Acute visceral cysticercosis in feed-lot lambs

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SUMMARY

In a feed-lot lamb herd consisted of 50 lambs aged about 2.5 months old, the flock-man complained that 2 lambs died after 2 days illness. Five lambs with obvious depression were submitted to the Clinic of Farm Animals. After clinicopathological examinations they were diagnosed to suffer from acute visceral cysticercosis. The remaining 43 lambs were slaughtered and 20 of them had lesions of acute cysticercosis. A small epidemiological investigation of this case is described.

Keywords: lambs, acute cysticercosis, diagnosis

RÉSUMÉ

Cysticercose viscérale aigue en parc d’engraissement chez l’agneau

Dans un troupeau d’agneau "feed-lot" composé de 50 agneaux âgés d’environ 2.5 mois, le berger s’est plaint de la mort de deux agneaux au bout de deux jours de maladie. Cinq agneaux en dépression déclarée ont été soumis à la Clinique des animaux de la ferme. Après des examens cliniques pathologiques, ils ont été diagnostiqués souffrant de la cysticercose viscérale aiguë. Les 43 autres agneaux ont été abattus et 20 d’entre eux présentaient des lésions de cysticercose aiguë. Une petite enquête épidémiologique de ce cas est décrite.

Mots-clés: aiguë cysticercosis, diagnotisque, agneaux

Introduction

Cysticercosis caused by *Cysticercus tenuicollis*, the metacestode larval stage of the tapeworm *Taenia hydatigena*, has been reported to have two clinical forms in sheep, the acute and the chronic one [2, 13]. The more common chronic cysticercosis is usually asymptomatic and diagnosed usually at the abattoir [2, 18]; it causes economic losses due to downgrading or condemnation of infected organs and carcasses [1, 22]. *C. tenuicollis* is commonly located on the omentum, the mesenteries, the peritoneum and the liver [25]. More rarely it can be found in lungs [14, 22, 30], kidneys and brain [5, 23]. Also, it has been found once in the urinary bladder of a sheep [27] and in the fetal allantoic cavity of a pregnant goat [18].

On the other hand, the acute form of the disease is rare. To date, in the accessed literature massive natural cases of acute cysticercosis with deaths in lambs have been reported only once in United Kingdom [13], while sporadic cases in single lambs have been reported in Asian countries [15, 30]. In the above cases the affected lambs died suddenly, without premonitory signs. Acute cysticercosis has also been described once in dead feedlot lambs in USA, but it was not the cause of their death [10]. Moreover, acute cysticercosis in lambs has been reproduced experimentally in Canada [20] and United Kingdom [4]. A retrospective study of spontaneous acute cysticercosis in goat kids has been reported in Greece about 4 decades ago [9], but the disease has not been reported in lambs to date. The present article describes an outbreak of massive acute cysticercosis in lambs that were ill for at least a couple of days.

Clinical case

CASE HISTORY

In a feed-lot lamb flock consisted of 50 lambs aged approximately 2.5 months old, which were bought one month ago from a sheep flock, the farmer complained that 2 lambs died after 2 days illness. Five lambs with obvious depression were submitted to the Clinic of Farm Animals. After clinicopathological examinations they were diagnosed to suffer from acute visceral cysticercosis. The remaining 43 lambs were slaughtered and 20 of them had lesions of acute cysticercosis. A small epidemiological investigation of this case is described.

Keywords: lambs, acute cysticercosis, diagnosis

RÉSUMÉ

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Dans un troupeau d'agneau "feed-lot" composé de 50 agneaux âgés d'environ 2.5 mois, le berger s'est plaint de la mort de deux agneaux au bout deux jours de maladie. Cinq agneaux en dépression déclarée ont été soumis à la Clinique des animaux de la ferme. Après des examens cliniques pathologiques, ils ont été diagnostiqués souffrant de la cysticercose viscérale aiguë. Les 43 autres agneaux ont été abattus et 20 d'entre eux présentaient des lésions de cysticercose aiguë. Une petite enquête épidémiologique de ce cas est décrite.

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was applied due to the unclear clinical findings and to the fact that 2 of the lambs were febrile. At the following post mortem examination the carcasses were in poor condition. Necropsy revealed the presence of sero-haemorrhagic fluid in the abdominal cavity as well as lesions in liver and lungs. Helicoid red or dark red tracts varying in length and diameter were seen on liver surface, caused by the immature cysticerci (Fig. 1a). On the cut surface the immature cysticerci caused extensive tissue damage as they migrated in the liver. In two cases plaques of fibrinous exudate covered part of the liver surface. Similar tracts were detected in lungs. Furthermore, bronchopneumonia lesions were seen in the 2 febrile lambs (Fig. 1b). The histopathological lesions in the liver included cyst-like channels caused by the migration of immature helminths through the liver. In early migrations, these channels were full of red cells and necrotic hepatocytes whereas in later ones an inflammatory zone including lymphocytes, macrophages and giant cells was evident in the bordering channels (Fig. 1c). Similar lesions were present in the lungs (Fig. 2a), while parasitic elements were found in some sections (Fig. 2b). The rest 43 lambs were slaughtered and 20 of them had lesions of acute cysticercosis.

**Figure 1a:** Acute parasitic migration tracks. Multiple worm shaped hemorrhagic tracks throughout liver surface.

**Figure 1b:** Cut surface of the liver. Multiple, dark red areas representing tracks or cysts filled with blood. There are some immature cysticerci (arrows).

**Figure 1c:** Lungs. Multiple, dark red hemorrhagic tracks, mainly on the caudal lobes. The ventral portions of the cranial and middle lobes are consolidated.

