

First report of coenurosis in sheep in the State of Mato Grosso do Sul, Brazil

Primeiro relato de cenurose em ovinos no Estado de Mato Grosso do Sul, Brasil

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Abstract

This paper reports the first case of coenurosis in the State of Mato Grosso do Sul, Brazil. This disease is caused by the larval stage of the tapeworm *Taenia multiceps* (Leske, 1780). The animal in which the disease was diagnosed was an 18-month-old ewe from an endemic area of Southern Brazil as an imported animal among a group of 30 sheep. The clinic-pathological condition was that commonly found in herbivores affected by the disease, especially sheep. Apathy, nystagmus, intermittent blindness, circling and pressing head against obstacles were the neurological signs reported. The necropsy showed that a brain lesion in the subcortex of the right hemisphere was a bladder-like cyst measuring 4 cm in diameter filled with a translucent fluid with a large number of white spherules (protoscolices) floating. In addition to the identification of the *Coenurus cerebralis* protoscolices, the brain tissue lesion was histopathologically described.

Keywords: Cestodes, metacestode, neurological lesion, parasites, epidemiology.

Resumo

Este trabalho relata o primeiro caso de cenurose no Estado de Mato Grosso do Sul, Brasil. Essa doença é causada por estágios larvais de *Taenia multiceps* (Leske, 1780). O animal no qual foi diagnosticado, tinha cerca de 18 meses de idade, oriundo de uma área endêmica no Sul do Brasil, integrante de um grupo de 30 ovinos importados para o Estado de Mato Grosso do Sul. O quadro clínico-patológico apresentado é aquele comumente descrito para herbívoros, infectados com o agente, especialmente ovinos. Os sinais clínicos relatados foram: apatia, nistagmo, cegueira intermitente, andar em círculos e pressão da cabeça contra obstáculos. Na necropsia foi observada uma lesão, no subcórtex do hemisfério cerebral direito, caracterizada por um cisto em forma de vesícula, medindo 4 cm de diâmetro, e seu interior preenchido por líquido translúcido com grande número de pequenas esferas brancas, identificadas como protoscolices. Os protoscolices foram identificados como *Coenurus cerebralis*, e os tecidos do cérebro submetidos complementarmente a exames histopatológicos para descrição da lesão.

Palavras-chave: Cestodas, metacestoda, lesões neurológicas, parasitas, epidemiologia.

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Coenurosis is caused by the larval stage of *Taenia multiceps* (Leske, 1780). At this stage, the larvae are called *Coenurus cerebralis*. The adult form of the parasite is found in the intestines of carnivores, especially dogs, while the larval stage, which causes coenurosis, is found in herbivores that have ingested eggs or gravid proglottids of *T. multiceps*. Human cases of coenurosis are reported in the literature (IBECHUKWU; ONWUKEME, 1991). In Brazil, the first case was reported by Correa et al. (1962). *Coenurus cerebralis* forms bladder-like cysts in the central nervous system and they are mostly seen in the midportion of the cerebral cortex (EDWARDS; HERBERT, 1982; KELLY; PAYNE-JOHNSON, 1993; ACHENEF et al., 1999; SCALA et al., 2007).

A common cause of neurological disease in sheep, coenurosis occurs mostly in animals from six to 18 months of age. The disease has different clinical signs depending on the number of cysts in the intermediate host, which determines disease progression (RIET-CORREA et al., 1998; SCOTT, 2007). Acute cases of coenurosis are characterized by symptoms such as fever, ataxia, muscle tremors and hemorrhagic retinal lesions (DOHERTY et al., 1989). In chronic cases, the most common clinical signs are paralysis, blindness, nystagmus, lack of coordination, lethargy and lack of response to stimuli. Infected animals tend to move away from the herd and press their head against objects (EDWARDS; HERBERT, 1982; RISSI et al., 2008).

Coenurosis is a fatal disease and death occurs as a result of encephalitis on average 30 days after infection (ACHENEF et al., 1999; CHRISTODOULOPOULOS, 2007). In the acute phase, the signs arise from a change to metacystode stage (EDWARDS; HERBERT, 1982). In the chronic phase, brain tissue displacement and atrophy occur due to pressure exerted by the mature *Coenurus* with varying degrees of necrosis and hemorrhage (ACHENEF et al., 1999).

