with those reported by Khaled M. Al-Qudah *et al*. [21].

Prevalence of visceral form in respiratory tract can be explained by the fact that the organism could be acquired via inhalation of droplets from infected animals. Besides, the cutaneous form of CL may spread through hematogenic or lymphatic route which produces visceral form of the disease [4].

At the opening, abscesses were surrounded by a fibrous shell and contained pus pale yellow or grayish green. In some cases it was creamy but in most cases it was thick, or even dry laminated with a caseous consistency and giving typical ' Onion skin ". Batey [8] reported that abscesses usually enlarged with necrosis and formation of the capsule producing an onion-ring effect of concentric layers of necrotic materiel.

Histopathological examination of lymph nodes and lung of affected goats showed abscess characterized by granulomatous inflammation, consisted of a necrotic center surrounded from the center to the periphery by mononuclear cells and fibrosis characteristic of chronic inflammation. It was also noted the presence of epithelioid cells in granulomatous inflammation.

The granulomatous inflammation was an example of secondary chronic inflammatory response to the persistence of the causative agent. It was poorly eliminated or badly degraded and caused lasting tissue damage area of caseous materials followed by heavy zone of polymorph nuclear leucocytes surrounded by fibrous tissue capsule. These results agree with those reported by Pepin *et al*. [22].

Control of CL presents several problems and treatment of the disease is often not success because bacterial agent stays alive after application and protected inside the abscess that is rounded by thick capsule [23].

In conclusion, the apparent resistance to infection observed in many goats in Tiaret (Algeria), as reflected by the low incidence of CL could be use as a recent scientific information in breeding programmer for the improvement of animal health in the flock and for selection of suitable breed goats.

REFERENCES

1. Brown, C.C. and H.J. Olander, 1987. Caseous lymphadenitis of goats and sheep: A Review. Veterinary Bulletin, 57(1): 1-12.
2. Paton, M.W., S.B. Walker, I.R. Rose and G.F. Watt, 2003. Prevalence of caseous lymphadenitis and usage of CL vaccines in sheep flocks. Australian Veterinary Journal, 81: 91-95.
3. Hatem, M.E., R.H. Arab, Ata S. Nagwa, Sherein I. Abd El-Moez, Eman A. Khairy and E.A. Fouad, 2013. Bacterial Abscessation in Sheep and Goat in Giza Governorate with Full Antibiogram Screening. Global Veterinaria, 10(4): 372-381.
4. Radostitis, O.M., C.G. Gay, D.C Blood and K.W. Hinchiff, 2007. Veterinary Medicine. A textbook of the diseases of cattle, horses, sheep, pigs and goats. WB Saunders, London, pp: 2156.
5. Williamson, L.H., 2001. Caseous lymphadenitis in small ruminants. Veterinary Clinics of North America. Food Animal Practice, 17: 359-71.

6. East, N.E., 1998. Common infectious conditions in proceeding small ruminants for the animal practitioner. Western Veterinary Conference, pp: 120-12.
7. INRAA (Institut National de la Recherche Agronomique d'Algérie), 2003. Rapport national sur les ressources génétiques animals, pp: 46.
8. Batey, R.G., 1986. Pathogenesis of caseous lymphadenitis in sheep and goats. Australian Veterinary journal, 63: 269-227.
9. Spigel, N.Y., D. Elad, I. Yeruham, M. Winkler and A. Saran, 1993. An outbreak of Corynebacterium pseudotuberculosis infection in an Israeli dairy herd. Veterinary Record, 133: 89-94.
10. El Sanousi, S.M., A.A. Hamad and A.A. Gamel, 1989. Abscess disease in goats in the Sudan. Revue Elevage Médecine vétérinaire des Pays tropicaux, 42: 379-382.
11. AL-Gaabary, MH., S.A. Osman and A.F. Oraiby, 2009. Caseous lymphadenitis in sheep and goats: Clinical, epidemiological and preventive studies. Small Ruminant Research, 87: 116-121.
12. Burrell, D.H, 1983. Caseous lymphadenitis vaccine, New South Wales Veterinary Proceedings, 19: 53-57.
13. Mubarek, M., A.F. Bastowrows, M.M. Abdelhafeez and M.M., Ali, 1999. Caseous lymphadenitis of sheep and goats In Assiut farms and abatoirs. Assiut Veterinary medical Journal, 42: 89-112.
14. Paton, M.W., M.G. Collett, M. Pepin and G.F. Bath, 2005. Corynebacterium pseudotuberculosis infections. In: Infectious Diseases of Livestock, 3rd Edition., J.A.W. Coetzer and R.C. Tustin, Eds, Oxford University Press Southern Africa, Cape Town, pp: 1917-1930.
15. Tamrat, D. and Y. Asfaw, 2003. Farm Animal Biodiversity in Ethiopia: Status and Prospects. Proceedings of the 11th Annual conference of the Ethiopian Society of Animal Production (ESAP) held in Addis Ababa, Ethiopia, August, pp: 28-30. ESAP, Addis Ababa.
16. Musa, M.T., 1998. Lymphadenitis in sheep and goats in the Sudan. Revue Elevage. Médecine. vétérinaire. Pays tropicaux, 51: 109-111
17. AL-Gaabary, M.H., S.A. Osman, M.S. Ahmed and A.F. Oraiby, 2010. Abattoir survey on caseous lymphadenitis in sheep and goats in Tanta, Egypt. Small Ruminant Research, 94: 117-124.
18. Alloui, M.N. and J. Kaba, 2002. Prévalence de la maladie des abcès des petits ruminants de la région de Batna. 1ére Journées Maghrébines d'Epidémiologie Animale. Université Saad Dahlab de Blida, Algérie.
19. Cetinkaya, B., M. Karahan, E. Atil, R. Kalin, T. De Baere and M. Vaneechante, 2002. Identification of Corynebacterium Pseudotuberculosis isolates from sheep and goats by PCR. Veterinary Microbiology, 88: 75-83.
20. Ghanbarpour, R. and M. Khaleghian, 2005. A study on caseous lymphadenitis in goats. Indian Veterinary journal, 82: 1013-1014.
21. Khaled, M. Al-Qudah., A.M. Al-Majali and M.M. Obaidat, 2008. A Study on Pathological and Microbiological Conditions in Goats in Slaughterhouses in Jordan. Asian Journal of Animal and Veterinary Advances, 3: 269-274
22. Pépin, M., D. Cannella, J.J. Fontaine, J.C. Pittet and A. Le Pape, 1992. Ovine mononuclear phagocytes in situ: identification by monoclonal antibodies and involvement in experimental pyogranulomas. J. Leukocyte Bioogy, 51: 188-198.
23. Shilong, P., N. Yu, S. Ye, H.D. Peng, D. Zhao and W. Chen, 1996. Investigation of Caseous lymphadenitis in goats and identification of the pathogens. Chinese Journal Veterinary Sciences and Technology, 26(9): 15-17.