

Review Article

Clinical and Postmortem Findings of *Coenuru scerebralis* in Harri Sheep Herd in Taif Province, Saudi Arabia

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Abstract

This study aims to investigate clinical, pathological and histopathological findings of clinically infected sheep by *Coenurus Cerebralis* in Turaba governorate, Taif province, Saudi Arabia.

The herd shuttles between pastures for grazing accompanied by dogs for guardianship (Dog, Fox and Wolf may be considered a source of infection).

Clinical examination of the sheep revealed that 403 from 1542 Harri sheep (majority were female) aged from 1 to 4 years were clinically suffering from nervous symptoms as incoordination, irregular gait, failure to hold the head straight, leftward head tilt and circling around himself.

The morbidity rates between Harri Sheep were 0.5%, 1.49%, 4.86% 19.3% and 26.1% while mortality rates were 0.32%, 1.04%, 0.58%, 2.79 % and 4.7 % respectively for male less than or equal one-year-old, male over one-year-old, female less than or equal one-year-old, female over one-year-old and sum of sheep in herd (Sum of male and female in Sheep Herd).

Post-mortem investigation of diseased animals showed that varying cerebral tissue was thin, atrophied and congested. It tore easily by hand and included with a multiple of cysts (*C. cerebralis*).

Cysts were evacuated spontaneously and observed that occupied by white clusters attached to the internal layer of the cyst over the caudal portion of the cerebellum within the cranium. The cyst caused compression over the ventral portion of the left cerebral hemisphere so nervous manifestations may be diagnosed. The cyst was diagnosed as *C. Cerebralis*

This report describes a rare case of coenurus cystin brain and spinal cord of sheep and the associated pathognomonic lesions.

In conclusion, we found it beneficial to present the clinical and pathological findings of Harri Sheep manifested with *C. cerebralis* which is known to be a serious clinical entity among sheep in Taif province, Saudi Arabia.

INTRODUCTION

Coenurus is caused by *C. cerebralis* which is larval stage of *Multiceps multiceps* (*Taenia multiceps*) which is seen in small intestine of carnivores [1,2] particularly affects sheep and goats [3].

T. multiceps, is a common parasitic disease of sheep and goats in the Afro-Asian region and constitutes a major health problem in sheep and goats worldwide [4].

Coenurus cysts are located in the cerebral hemispheres in 88 – 96% (almost equally distributed in the left and right

hemispheres) and in the cerebellum in 4–12% of infected sheep [5,6].

Cysts may be present elsewhere in the brain and spinal cord, protruding into the cerebral ventricles, but they are often found near the surface of the parietal cerebral cortex [7].

The predilection sites of *C. cerebralis* cysts in the cerebral hemispheres of sheep, especially the subarachnoid space, facilitate the nourishment of the cyst by cerebrospinal fluid [8]. Given that there have been few reports to date describing localization of *Coenurus* cysts in the cerebral ventricles of sheep.

It can occur in both acute and chronic disease form. Acute Coenurosis occurs during the migratory phase of the larvae, usually about 10 days after the ingestion of large numbers of the tapeworm eggs. Young lambs/kids aged 6-8 weeks are most likely to show signs of acute disease and the signs are associated with an inflammatory and allergic reaction. There is transient pyrexia, and relatively mild neurological signs such as listlessness and a slight head aversion. Occasionally the signs are more severe and the animal may develop encephalitis, convulse and die within 4 - 5 days [9].

Most of the cysts are located in the cerebral hemispheres and spinal cord, but they rarely invade the subcutaneous and intramuscular tissues along with other organs [4].

Clinical signs manifested by the infected animals include circling, head tilt towards the side of the cyst location, incoordination and uncontrolled movements, ataxia, failure to hold the head straight, teeth grinding, salivation, paresis, convulsions and cerebral atrophy [10].

C. cerebralis initially causes purulent meningo encephalitis, later as the cyst grows; it leads to central nervous system symptoms resulting in death [2]. Most of the characteristic clinical findings are observed 2-8 months after the intake of pathogen [11].

Clinical symptoms are based on location and size of the Coenurus cyst in the brain [6]. Symptoms vary depending on the cyst's location, size, and compression of the brain [4,11].