The clinical signs and symptoms of coenurosis in sheep may be confounded with listeriosis, papilledema, polioencephalomalacia, head trauma or brain abscess (EDWARDS; HERBERT, 1982; SCOTT, 2007). The diagnosis is made based on epidemiological and clinical evaluations as well as necropsy and requires an anatomohistopathological examination for confirmation (RISSI et al., 2008).

The purpose of the present report is to present clinical and pathological findings of chronic coenurosis and made the first report of this disease in an infected imported animal identified as a carrier of coenurosis in the State of Mato Grosso do Sul, Brazil, emphasizing the need for disease control through monitoring transit of animals for trade.

An 18-month-old ewe (Texel breed) from a group of 30 sheep reared on a farm in Campo Grande, MS, Brazil, originally from the region of Bagé, RS, Brazil, and acquired eight months earlier, underwent a clinical examination at the Veterinary Hospital of the Universidade para o Desenvolvimento do Estado e da Região do Pantanal (UNIDERP)/Anhanguera due to signs of blindness and changes in locomotor activity. These signs were preceded by the animal separating itself from the flock one month earlier, according to the owner's report. On clinical examination, the animal showed pressing apathy, blindness, nystagmus and intermittently hit its head against the wall of the stall as it were walking in circles. With the exception of tachypnea, other

clinical parameters were within normal limits. The animal was treated with dexamethasone, vitamin B1 and fluids. Over the course of treatment, the animal began to decline food and water. Baseline blood test revealed leucopenia ($4700 \text{ cells.mm}^{-3}$), and no significant abnormalities were found in the cerebrospinal fluid. The drug therapy was not effective. On the fourth day of treatment, the animal remained in lateral decubitus and euthanasia was necessary.

The postmortem examination revealed a bladder-like cyst with 4 cm in diameter (Figure 1) filled with a translucent liquid in the right brain hemisphere. A large number of white beads floated in the fluid in the cystic cavity (Figure 2). Stereomicroscopy revealed that these beads had protoscolices characteristic of *T. multiceps*, confirming the definite diagnosis of coenurosis (*Coenurus cerebralis*). Brain compression showed extensive areas of malacia in the right hemisphere at the lesion site (Figure 3).

The cyst replaced a large portion of cerebral parenchyma in the right hemisphere. After removal of the cyst and its capsule, a cavity with irregular walls could be seen. Microscopically, the lesion consisted of a cavity with eroded margins with an underlying wide band of eosinophilic necrotic tissue surrounded by numerous macrophages and Langhans giant cells and small clusters of lymphocytes. Due to cyst compression, the underlying parenchyma was compressed and slightly hyperemic with minor degenerative or inflammatory reaction. Other organs showed no macroscopic abnormalities. As coenurosis was confirmed in this specimen, feces of four adult dogs living on the property were collected for laboratory examination, which revealed absence of proglottids or eggs of *Taenia* spp.

The State of Mato Grosso do Sul has experienced a continuous growth in its sheep population in recent years. For flock formation, matrices are usually imported from areas with long-standing tradition of sheep raising, mainly in Southern Brazil. The region of origin of the animal described in the present case report has a previous history of coenurosis in sheep and cattle (FERREIRA et al., 1992; RIET-CORREA et al., 1998; RISSI et al., 2008) and the disease is spreading to other Brazilian States (SOUZA et al., 2008). Thus, the source of infection in this case is most probably identified. The clinical, macroscopic and microscopic findings were substantially similar to many other cases reported in the literature (RIET-CORREA et al., 1998; ACHENEF et al., 1999; SCOTT, 2007; RISSI et al., 2008).

An important necropsy finding was that the cyst was found in the telencephalic portion of the right cranial lobe. The same has been reported in most cases studied by Achenef et al. (1999). According to Sharma and Chauhan (2006), this common location of the cyst causes the visual, behavioral and posture impairments that are the main clinical manifestations of coenurosis. A similar finding was reported by Rissi et al. (2008).

