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Management of non-cerebral coenurosis in a goat: A case report

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Abstract

Aim: The objective of this report is to document and manage a clinical case of non-cerebral coenurosis (*Coenurus gaigeri* infection) in a two-year-old female goat. The report highlights the animal's clinical presentation, the diagnostic procedures employed, the surgical intervention performed, and the broader zoonotic implications associated with the condition.

Study Design: This work is presented as a detailed clinical case report that outlines the diagnostic process and surgical management of coenurosis in a goat, supplemented with postoperative monitoring.

Place and Duration of Study: The case was handled at the Veterinary Clinical Complex, Rajendranagar, Hyderabad. Clinical management, surgical intervention, and postoperative care were conducted over a 12-day period, during which the animal was continuously evaluated for recovery and recurrence.

Methodology: A two-year-old female non-descript goat was brought to the clinic with a noticeable swelling on the lateral aspect of the left hind limb. Clinical examination revealed the swelling to be soft, fluctuating, painless, and mildly edematous. Fine needle aspiration (FNA) of the mass yielded clear fluid containing multiple small, white plaque-like structures. Microscopic evaluation of the aspirated material confirmed the presence of *Coenurus gaigeri* larvae. Postoperative care consisted of administering broad-spectrum antibiotics to prevent secondary infection, anti-inflammatory medication to reduce pain and swelling, and praziquantel to eliminate any residual parasitic burden. The goat was monitored closely throughout the recovery period.

Results: The cyst was successfully exteriorized and excised along with its fluid contents, without any rupture or intraoperative complications. Healing progressed smoothly, and by the 12th postoperative day, the goat showed complete recovery with no evidence of recurrence, local inflammation, or systemic complications. The surgical site healed satisfactorily, and the animal resumed normal behavior and limb function.

Conclusion: This clinical case confirms the occurrence of subcutaneous coenurosis in goats and demonstrates that surgical excision combined with antiparasitic therapy is both safe and highly effective. The report further emphasizes the zoonotic significance of *Coenurus gaigeri* infection, as contamination of the environment with canine feces can pose a risk to both livestock and humans. Routine deworming of dogs, responsible disposal of animal waste, strict carcass inspection, and adequate cooking of meat are essential control measures to break the transmission cycle and reduce public-health risks.

Keywords: Goat, cyst, non-cerebral coenurosis, *Coenurus gaigeri*

1. Introduction

Coenurus gaigeri represents the larval, or metacestode, stage of *Taenia multiceps* (Oryan *et al.*, 2010) [9] and is known to cause non-cerebral coenurosis, a parasitic condition that primarily affects small ruminants such as goats and sheep. In the parasite's life cycle, dogs serve as the definitive hosts, harboring the adult tapeworm in their small intestine (Soulsby, 1982) [13] and continuously shedding large numbers of infective eggs in their feces. These eggs, which contain viable hexacanth embryos, contaminate grazing areas, feed, and water sources. Herbivorous animals acting as intermediate hosts acquire the infection when they inadvertently ingest these contaminated materials during normal feeding behavior. After ingestion, the embryos penetrate the intestinal mucosa and migrate through the bloodstream to various tissues. Although the central nervous system is the most common site for larval development—leading to the classical neurological condition known as *Coenurus cerebralis*—

ectopic localization is also well documented. Several researchers (Bhalla and Negi, 1962; Sharma *et al.*, 1995) [2, 12] have reported cysts occurring in subcutaneous tissues, intramuscular spaces, and numerous visceral organs. In goats, the parasite has been identified in a wide array of anatomical regions, including the thigh musculature, cervical muscles, diaphragm, heart, kidneys, uterus, rectum, and even the urinary bladder.

When these cysts develop within muscular tissues, they may exert pressure on surrounding structures, leading to clinical signs such as localized swelling, discomfort, lameness, or restricted movement of the affected limb or body region. Beyond the health impact on the animal, *C. gaigeri* infection has significant economic implications. The presence of subcutaneous or intramuscular cysts reduces the market value of meat and hides, contributing to financial losses for livestock owners and affecting the overall quality of animal products.