**Figure 2a:** At the left part an early formation of a channel is evident, which is full of red cells, neutrophils and eosinophilic cells and cell debris, surrounded by lymphocytes and macrophages. At the right part, there is a later tissue damage where large numbers of macrophages and giant cells surround channels which contain an eosinophilic mass of cell debris. At the periphery of the above zone, lymphocytes and a small number of eosinophilic cells are seen.

**Figure 2b:** Lungs. Transversal section of the channel and parasite. The parasite is surrounded by large number of red cells, cell debris, neutrophils and eosinophilic cells and scattered lymphocytes and macrophages.
The next step was to find out the cause of such a great dispersion of *T. hydatigena* eggs in the flock. The dispersion of eggs of *T. hydatigena* has been studied by Gemmell and Johnstone [7]. They placed an infected dog into its small intestine at a fixed site for 50 days and they found that the main egg clusters remained within a radius of 25 meters from this site. In the present case, after interviewing the farmer, it became evident that 4 dogs were chained no more than 5 meters away from the fenced yard. The distance between the chained dogs and the fenced yard was much smaller than the reported experimental one and, therefore, the infection of the lambs could be quite easy. These dogs received just a few days earlier an anthelmintic treatment with praziquantel for the first time in their life. In addition to this, the farmer was feeding them raw mutton, viscera and other by-products. It was suggested treatment of the dogs with anthelmintics every 3 months and sanitary control (cleaning and disinfection of the premises) for the next batches of lambs. Also, the farmer was advised to feed the dogs of the farm with commercial food and to avoid feeding sheep viscera etc.

Discussion

Everett and Gruchy [6] reported a case of acute cysticercosis in a goatling, twelve days after being housed in a dog kennel. Jensen and Pierson [10] correlated the qualitative features of hepatic lesions with the time of infection. Concerning the above data and the postmortem findings, the lambs in the present case probably became infected two weeks ago. This is in full accordance with the study of Pathak et al [17], which infected goat kids and killed them on days 7, 15, 30 and 60 post-infection. They concluded that the liver and the lungs appeared greatly affected on day 15.

Up to now, there are no data in the literature explaining why cysticercosis can occur either in its acute or in its chronic form. Taking into account the inadequate biosecurity measures applied in the present case and the existing knowledge from other similar infections like coenurosis [8], it could be concluded that this condition could be the result of massive infection with a large number of eggs.

Possible intermediate hosts for *C. tenuicolis* can be squirrels, pigs, cattle, sheep, goats and wild ruminants [18]. Infection with *C. tenuicolis* has also been reported in a variety of wild ungulates, feral animals and rabbits [11, 26], in fallow and rusa deer [19] and incidentally in a cynomolgus monkey [29].

The prevalence of cysticercosis varies from country to country and generally reaches higher incidence in countries with a lower degree of sanitary control and with an uncontrolled wild carnivore population [18]. Regarding the seasonal rate, the highest level of infection is observed during the rainy season and winter [13, 16, 28]. Pathak and Gaur [16] found higher incidence of *C. tenuicolis* infection during the rainy season probably due to the availability of the adequate humidity necessary for the development of the eggs. Livesey et al [13] reported higher possibility of infection during winter as a result of a closer contact between sheep and dogs because of the increasing tendency to house sheep during this season. Moreover, Trees et al [28] referred that liver condemnations reach the peak in winter. In our study, the severe acute cysticercosis infection occurred in February that is in the middle of the rainy season in Greece, before the end of winter. Also, this period of year the young lambs in Greece are usually aged 3-4 months old, which is an age of high susceptibility to cysticercosis, as according to Edwards and Herbert [4], sheep aged under 1 year old are susceptible to the disease.

In an abattoir study of chronic cysticercosis in Greece, it has been found 29.41% with a significant higher prevalence in adult (over 1 year old of age) [2]. It is well known that chronic cysticercosis is a common disease of sheep and there are many studies in the literature relative to this pathologic condition. On the contrary, acute cysticercosis is quite seldom and only a small number of such reports exist. Livesey et al [13] referred to a sudden death of five lambs due to *C. tenuicolis* infection. More recently, Yildirim et al [30] reported a case of “acute hepatitis cysticercosa” and “pneumonitis cysticercosa” in a one-month old lamb and Nourani et al [15] attributed the sudden death of a four-month old lamb to *C. tenuicolis*. The difference in mortality rates among the aforementioned cases could be attributed to different infection rate [10]. Acute disease has also been found by Everett and Gruchy [6] in a goatling which died twelve days after being housed in an old dog kennel. Finally, Manfredi et al [14] reported the same disease in a goat farm. Also, in a retrospective study in Greece [9] acute cysticercosis was diagnosed in goat kids; however, acute cysticercosis in lambs has never been reported in Greece so far and this is the first known case.

In the present study, lesions from *C. tenuicolis* migration were present in liver and also in lungs. This is in accordance with Livesey et al [13] and with Yildirim et al [30] who reported affection of both liver and lungs. On the other hand, in the study of Nourani et al [15] pulmonary involvement was not present, but they found only severe “hepatitis cysticercosa” in a four month old lamb died from acute cysticercosis.

Acute cysticercosis has also been diagnosed in various other animal species than lambs and goat kids, such as calves and piglets, but usually it causes sudden death without premonitory signs very sporadically [9, 24].

Acute cysticercosis has similar clinical and pathological findings with acute fasciolosis, a disease that should be taken into account for differential diagnosis, particularly in adult animals. The 2 conditions are differentiated with parasitological examination [9, 21], even though immature flukes do not produce eggs and therefore attention should be paid in live animals. Other common causes of acute death in lambs are septicemic pasteurellosis [3] and clostridial infections [12]. Also, the aforementioned conditions have
specific pathological findings and they do not have parasitic elements in the viscera.

References