This study presents clinical and postmortem findings in a rare case of *C. cerebralis*, Sheep (especially large number of ewes) were suffering from nervous symptoms that included torticollis, head inclination to the right, ataxia, irregular gait, sometimes walking in a straight line, circling and pressing the head against obstacles this leads to loss of appetite, blindness, dullness without treatment responses, so euthanasia of the affected sheep will be recommended.

MATERIALS AND METHODS

Harri sheep were clinically examined at the field. History was taken from the owner and the gross examination showed, incoordination, failure, circling to hold the head straight, loss of appetite, blindness. As a result of the systemic clinical examination of the infected sheep.

C. cerebralis infection was suspected and monitoring is recommended, during examination one animal fell to the ground in an upside down manner and hit the head severely onto the ground with convulsions that extended for few minutes. One male and 3 female were slaughtered in the Islamic way for dissection purposes. Postmortem examination was performed and the cranium dissected, also spinal cord and internal organs.

The head of two slaughtered animals preserved at -20 C° and sent to laboratory identification.

RESULTS

Clinical findings

The examined two animals showed symptoms of irregular gait, failure to hold the head straight and circling.

In our case no other abnormal clinical manifestation beside nervous manifestation was observed. Animals showed normal appetite, normal body temperature, no enlarged lymph nodes and the ruminal movements are within the physiological limits.

Brain tissue is collapsed (due to the drainage of the cystic fluid during removal of the brain from bony brain cavity) over the cystic formation extending from caudal to cranial in the left cerebral hemisphere.

Marked perforation on the sphenoid bone where it contacts with the ventral portion of the left cerebral hemisphere exhibiting a severe cyst formation.

Postmortem findings

Postmortem findings showed no pathological findings or gross lesions in the internal organs.

However, dissection of the cranium exhibited multiple cyst as white clusters attached to the internal layer of the cyst over the caudal portion of the cerebellum (arrows at Figure 1), Furthermore, cyst formation occupied the entire caudal hemisphere where the brain is thoroughly affected.

Laboratory findings

Opening of preserved sheep brains in Al Hassa provincial veterinary laboratory showed grossly (by necked eye) a large cyst measuring about 5×3cm and weighing about 120g occupied the dilated left lateral ventricle of brain cavity.

The cyst contained a translucent fluid and a large number of white clusters of scolices budding from the internal layer of the cyst. The overlying cerebral tissue was thin, atrophied and congested. It tore easily, and the cyst was evacuated spontaneously (Figure 2).

A secondary smaller cyst measuring 2×1cm in diameter may have been connected to the large one, leaving a cavity in the cerebral tissue (Figure 3). White clusters of numerous rice-shaped scolices were attached to the germinal layer of the cyst.

DISCUSSION

In this study, we evaluate the clinical and macroscopic finding of the infected sheep.

We find that clinical symptoms vary depending on the location and size of *C. cerebralis* cysts [4,7].

Reported clinical symptoms observed in the sheep herd are incoordination, impaired vision, ataxia, uncontrolled movements, and paralysis in legs, occasionally circling, fatigue and low mortality rate (4.7 %) [10,11].

Infected animals are noted to tilt their head towards the side of location of the cyst and circle to the direction of cyst location [4].

In our case presenting clinical symptoms of the infected sheep (52 ewes and 21 males from 1542 animals) agreed with (Achenef et al. [12], 1999 & Guclu et al. [13], who mentioned to the following symptoms, inertia, incoordination, irregular gait, failure to hold head tilt and circulating [8,14].



Figure 1 Animal reveals failure to hold the head straight suffering from alopecia.

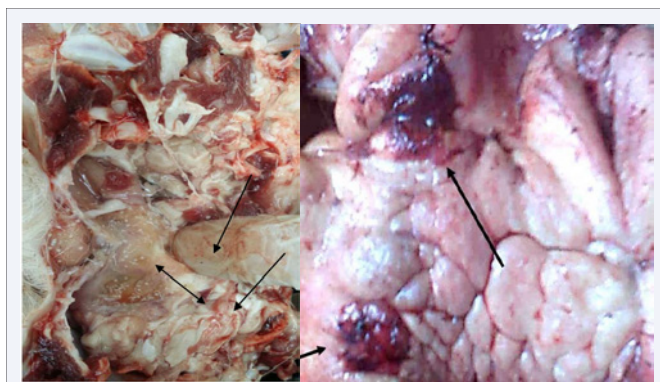


Figure 2 Multiple scolices of *T. multiceps* as white clusters attached to the internal layer of the cyst (arrows) in spinal cord and brain.

male over one-year-old, female less than or equal one-year-old, female over one-year-old and for both male and female (Sum of male and female at different ages in Sheep Herd) respectively (Table 1).