The present case report highlights a rare occurrence of *Coenurus gaigeri* infection localized within the thigh musculature of a non-descript goat, underscoring the unusual presentation of this parasitic disease outside the central nervous system. The diagnosis was established with precision through a combination of clinical evaluation, fine needle aspiration, and microscopic examination, which revealed characteristic larval structures confirming the identity of the parasite. Surgical excision of the intact cyst was performed under strict aseptic conditions, ensuring complete removal without rupture and thereby preventing contamination of surrounding tissues. Postoperative management included the administration of antibiotics to control potential bacterial infection, anti-inflammatory therapy to reduce pain and swelling, and targeted anthelmintic treatment with praziquantel to eliminate residual parasitic stages. The goat responded favorably, exhibiting smooth wound healing, restoration of normal limb function, and absence of recurrence or complications during the follow-up period. This case emphasizes the importance of early recognition, accurate diagnosis, and integrated surgical and medical intervention in managing non-cerebral coenurosis, while also drawing attention to its broader veterinary and public health significance.

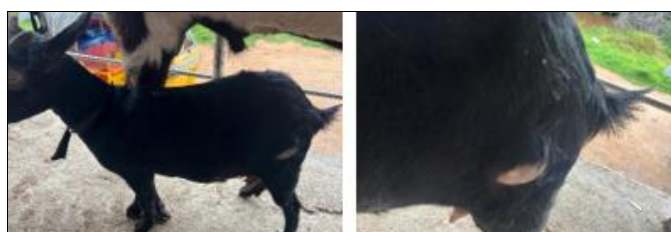


Fig 1: Swelling on the lateral aspect of the left hind limb

2. Materials and Methods

A two-year-old, non-descript female goat was brought to the Veterinary Clinical Complex at the College of Veterinary Science, Rajendranagar, Hyderabad, with a history of a gradually enlarging mass on the lateral aspect of the left hind limb, noted by the owner as progressive over time and documented clinically (Fig. 1). The animal was maintained under a free-range grazing system, spending considerable time in open pastures, a management practice that can increase contact with environmental contaminants such as canine fecal matter and, by extension, parasite eggs. On presentation, the goat was bright, alert, and responsive,

without evidence of systemic compromise; vital signs were within normal limits, including a body temperature of 102.3°F, pulse rate of 80 beats per minute, and respiratory rate of 22 breaths per minute, supporting a localized rather than generalized process. Focused examination of the limb identified a soft, fluctuant, non-tender swelling measuring roughly 5 cm in diameter, well-circumscribed and mobile relative to surrounding tissues. The consistency and mobility of the mass, together with its fluid character, strongly suggested a cystic lesion rather than a solid neoplasm or inflammatory abscess, guiding subsequent diagnostic procedures toward aspirative and microscopic evaluation.

To obtain a more definitive evaluation of the lesion, fine needle aspiration (FNA) was carried out under strict aseptic precautions using a sterile 21-gauge needle. The procedure resulted in the withdrawal of a clear, watery cystic fluid that contained small, whitish floccular particles suspended within it. This aspirated material was carefully placed onto a clean glass slide, covered with a coverslip, and subjected to microscopic examination under both low (10X) and high (40X) magnifications. The microscopic analysis revealed numerous motile larval forms, each characterized by multiple scolices. These scolices were distinctly identifiable by the presence of four well-developed suckers and a rostellum armed with a crown of hooks, which are hallmark features of *Coenurus* larvae. The combination of these morphological traits provided conclusive evidence for the identification of the parasite as *Coenurus gaigeri*, the larval stage of *Taenia multiceps gaigeri*. This diagnostic confirmation highlighted the parasitic origin of the lesion and explained the clinical presentation observed in the goat, thereby guiding appropriate therapeutic intervention.

