

A Laboratory Epidemiological Outbreak Investigation of Kumri (Cerebrospinal nematodiasis) and use of diethylcarbamezine in treatment of Goat in Banke district of Mid-Western Region of Nepal

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Abstract

Seasonal occurrence (mainly in October-November) of a disease syndrome locally called 'Kumri' meaning weak back was observed in goats in Banke and other districts of western Terai in the last few years. Traumatic injury to the lumbar region, nutritional deficiencies and parasitism in the spinal cord were the likely causes considered. Based on the epidemiological pattern viz; seasonal occurrence, clinical symptoms, afebrile condition and local nature of infection, and non response to supplementation of vitamins and minerals, the disease was provisionally diagnosed as cerebrospinal nematodiasis. This has been further substantiated through laboratory of *Seteria* spp in cattle in this region, detection of microfilaria in affected goat and treatment response of affected goats with diethylcarbamezine. As adult *seteria* spp in cattle, Buffalo and microfilaria from blood smears of affected goat confirmed the cerebrospinal nematodiasis in goat in Nepal.

Keywords: Kumri, *Seteria*-spp, Banke, Nepal, Diethylcarbamezine, Microfilaria, Goat, Mosquito, Culex, Postmonsoon disease, Cerebrospinal nematodiasis, Posterior paralysis, Epidemiology,

Introduction

There was an outbreak of peculiar syndrome in goats in Kusum, Mahadevpuri, Kamdi, Kohalpur, Kachnapur Village Development Committees of Banke district of west region of Nepal was observed during October/November 2006. In this V.D.C. out of total population of 7434 Goats 2028 were affected by this syndrome when treated with diethylcarbamezine (Hetrazan) 1866 goats recovered and 162 died. During outbreak goats above twelve months of age were mostly affected. Typical clinical signs in affected goats were paralysis of one or both fore/hind limbs, paralysis of Lumber region in coordination and swaying back gait. When hand fed affected animal seat normally and there was no systematic involvement, (no rise in Temperature diarrhea). Since year 1986-1987 (Karki) reported same pattern of disease in this area with morbidity 25.30% and mortality 12-15% were recorded. When these animals were treated with diethylcarbamezine 10mg/kg disease entity started to disappear within 5-7 days, but there was 2-5% post recovery.

Material and Methods

Haematological investigation for detection of Microfilaria in affected goat. Haematological analysis

of RBC, WBC, Hb, PCV of blood from affected goat. Evaluation of Treatment response of Diethylcarbamezine.

Outbreak Investigation			
Village Development Community	Total Goat	Affected	Dead
KUSUM.		175	20
MAHADEBPURI	1720	562	35
KACHNAPUR	1552	480	45
KOHALPUR	1825	390	27
KAMDI	1775	495	35
TOTAL.	7434	2038	498

Based on the clinical manifestations, the animals were treated with Diethylcarbamezine (Hetrazan Banocide fort) provisionally diagnosed as cerebrospinal nematodiasis locally known as Kumri in outbreak areas.

A total blood sample slide when examined for presence of blood parasite. 6 out of 10 sample revealed the presence of typical microfilaria with sheath is most easily seen as it extends beyond the anterior and posterior ends of microfilaria.

Result and Discussion

On the basis of clinico-epidemiological study, finding of adult *Setaria* spp in the cattle/ Buffalo in

Table - 1. Hematological examination

Differential blood count	Normal Value	Meant \pm se
Basophil	0-3%	0.46 \pm 0.10
Eosinophil	1-8%	8.78 \pm 0.38
Monocytes	1-5%	0.93 \pm 0.16
Lymphocytes	40-75%	57.63 \pm 1.3
Neutrophils	10-50 %	32.20 \pm 1.25
Total R.B.C	8-18 Millions	3.3-4.6Millions
Total W.B.C	13-15103/m/m	36.2-8.5/103/m ³
Hemoglobin	8.8-13.8%	6.6-9.3%
P.C.V	25-40%	20-28%

out break area and also microfilaria in blood from diseased goat confirm *Setaria* as the main cause of posterior paralysis Kumri. The finding of hematological analysis indicated a marked decrease of total R.B.C, W.B.C.Haemoglobin, P.C.V., but a marked increase in Eosinophil confirm the finding of other researcher in filarial infestation. Responses of Treatment was similar to earlier worker also confirmed in this entity is caused by *Setaria* spp. Posterior paralysis (KUMRI) in goat is being considered to be caused by a filarial parasite *Setaria*. *Setaria labiatopapillosa* (syn. *Setaria digita*, *Setaria cervi* normally occurs in the peritoneal cavity of cattle, buffaloes and deer. The parasite in the peritoneal cavity of these animals is not generally pathogenic. However, the immature forms in non-natural hosts like sheep and goats causes cerebrospinal nematodiasis (Posterior Paralysis Kumri) with different neurological signs which is often fatal. Male parasites measures about 40-60mm and females measures about 60-120mm. Morphologically, the peribuccal ring and dorsal and ventral prominences are distinct. Mouth opening is elongated. The tail of female terminates in a marked button, which is divided into a number of papillae. The microfilaria is sheathed both anteriorly and posteriorly and measure about 240-260 microns. Microfilaria are transmitted mechanically by culicine mosquitoes. The second stage of microfilariae are ingested by mosquito in which development of 3rd stage microfilaria takes place. These microfilaria are transmitted from mosquito to other animal by bite. In non-natural host, after bite, microfilaria may enter the spinal cord or the central nervous system leading to clinical manifestations of paralytic signs. The disease mostly occurs in the end of summer and autumn. (E.J.L. Soulsby., O.M. Radiostitis D.C. Blood C.C. Gay: A.K. Upadhyaya; Karki et al.).