We determined cysts ranging about 5:2 x 3:1cm size in the caudal portion of the left cerebral hemisphere. The size of this cyst was larger than the ones reported in other studies [10,18]. The diameters of the cysts located in the brain are reported lobe 1.5:4.5cm [13].

It is noted that the prevalence of coenurosis among sheep was reported to be 0.35-9.8% in various countries [19].

In conclusion, clinical symptoms of *C. cerebralis* were observed in this Harri breed herd were verified on the basis of pathological lesions.

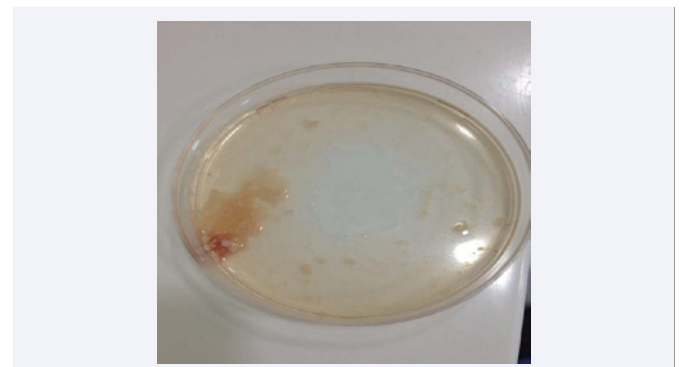


Figure 3 Multiple white scolices were evacuated from *C. cerebralis* cysts in petri dish.

In our study postmortem (dissection) findings stated that the reported *C. cerebralis*, were localized in the central nervous system (Brain and Spinal Cord) prevalent to be scattered in the left hemisphere of the CNS (cysts are located in both left, right hemisphere, and cerebellum) this agrees with Yoshino and Momotani (1988) [10,15] and (Nourani and Kheirabadi 2009), whereas Yilmaz and Can (1986) [16] found a cyst in the right hemisphere. In another study on calves [17] proved that cysts were located in the temporal parietal lobe (28.5%), occipital lobe (23.31%), frontal lobe (19.04%), cerebellum (14.28%), cerebrospinal lobe (9.52%) and spinal cord (4.99%).

The morbidity rates between Harri Sheep were 0.5%, 1.49%, 4.86% 19.3% and 26.1% and mortality rates were 0.32%, 1.04%, 0.58, 2.79 and 4.7 % for male less than or equal one-year-old,

The best method for control and prevention of coenurosis is to prevent dogs from having intermediate host's carcasses. In addition, the control and prevention of coenurosis should be based on routine anthelmintic dosing of dogs, recommended particularly every two months interval with anthelmintic compounds such as praziquantel [20]. Treating at this interval eliminates the worms before they become sexually mature and, therefore, prevents the shedding of eggs.

Treatment of infested sheep based on surgical removal of the coenurus which is the only efficient therapeutically protocol but needs to well-trained veterinarian.

The economic impact of *C. cerebralis* (dog tapeworms) on sheep production is often considered negligible in comparison to other ovine parasitic infections thinking that it would be

Table 1: Morbidity and mortality rates of Coenurus Cerebralis infection of Harri sheep in Taif province (Tourba governorate), Saudi Arabia year 2017.

Number of Sheep (in herd)			No of Infested Animals (Morbidity Rate)	No of Dead Animals (Mortality Rate)	Post-Mortom Examined
Sex	Age				
Male	≥ 1 year	24	8 (0.5 %)	5 (0.32 %)	0
	< 1 year	159	23 (1.49 %)	16 (1.04 %)	1
Female	≥ 1 year	738	75 (4.86 %)	9 (0.58 %)	1
	< 1 year	621	297 (19.3 % %)	43 (2.79 %)	2
Total		1542	403 (26.1 %)	73 (4.7 %)	4

appropriate to increase awareness as well as precaution measures for prevention of the spread of the disease in Saudi Arabia.