Following confirmation of non-cerebral coenurosis, the cyst was surgically excised under strict aseptic conditions to prevent intraoperative rupture and limit any risk of contaminating adjacent tissues. After standard site preparation, a local anesthetic block with lignocaine hydrochloride was administered, and a precise incision was made directly over the swelling; subcutaneous planes and muscle fibers were carefully dissected to expose and gently mobilize the lesion. The intact cyst was exteriorized without breach, minimizing spillage of cystic contents, and the residual cavity was irrigated and treated with tincture of iodine to achieve local antisepsis. Layered closure was performed: the muscle fascia was apposed using a simple continuous suture pattern with an absorbable material (vicryl), and the skin was closed with simple interrupted sutures using a non-absorbable monofilament (nylon), ensuring robust wound edge approximation and optimal drainage. The cyst was dissected free from surrounding musculature with meticulous attention to hemostasis and tissue preservation, and removed intact for further evaluation. Postoperative care comprised an evidence-based regimen including a broad-spectrum injectable antibiotic to mitigate bacterial contamination, a nonsteroidal anti-inflammatory drug to control pain and inflammation, and an oral anthelmintic (praziquantel) to target residual larval stages and reduce the likelihood of reinfection, all administered for appropriate durations under veterinary supervision. The goat's recovery was smooth and uneventful, with progressive resolution of local swelling, clean wound healing, and restoration of normal limb function; serial follow-up assessments revealed no signs of recurrence, secondary infection, or postoperative complications, confirming the effectiveness of the combined surgical and medical management strategy.

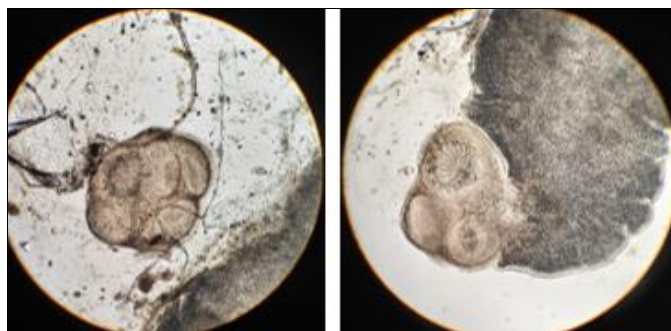


Fig 2: Microscopic view of cyst containing four suckers and hooks of *Coenurus gaigeri*



Fig 3: Cyst containing protoscolices in clusters attached to the inner germinal layer of *Coenurus gaigeri*

3. Results and Discussion

Based on the clinical history, thorough physical examination, and confirmatory diagnostic findings, the goat was conclusively diagnosed with non-cerebral coenurosis, a rare manifestation of *Coenurus gaigeri* infection. Unlike the more common cerebral form, the parasitic cyst in this case was located deep within the intramuscular tissue of the thigh, firmly embedded between muscle fibers, which accounted for the distinct localized swelling in the absence of neurological deficits. The management strategy involved complete surgical excision of the cyst, ensuring removal of the parasitic structure without damage to surrounding tissues, followed by adjunct medical therapy with praziquantel to eliminate any residual parasitic stages and prevent reinfection. Postoperatively, the goat demonstrated an excellent clinical response, with rapid improvement in mobility and resolution of swelling. Careful monitoring during the recovery period revealed no complications such as wound infection, systemic illness, or recurrence of cystic lesions. Over a two-month follow-up, the animal remained healthy and active, highlighting the effectiveness of combining surgical intervention with targeted anthelmintic therapy in treating non-cerebral coenurosis and emphasizing the importance of early diagnosis and comprehensive management in ensuring favorable outcomes.

The excised cyst measured approximately 5 cm in length. On gross examination, the outer surface of the cyst wall appeared thick, fibrous, and grayish in color, suggesting a chronic host tissue reaction. In contrast, the inner surface was thin, smooth, and translucent, containing numerous clusters of invaginated scolices firmly attached to the germinal layer (Fig. 3). Microscopic evaluation of the isolated scolices revealed prominent taeniid hooks and well-developed morphological features consistent with *Coenurus* species. Because the cyst occurred at an extracranial site—within muscular tissue rather than the central nervous system—it was identified as *Coenurus gaigeri*, the larval or intermediate stage of *Taenia multiceps*. As described by Soulsby (1982) [13] and

supported by Desouky *et al.* (2011) [4], each scolex typically bears four cup-shaped suckers and a rostellum equipped with two concentric rows of hooks, the number of which may range from 22 to 32 depending on developmental stage.

