THERAPEUTIC ASPECTS OF POSTERIOR PARALYSIS IN SURTI GOATS

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ABSTRACT

An investigative study was conducted on Surti goat flock maintained under AICRP on goat improvement at Livestock Research Station, NAU, Navsari. A total 24 adult Surti goats (16 males and 8 females) over a period of four years (2010-2013) were presumptively diagnosed as posterior paralysis. Affected goats showed sudden onset of paralytic symptoms in one or both hind limbs or paralysis of lumber region along with incoordinated and swaying back gait, Few fecal samples were found positive for presence of eggs of *Strongylus* spp. FAMACHA score of clinically affected goats was between 3 and 4 which indicated mild to moderate anaemia. All affected goats were treated with Inj. Ivermectin @0.4mg/kg body weight followed by oral fenbendazole @10 mg/kg daily for 5 days. Goats with both hind limbs/lumbar paralyses were provided slings till sufficient weight bearing on both hind legs. All affected goats were given supportive treatment and oral supplementation of vitamins and minerals for 5-10 days. Except death of one female, all were survived and recovered completely after 10 days. Improvement in FAMACHA score was observed on 11th day of treatment. The present investigation suggested that sufficient dosage of selective anthelmantic along with proper care and management during paralytic phase in cases of parasite caused posterior paralysis result in better clinical recovery within 10 day in goats.

KEY WORDS: Goats, posterior paralysis, therapeutic management.

INTRODUCTION

Goats are considered as hardy and resistant to many infectious diseases. But, parasitic diseases are considered as major cause of considerable economic losses in goat rearing, therefore, goats are called “House of Parasites”. Several species of parasites are found in goats and the relative importance of each species in a particular region varies with its agro climatic and husbandry practices (Radostits *et al.,* 2000). Among all, the role of nematodes in production of neurological disorders in animals is a global problem. *Setaria* spp. is the main causative agent of cerebrospinal nematodiasis (CSN) which is filarial parasite commonly found in peritoneal cavity of cattle and other ungulates. Transmission of infective larvae through arthropod vectors to non-permissive hosts such as goats, sheep, cattle, horse and man, can result in serious and often fatal neuropathological disorders commonly referred to a cerebrospinal nematodiasis (Tung *et al*., 2003). Other parasites (*Elaphostrongylus* and related species) can also be responsible for producing CSN. Small ruminants that shares common pasture with wild ungulate may become infected with CSN (Radostits *et al.,* 2000). An outbreak of neurofilariosis in young goats due to unknown filarial worm was also reported by Mahmoud *et al.* (2004).

Treatments of cerebrospinal nematodiasis causing infestations involve use of diethylecarbamezine (Karki, 2008) or very high dosages of fenbendazole or ivermectin. Treatment of neurological disorders also includes supportive therapy along with special care and management. If the goat is down and can’t get up on its own, the chance for recovery is not good (Nagy, 2004). Looking to above available information and routine occurrence of sporadic cases of posterior paralysis causing high mortality motivated us to investigate in detail about clinico-therapetic aspects of parasite caused posterior paralysis of Surti goats of an organized farm of South Gujarat.

MATERIALS AND METHODS

Under AICRP on goat improvement - Surti field unit, a small flock of Surti goats is being maintained at Livestock Research Station, NAU, Navsari, Gujarat. These goats are reared under semi-intensive system. Adult goats are allowed to graze in fallow land in and around large water body for 4-6 hours in a day. Concentrate and night feeding is being done in shelter. All goats were dewormed at regular interval of 4-6 months with different dewormer available in market. Further, they were vaccinated against PPR, FMD, HS and ET as per routine schedule followed at station. Depending upon previous history of deaths of all posterior paralysed goats at this farm, whole blood (24) and fecal (24) samples were collected from suspected cases (n=24) of posterior paralysis over a period of four years (2010-2013). Samples were thoroughly examined for presence of parasite/parasitic ova/larvae as per the method described by Soulsby (1982). Further, each case was observed for various symptoms and feeding behavior. Individual casewise clinical symptoms were also recorded. The anaemic condition of each case was judged by FAMACH chart.