REFERENCES

1. Güçlü F, U Uslu, Ö Özdemir. Bilateral bone perforation caused by *Coenurus cerebralis* in a sheep: case report. *T Parazitol Derg.* 2006; 30: 282-284.
2. Christodoulouopoulos G. Two rare clinical manifestations of Coenurosis in sheep. *Vet Parasitol.* 2007; 143: 368-370.
3. Oge H, Oge S, Gonenc B, Ozbakis G, Asti C. Coenurosis in the lumbar region of a goat: a case report. *Veterinari Medicina.* 2012; 57: 308-313.
4. Sharma DK, PPS Chauhan. Coenurosis status in Afro-Asian region: A review. *Small Rumin Res.* 2006; 64: 197-202.
5. Edwards GT, Hackett F, Herbert IV. *Taenia hydatigena* and *Taenia multiceps* infections in Snowdonia, UK. The role of hunting dogs and foxes as definitive hosts, and of sheep as intermediate hosts. *Br Vet J.* 1979; 135: 433-439.
6. Avcioglu H, Terim KA, Yildirim A. Clinical, morphological and histopathological features of bovine coenurosis: case reports. *Revue Méd. Vét.* 2012; 163: 295-298.
7. Brown CC, Baker DC and Barker IK 2007. Alimentary system p.256. In: Jubb, Kennedy, and Palmer's Pathology of Domestic Animals, 5th edn vol 2 (Maxie, M.G.ed.) Saunders/ Elsevier, Philadelphia.
8. Epstein E, Proctor NS, Heinz HJ. Intra-ocular *Coenurus* infestation. *S Afr Med J.* 1959; 33: 602-604.
9. Skerritt GC. Coenurosis. In: Diseases of Sheep. 2nd Edn. Martin WB, Aitken ID. Blackwell Scientific Publications. Oxford. 1991; 70.
10. Yoshino T, E Momotani. A case of bovine Coenurosis (*Coenuruscerebralis*) in Japan. *Jpn J Vet Sci.* 1988; 50: 433-438.
11. Gül Y, M İssi, S Özer, 2007. Clinical and pathological observations of flock of sheep showing epileptoid spasm related to Oestrosis and Coenurosis. *F Ü Sağlık Bil Derg.* 21: 173-177.
12. Acheneff M, Markos T, Feseha G. *Coenuruscerebralis* infection in Ethiopian highland sheep: incidence and observations on pathogenesis and clinical signs. *Trop Anim Health Prod.* 1999; 31: 15-24.
13. Güçlü F, U Uslu, Ö Özdemir. Bilateral bone perforation caused by *Coenuruscerebralis* in a sheep: case report. *T Parazitol Derg.* 2006; 30: 282-284.
14. Ibrahim A Qassim, Adil A Mohammed, Izeldin A Babiker, Mohamed Ali Salih, Abdul-Aziz M. Albadrani, Nasereldin B, et al. Clinical *Coenurus Cerebralis* in Harri Sheep in Mecca Region of Saudi Arabia: A case Report. 2017.
15. Nourani H, KP Kheirabadi. Cerebral coenurosis in a goat: Pathological findings and literature review. *Comp Clin Pathol.* 2009; 18: 85-87.
16. Yılmaz K and R Can. A case of coenurosis (*Coenuruscerebralis* Batsch, 1786) in a heifer. *Ank Univ Vet Fak Derg.* 1986; 33: 187-192.
17. Islam AWMS, MS Rahman, 1997. A report on incidence of gid of calves of Bangladesh. *Indian J Anim Health,* 1997; 36: 187-188.
18. Dinev I, D Stoykov, I Bozadjiev. Clinical and morphological studies in spontaneous coenurosis in calves. *Bulgarian J Vet Med.* 1999; 2: 131-136.
19. Radfar MH, Tajalli S, Jalalzadeh M. Prevalence and morphological characterization of *Cysticercus tenuicollis* (*Taenia hydatigena cysticerci*) from sheep and goats in Iran. *Veterinarski Arhiv.* 2005; 75: 469- 476.
20. Gascoigne E, Crilly JP. Control of tapeworms in sheep: a risk-based approach. *Practice.* 2014; 36: 285-293.

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