Evaluation of the Impact of Anthelmintic Treatment of Herding Dogs with Praziquantel and Their Nutritional Hygiene Management on Reducing Cerebral Coenurosis in Female Afshari Lambs Under Two Years of Age

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Abstract

Background: Cerebral coenurosis, caused by *Taenia multiceps* larvae, is a significant neurological disease in sheep, impacting the central nervous system and causing economic losses due to mortality and culling. Herding dogs, as definitive hosts, transmit the parasite through fecal egg shedding, contaminating pastures. This study evaluates the effectiveness of regular anthelmintic treatment of herding dogs with praziquantel and nutritional hygiene management in reducing coenurosis incidence in female Afshari lambs under two years of age.
Methods: From 2019 to 2024, in a 20,000-head sheep breeding unit in Jolgah Rokh-Torbat Heydariyeh, Iran, 100 herding dogs were treated with praziquantel (5 mg/kg body weight, every 6 weeks) starting in 2021. Dog feces were collected and incinerated post-treatment to prevent egg dissemination, and feeding dogs with infected sheep offal was prohibited. Female Afshari lambs under two years were monitored for clinical signs (e.g., circling, head deviation) and confirmed via necropsy. Prevalence was calculated annually, and pre- and post-treatment data were compared using the chi-square test ($P<0.05$).
Results: Of 31,252 lambs examined, coenurosis prevalence decreased from 12.5% in 2019–2020 (before treatment) to 0.22% in 2024 ($P<0.001$) after implementing the treatment and hygiene program. Necropsy confirmed *Coenurus cerebralis* cysts in the brain or cerebellum of affected lambs. No adverse effects from praziquantel were observed in dogs.
Conclusion: Regular praziquantel treatment of herding dogs combined with nutritional hygiene management significantly reduced cerebral coenurosis prevalence, improving herd health and reducing economic losses. This cost-effective strategy is recommended for broader implementation in sheep farming.

Keywords: *Taenia multiceps*, Praziquantel, Sheep, Prevention.

Introduction:

Cerebral coenurosis is a common parasitic disease in sheep, primarily affecting the brain and spinal cord. It is associated with neurological symptoms such as confusion, circling, head deviation, imbalance, and blindness, often leading to animal death and economic losses (1). The risk of transmission to humans is negligible. Coenurosis is more prevalent in young sheep (9–18 months) and causes significant economic losses due to the culling or slaughter of affected animals.

The parasite's life cycle involves definitive hosts (dogs and other carnivores) and intermediate hosts (sheep and other ruminants). Herding dogs play a key role in disease transmission by shedding parasite eggs in their feces, contaminating pastures (2). Sheep ingesting contaminated forage develop cysts in their central nervous system (CNS), leading to clinical lesions after 6–8 months.

In Iran, coenurosis prevalence ranges from 0.3% to 42.2%, depending on factors such as herd management, feeding dogs with infected offal, and lack of anthelmintic treatment (3,4). Treating affected sheep is challenging and uneconomical, making prevention by interrupting the parasite's transmission cycle critical. Regular treatment of herding dogs with praziquantel and hygienic carcass management have been recommended as effective preventive measures (5). However, limited data exist on the long-term effectiveness of these strategies in large Iranian herds. This study aimed to assess the impact of regular praziquantel treatment of herding dogs and their nutritional hygiene management on reducing coenurosis incidence in female Afshari lambs under two years in a 20,000-head herd in the Jolgah Rokh-Torbat Heydariyeh region. Slaughterhouse studies in Iran have reported varying prevalence, indicating the influence of regional and management factors (6). This study evaluated a preventive program based on praziquantel treatment and hygienic carcass management in a large herd over five years to provide a practical and effective disease control strategy.

Materials and Methods:

The study was conducted from 2019 to 2024 in a 20,000-head sheep breeding unit in the Jolgah Rokh-Torbat Heydariyeh region. The target population was female Afshari lambs under two years, selected due to their high susceptibility to coenurosis.

From summer 2021, 100 herding dogs were treated every 6 weeks with praziquantel (Drontal tablets, 5 mg/kg body weight) (7). After the initial treatment, dog feces were collected and incinerated for 3 days to prevent egg dissemination. Feeding dogs with infected sheep offal or carcasses was strictly prohibited. Sheep were regularly monitored for clinical signs of coenurosis (circling, head deviation, imbalance, blindness), and suspected cases were confirmed by necropsy. Sheep were fed from pastures in Sarakhs, Khangiran, Jolgah Rokh, and Feyzabad-Mahvelat, supplemented with manual feeding. Confirmed coenurosis cases were culled or slaughtered.

Data on lamb populations and coenurosis cases were recorded annually. Disease prevalence was calculated as (number of confirmed cases ÷ susceptible population × 100). The chi-square test with a significance level of $P<0.05$ was used to compare prevalence before and after treatment (8).

Results and Discussion:

Over five years, 31,252 female lambs were examined. Before the treatment program (2019–2020), the average coenurosis prevalence was 12.5%. After initiating regular dog treatment in 2021, prevalence gradually decreased, reaching 0.22% in 2024 ($P<0.001$). Table 1 provides detailed results. Necropsy of slaughtered animals confirmed Coenurus cerebralis cysts in the brain or cerebellum. No adverse effects from praziquantel were reported in dogs.

Table 1. Female lamb population and coenurosis cases by year (2019–2024)

Year	Female Lamb Population	Coenurosis Cases	Prevalence (%)
2019	6200	775	12.5
2020	6350	794	12.5
2021	6400	512	8
2022	6300	126	2
2023	6250	31	0.5
2024	6252	14	0.22

The results demonstrate that regular praziquantel treatment of herding dogs and hygienic carcass management effectively reduced coenurosis prevalence. The decline from 12.5% to 0.22% over five years confirms the importance of interrupting the parasite's transmission cycle. Previous studies have also reported praziquantel's effectiveness in reducing *Taenia* egg shedding by dogs (2,5).

The initial 12.5% prevalence in this study aligns with the 18.6% reported in Urmia (Tavassoli et al., 2011) but is higher than 0.3% in Babol (6) and 3.8% across various Iranian cities (4). These variations are attributed to sampling methods (live population vs. slaughterhouse), animal age, and herd management. Lambs under two years were an appropriate target group due to their high susceptibility to CNS cyst formation (1).

International studies also report varying prevalence. Gicik et al. (2007) in Turkey linked an 8.73% prevalence to feeding dogs with infected offal, while Scala et al. (2007) in Sardinia

reported 0.35% due to better hygiene management (5,9). This study provides stronger evidence than cross-sectional studies by examining a large, stable population over five years (8).
Carcass management and preventing dogs' access to offal complemented praziquantel treatment, playing a key role in reducing the parasite's transmission cycle. This aligns with WHO recommendations (2014) for controlling zoonotic diseases (10). However, limitations include not examining other definitive hosts (e.g., foxes) and potential pasture contamination from external sources.
Regular treatment of herding dogs with praziquantel (5 mg/kg body weight, every 6 weeks) and hygienic carcass management reduced cerebral coenurosis prevalence from 12.5% to 0.22%. This preventive strategy improved herd health and minimized economic losses. It is recommended that this program be implemented in other farms, and future studies explore its impact in different regions and livestock species.
Farmers should consistently treat herding dogs with praziquantel (5 mg/kg body weight, every 6–8 weeks), collect and dispose of dog feces post-treatment, and prevent feeding dogs with sheep offal or carcasses. This cost-effective approach minimizes coenurosis prevalence and ensures herd health. Farmer education and collaboration with veterinarians for herd monitoring are recommended.

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