All affected goats were treated with Inj.Ivermectin@0.4mg/kg body weight subcutaneously followed by oral fenbendazole orally @20mg/kg once a day for 5 days. Goats with both hind limbs/lumbar paralyses were provided slings till sufficient weight bearing on both hind legs (Plate-1). All affected goats were given intramuscular injection of Inj. Isoflud®@1ml (Zydus Animal Health Ltd., India) and Inj. Tribivet®@3ml (Intas Pharmaceuticals Ltd., India) @2-3ml daily for 5 days. They were also orally supplemented with Liq. Vigest® (Bayer Animal Health Ltd.) @10ml twice daily for 5-10 days. Feed (green and concentrate) and water were made available at their bed until recovery. Blood and fecal samples from all cases were also re-examined on 11th day and conjuctival mucous membranes were matched with FAMACHA to judge the improvement.

Data pertaining to year-wise and sex-wise occurrence of parasite caused posterior paralysis were

Plate 1 : Special care and management of posterior paralysis cases of goats

Special arrangement made for paralysed goats

Watering of affacted goats

Feeding to affacted goats

Therapeutic response in affected goat on 10th day

statistically analyzed using Chi-square test, whereas information on various clinical symptoms observed were tabulated and their frequency of occurrence and mean rank were calculated using Friedman test on IBM SPSS statistical software version 20.0 as per method described by Snedecor and Cochran (1990).

RESULTS AND DISCUSSION

During the present study, goats maintained under AICRP on an organized farm were monitored for occurrence of posterior paralysis. On screening of all 24 cases of posterior paralysis for presence of parasite/parasitic ova/larvae in whole blood smear examinations, none of the blood smear revealed presence of any parasite or larvae of parasite. Whereas, 8 out of 24 fecal samples revealed presence of ova of *Strongylus* spp. and another 3 fecal samples revealed presence of coccidial oocytes. Based on clinical symptoms, nature of infection, non- response to routine deworming and supplementation of vitamins, minerals, anti-inflamatory drugs (Steriodal/NSAID) and antibacterial drugs, the disease was presumptively diagnosed as parasitic cerebrospinal nematodiasis. The year-wise and sex-wise distribution of occurrence of parasite caused posterior paralysis is given in Table-1. The overall occurrence of posterior paralysis was 8.57 per cent. All 24 cases of parasite caused posterior paralysis were observed in adult goats only. All cases were observed during a period from September to January. The significantly higher occurrence was observed in male (15.53%) than female (8.57%). Highest occurrence was observed in year 2010 (14.29%) which showed gradually reducing trend with the lowest occurrence in year 2013 (6.52%) due to proper treatment undertaken in suspected cases.

Table 1: Yearwise and sexwise distribution of cases of posterior paralysis in goats

Year	Goat population covered			Cases of posterior paralysis			Chi-square value
	Male	Female	Total	Male	Female	Total	
2010	24	25	49	4 (16.67)	3 (12.00)	7 (14.29)	2.64*
2011	19	35	54	2 (10.53)	2 (05.71)	4 (07.41)	
2012	31	54	85	5 (16.13)	2 03.70	7 (08.24)	
2013	29	63	92	5 (17.24)	1 (01.59)	6 (06.52)	
Total	**103**	**177**	**280**	**16 (15.53)**	**8 (04.52)**	**24 (08.57)**	
Chi-square value				10.08**			

Figures in parenthesis indicate percentages. *, ** significant at p<0.05 & P<0.01, resp.

Clinically affected goats were apparently normal with slightly pale conjunctival mucous membrane with FAMACHA score between 3 and 4, which indicates mild to moderate anaemia. The variety of clinical symptoms observed in suspected cases of posterior paralysis were also recorded (Table-2). Further, symptoms observed in individual cases were statistically ranked. Most prominent symptom was posterior incordination that ranked first followed by head tilting, mild to moderate anaemia, stiffness, paralysis in either one or both hind limb with knukling, lumbar paralysis and diarrhea.