The histological sections showed an area of necrotic tissue on the margins of cerebral tissue in close contact with the cyst with an expressive amount of eosinophils at its center. The eosinophilic band in the eroded margins of the brain parenchyma in close contact with the cyst is probably a result of cerebral tissue compression and the presence of Langhans

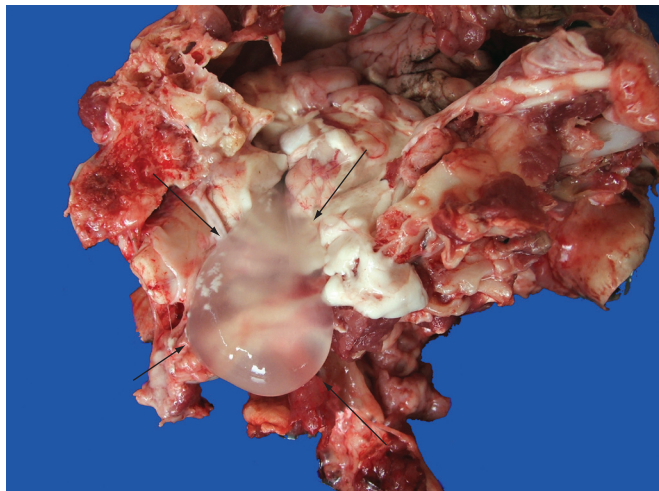


Figure 1. Coenurus cyst (black arrow) filled with translucent fluid in the brain subcortex of a sheep.

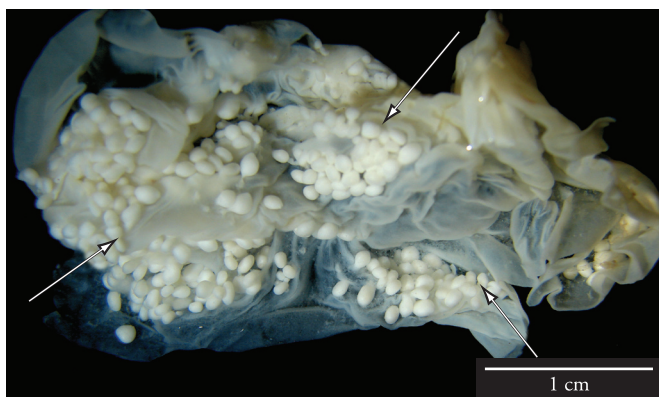


Figure 2. Scolices (*Coenurus cerebralis*) of *Taenia multiceps* (arrow) in the cyst removed from the brain subcortex of a sheep (scale bar = 1 cm).

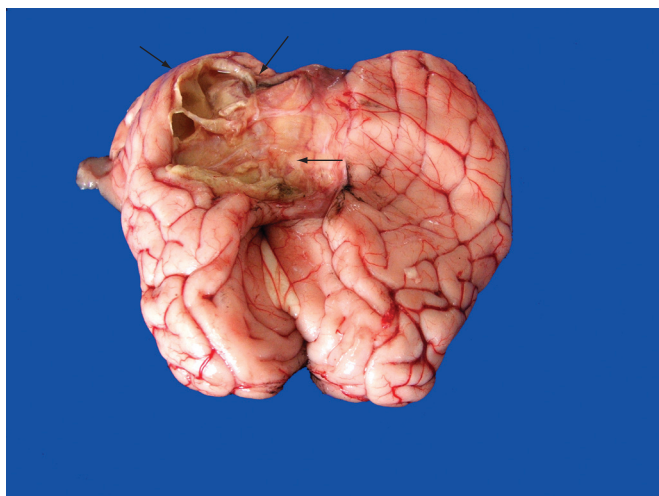


Figure 3. Brain of sheep infected by *Taenia multiceps*; extensive area of malacia in the right hemisphere of the brain caused by cystic compression (*Coenurus cerebralis*).

giant cells typically indicates a chronic inflammatory response to parasitic infection.

Considering the existence of this endoparasite in Brazil, reports of new cases should be continuously encouraged for gaining more knowledge on its distribution, endemic areas and outbreaks nationwide. This first report of coenurosis in the State of Mato Grosso do Sul is intended to call health surveillance authorities attention to the importance of establishing more effective control measures for this disease and other zoonotic diseases in sheep not yet reported in the region.

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