The wide distribution of goat in Tropics and subtropics reflects their ability to adapt to a variety

of environment. However the preferred environment is on the lighter sandy soil in the drier tropics rather they perform better and thrive in large number the inherent characteristic of goat such as resistance to dehydration, preference to browse and wide ranging feeding habit enables them to thrive in regions that receives less than 750 mm of rainfall (C. Devendra G. B. McIeroy 1990.) In Nepal approximately 6080060 goats are being raised by small and marginal farmers out of that 491152 goats are being reared in western tropical past of (Statistical information on Nepalese Agriculture 1997/1998) Nepal. Due to many ethnic group and religions believe 24.28 pp the male goat is preferred in comparison of other livestock product. (C.L. Yadav 2000). As the goats are considered as hardy and resistance to many infections disease but parasitic disease of goat are considered to be major cause of considerable economic loss, which arise primarily from the failure of parasites to grow or perform satisfactory several species of parasites are involved and the relative importance of species in a particular region varies with its agro climatic and husbandry practices. Since 1986-87 There was an outbreak of peculiar syndrome in goats in Banke district of west region of Nepal was observed during October/November. Goats above six months of age were mostly affected. Typical clinical signs in affected goats were paralysis of one or both hind limbs, paralysis of Lumber region in Coordination and survey back gait. When hand fed affected animal seat normally and there was no systematic involvement, (no rise in Temperature diarrhea) with morbidity 15.20% and mortality 2-15% were recorded. On treatment with diethylecarbamzan 10mg/kg affected animal disease entity disappear with 5-7 days, But there was 2-5% post recovery deformity was recorded (Karki 1996). On treatment with diethylecarbarnzan 10mg/kg affected animal disease entity disappear with 5-7 days, But there was 2-5% post recovery deformity was recorded (Karki 1996). Adult *Setaria* male female collected from cattle buffalo (Karki et al. 2000). The menegial worm (*Parelaphostrongyle tenius*) also known as the deer worm its aberrant migration in sheep, goats causes damage to central nervous system with clinical signs ataxia, stiffness, muscular weakness posterior paresis, paralysis, head tilt arching back. Clinical sings generally begin in the hind limbs and progress to front limbs (David E Anderson 2002). There was consistent abnormality shift in nucleated cell count from predominantly lymphocytes and monocytes to eosinophils over the

course of infection. *Parelaphostrongylus tenuis* nematode normally found in the venous sinuses and subdural space of the brain of white tailed deer in eastern northern America. Moos caribou, reindeer, sheep, goat are susceptible to infection. However they are abnormal hosts in them it causes cerebrospinal nematodiasis, a disease of nervous system, often resulting to death. (DNR-Brain worm 2001-2006). Cerebro-spinal nematodiasis (CSN, or Setaria) occurs in Shrilanka (Nepal, India?) in crossbred/improved goat (B.D. Perry et al 2002). Sheep and goats are considered dead end host of deer fluke and meningeal worm once the either parasite is ingested by sheep, goat it may migrate through different part of body wrecking havoc with the animal (J.S. Rook et al.). Sheep and goat are considered dead end hosts for *P.tenuis*. The neurological signs observed in infected sheep, goat depend upon the number of larvae present in nervous tissue and specific portion of brain or spinal cord, a mild infestation in a local area may produce slight limp, or weakness in one or more legs. A more severe infestation may cause animal to become partially or completely paralyzed (M. Kopcha et al.; Susan Schoenian 2005; SCWDS Briefs, 1992; Corry Jeanne Mortensen 2000; Pusterla et al 1997; Kopcha, M. 1989; FS, Guthery et al 1979).

Setaria digitata and *S.marshali* larvae were observed in cerebrospinal cavity of 2 paralyzed cattle in Taiwan. Affected cattle showed quadriplegia and lumbar paralysis (Kwong-Chung Tung et al 2003). (El-Azazy O.M.E. 1999) Recorded Patent *Setaria digitata* in 5 out of 48 goats in Saudi Arabia. (Subhachal P et al 1999) morphologically identified worm collected from Thai cattle. (Karki et al. 2000) Detected male, female adult *Setaria* parasite from peritoneal cavity of zebu cattle and buffalo during post-mortem examination in Banke. Mukhopadhyay S; et al 1996 implanted adult gravid female of bovine filarial worm in *Mastomys coucha* found microfilaraemia. Which was detected as early as 4 days post plantation. Implantation resulted in a decrease in total leukocytes and erythrocytes and induction of eosinophilia. The microfilaria in circulation were found to be eliminated by oral administration of diethylcarbamazine citrate, indicating its usefulness as potent anti-micro filarial drugs. There was slight eosinophilia in affected goat (S.P.Shrestha). Prevalence of Lumber paralysis caused by cerebrospinal nematodiasis is common in goats all over India mainly during the month of October-December with morbidity as high as 31%. Prophylactic treat-

ment with Hetrazen (diethylcarbamazine at the onset of winter is highly effective for control of lumber paralysis in goat (P.Ghalsasi et al 2000).

Recommendation: On the basis of above finding, confirm the in specific Agro-geo. ecozone in specific season, out break of posterior paralysis (Kumri) is caused by *Setaria* spp. and response of Diethylcarbamazine on its treatment is recommended as soon as possible. Same treatment if applied can prevent the loss.

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