Setaria spp. and *Elaphostrongylus* spp. are the main causative agents of cerebrospinal nematodiasis (CSN) in small ruminants (Srivastava *et al*., 1985; Radostits *et al.,* 2000; Upadhyay, 2005). The adult parasites are generally considered to be non-pathogenic in their natural hosts, but transmission of infective larvae through mosquito and other arthropod vectors to non-permissive hosts such as

Table 2: Clinical symptoms in cases of posterior paralysis in goats

Sr. No.	Type of clinical symptom	No. of cases			Rank*
		Male	Female	Total	
1	Posterior incordination	16	8	24	8.96
2	Head tilting	14	5	19	7.81
3	Mild to moderate anaemia	11	6	17	7.35
4	Stiffness	8	3	11	5.98
5	Paralysis in one hind limb	8	3	11	5.75
6	Paralysis in both hind limbs	6	3	9	5.75
7	Knukling on hind limbs	6	4	10	5.75
8	Lateral recumbancy	5	3	8	5.29
9	Anorexia	4	1	5	4.60
10	Lumbar paralysis	3	1	4	4.38
11	Diarrhoea	2	2	4	4.38
12	Paralysis in fore limbs	0	0	0	0.00
13	Pyrexia	0	0	0	0.00

* ranked as per Friedman test

goats, sheep, cattle, horse and man, can result in serious and often fatal neuropathological disorders (Radostits *et al.,* 2000; Tung *et al.,* 2003; Karki, 2008). The meningeal worms (*Parelaphostrongyle* spp.) also known as the deer worms are commonly found in the venous sinuses and subdural space of the brain of wild ungulates whereas, sheep and goats are susceptible to infection as abnormal hosts. Aberrant migration in sheep and goats causes damage to central nervous system with clinical signs of ataxia, stiffness, muscular weakness, lumbar paresis, paralysis in one or both hind limbs, head tilt arching back (Handeland *et al.,* 1994; Bazargani *et al.,* 2008; Karki, 2008).

All affected goats were given therapeutic and supportive treatment during the course of time as mentioned earlier. Goats with both hind limbs/lumbar paralyses were provided slings till sufficient weight bearing on both hind legs **(Plate-1).** It is known that enough medication of selective drug is required to remain in the goat's system so that the blood-brain barrier can be crossed in order to kill the larvae that have already penetrated the spinal column. Additional extensive supportive therapy and managemental care during the paralytic phase is also important. Therefore, during present study specific dosage of Inj.Ivermectin and fenbendazole along with other supportive therapy and managemental care of paralysed goats resulted in good clinical response as advocated by Radostits *et al.* (2000). Except 4 goats, (2 male and female), rest all (n=20) were recovered completely after 10 days with absence of parasite/parasite larvae/parasite ova in blood as well as fecal samples. One female died due to prolonged lateral recumbency and debility whereas one female and two male survived with limping of one hind leg. Observation of four goat that could not recovered completely during present study is in accordance with the observation of Karki (2008) who reported 2-5% post-recovery deformities with the general disappearance of clinical symptoms with 5-7 days treatment of cerebral nematodiasis. In recovered goats, FAMACHA score found improved which was between 2 and 3 on 11th day of treatment. Such improvement in FAMACHA score after anthelmintic and supportive treatment is in accordance with the observation of Ved and Siddiqui (2009).

The posterior paralysis probably caused by parasites in goats goes unnoticed and didn't respond to routine antibiotic, nervine tonics and steroids without specific treatment with sufficient recommended

double dosage of selective anthelmentics along with proper care and management during paralytic phase. Moreover, the detailed laboratory investigation should be carried out in each case of posterior paralysis in goats for confirmatory diagnosis, which we couldn't however do in the present study.

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