

Cerebrospinal Nematodiasis in Sheep and its Management in Hill Agricultural System

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ABSTRACT

A cross-bred recumbent sheep (ram) diagnosed as a probable case of Cerebrospinal Nematodiasis (CSN) was treated with ivermectin @ 200 µg/kg bwt SC on day 1 followed by oral daily fenbendazole @ 30 mg/kg bwt for five days, and daily intravenous flunixin meglumine @ 1.1 mg/kg bwt for three days. A significant improvement in the neurological score was noted initially on day 3 followed by complete recovery by day 15, indicating that the above mentioned therapeutic regimen could be successfully used for management of CSN.

Key words: Lumbar paralysis, cerebrospinal nematodiasis, small ruminants, ivermectin, fenbendazole, flunixin meglumine

I.INTRODUCTION

Lumbar Paralysis in small ruminants is characterized by sudden appearance of hind quarter weakness (leading to incoordination and swaying back gait) or paralysis (leading to recumbency) with or without systemic involvement (absence of fever and normal appetite and other vital parameters) depending upon the causal factor(s). Traumatic spinal injury, vitamin and mineral deficiency, streptococcal infection and neoplasia (Emoto 1992) and aberrant migration by neurotropic nematodes such as *Setaria spp.* and *Parelaphostrongylus tenuis* (Ogunremi et al. 2002) are considered as causal factors for occurrence of lumbar paralysis in sheep, goat, cattle, horse, elk etc. The disease entity caused by the latter is known as Cerebrospinal Nematodiasis (CSN).

II.HISTORY AND OBSERVATIONS

A cross-bred ram (body weight 50 Kg) aged 2 years with a complaint of hind quarter incoordination followed by day-long recumbency was presented to Veterinary Clinical Services Complex, FVSc & AH, Shuhama Alusteng during mid-summer (August-2017) for veterinary-medical intervention. Enrolment-time examination revealed rectal temperature of 102°F, heart rate of 76 beats/minute and respiratory rate of 60 breaths/minute. Appetite,

ocular mucous membrane, defecation, urination and rumination were normal, indicating no systemic involvement. No cranial nerve deficits (tremors, head tilt, circling) were detected. The patient had no history of deworming since birth. Considering the clinical presentation, the case was tentatively diagnosed as a probable case of Cerebrospinal Nematodiasis.

III.TREATMENT

The treatment administered consisted of injectable Ivermectin (HITEK marketed by Virbac) @ 200 µg/kg bwt SC once, oral Fenbendazole (Fentas marketed by Intas) @ 30 mg/kg bwt daily for 5 days and intravenous Flunixin Meglumine (Megludyne marketed by Virbac) @1.1 mg/kg bwt daily for 3 days. On day 3rd of the treatment, a marked neurological improvement was observed as indicated by return to near-normal (proprioceptive deficit in left hind leg) gait/posture. Injectable nerve tonic (Neurokind forte marketed by Mankind Pharmaceuticals) was given @ 1 ml on alternate days for a week. The case recovered uneventfully by day 15.

IV.DISCUSSION

Sheep husbandry forms an integral part of hill agricultural system. However, its economic contribution is greatly influenced by infectious and parasitic diseases. Cerebrospinal Nematodiasis (due to *P. tenuis* or *Setaria spp.*) as a cause of lumbar paralysis possibly occurs in small ruminants in Kashmir valley during summer season (July-October) probably due to comingling of livestock (Cattle, Sheep and Goats), and presence of snails and slugs during the season. The meningeal worm *P. tenuis* is considered one of the most pathogenic protostrongylus nematodes of cervids. It rarely causes disease in definitive host (white tailed deer) but is responsible for neurological signs and death of other infected cervid hosts like woodland caribou, elk, fallow deer and mule deer. Non-cervid domestic livestock such as llamas, goats, sheep and cattle are also susceptible (Anderson et al. 1981; Lankester 2001).

P. tenuis, a neurotropic nematode, is responsible for severe inflammation during aberrant migration within the central nervous system of camelids (Pinn et al. 2013), small ruminants (Guthery et al. 1979; Jenkins et al. 2006) and rarely cattle (Yamani et al. 1997; Mitchell et al. 2011). In equines affected with *P. tenuis* nematodiasis, cervical scoliosis and analgesia and general proprioceptive ataxia and upper motor neuron paresis have been attributed to continuous dorsal grey column lesions and surrounding white matter involvement respectively (Biervliet et al. 2004; Johnson et al. 2008). Marked malacia and inflammation in CSN (in equines) have been attributed to combination of mechanical damage due to migration and host immune response (Costa et al. 2000).

Setaria spp. like *S. labiato-papillosa* and *S. digitata*, are normally found in the peritoneal cavity of cattle without causing any significant clinical effects but their migration in aberrant hosts like sheep, goats, horses and humans can lead to lumbar paralysis by invasion of brain and spinal cord (Radostitis et al. 2010).

Treatment of calves affected with CSN with a combination of moxidectin, fenbendazole and dexamethasone has been found successful (Mitchell et al. 2011). Goats diagnosed with CSN have fairly responded to treatment with diethylcarbamazine @ 10 mg/kg bwt.

The response shown to the adopted therapeutic regimen enjoins for use and evaluation in larger number of cases before disseminating it to the field practitioners. Further confirmation of the CSN using molecular techniques needs to be done.

Conflict of Interest: We declare that there is no conflict of interest involved

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Recumbency in sheep due to presumptive CSN
(Day of enrolment)



Sheep with near-normal posture/gait
(Day 3rd of the treatment)