Coenurosis, commonly referred to as “gid” or “sturdy,” is a serious parasitic disease of sheep and occasionally humans, caused by the larval stage of *Taenia multiceps*. The parasite generally establishes itself in the brain and spinal cord, where expanding cysts interfere with normal central nervous system function, often leading to severe neurological deficits or death. While cerebral involvement is most common in sheep, goats exhibit a higher tendency for atypical or ectopic cyst development. Several studies (Bhalla and Negi, 1962; Sharma *et al.*, 1995; El-Sinnary *et al.*, 1999; Sharma and Chauhan, 2006) [2, 12, 5, 11] have reported that in goats, cysts frequently form in subcutaneous tissues, skeletal muscles, and other extracranial locations. These lesions often remain localized and may persist unnoticed for long periods since they do not always produce overt clinical symptoms.

The severity of clinical signs in such infections can differ greatly from one animal to another, largely because multiple host- and parasite-related factors shape how the disease progresses. An animal's immune competence plays a major role those with weaker or immature immune systems, such as young kids or individuals that are immunocompromised, are generally less able to limit parasite development and therefore tend to develop more extensive lesions or experience a more rapid formation of cysts. The overall parasite burden also influences outcome, as ingesting a larger number of infective eggs can overwhelm the host's defenses and worsen tissue damage. In the case described, the affected goat showed an excellent therapeutic response, surgical intervention combined with appropriate medical management led to steady improvement, and subsequent administration of praziquantel successfully eliminated residual parasitic stages. Follow-up evaluations revealed no signs of relapse, indicating a complete and sustained recovery.

Table 1: Haematological findings in *Coenurus* affected Goat

Parameter	Reference values	Infected Goat
Hb (g/dl)	8 - 12	10.97
RBC (106/cmm)	8 - 18	9.88
PCV (%)	22 - 38	29.01
WBC (103/cmm)	4 - 13	12.01
PLT (x109/uL)	300 - 600	400.38
NEUTROPHILS (%)	30 - 48	37.38
LYMPHOCYTES (%)	50 - 70	58.67
MONOCYTES (%)	0 - 4	2.98
EOSINOPHILS (%)	1 - 8	10.13

*Reference values taken from Merck Manual

Table 2: Serum biochemical findings in *Coenurus* affected Goat

Parameter	Reference values	Infected Goat
ALT (U/L)	6- 19	17.19
AST (U/L)	167 - 513	175.20
ALP (U/L)	93 - 387	193.78
Total bilirubin (mg/dL)	0 - 0.1	0.06
Total protein (g/dL)	6.4 - 7.0	6.87
Creatinine (mg/dL)	1.0 - 1.8	1.06
BUN (mg/dL)	12 - 26	17.20
Cholesterol (mg/dL)	80 - 130	93.23

*Reference values taken from Merck Manual

4. Conclusion

The present report documents an uncommon case of non-

cerebral coenurosis in a goat, attributed to *Coenurus gaigeri*. The diagnosis was confirmed through detailed microscopic evaluation of the cystic lesions, and the animal was successfully managed using an appropriate combination of surgical intervention and adjunct medical therapy. This condition is of considerable veterinary and public-health significance, having notable zoonotic implications. Goats, particularly those between one and two years of age, are commonly slaughtered for chevon, and meat from infected animals can serve as an important source of parasite transmission if proper precautions are not followed. Domestic dogs, which act as the definitive hosts for *Taenia gaigeri*, are central to the epidemiology of the disease. They perpetuate the life cycle of the parasite by shedding infectious stages in their feces, thereby contaminating the environment. Goats acquire infection primarily by ingesting these eggs from contaminated feed, water, or pastureland that has been exposed to dog fecal matter. Consequently, restricting dogs' access to grazing fields, barns, and feed storage areas, along with adhering to a routine and strategic deworming schedule for canine populations, is essential for effective control. In addition to these preventive steps, proper disposal of animal by-products, hygienic handling of carcasses during slaughter, and careful meat inspection are vital to interrupt transmission. Thorough cooking of goat meat before consumption further reduces the likelihood of zoonotic infection in humans. Collectively, these measures help safeguard both livestock health and public well-being by limiting the spread of this parasitic disease.

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Competing Interests

Authors have declared that no competing interests exist.

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