ABSTRACT

STUDIES ON CEREBROSPINAL NEMATODIASIS IN SHEEP AND GOATS IN SRI LANKA

by

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A study was undertaken to investigate the aetiology, epidemiology, pathology and clinical manifestations of cerebrospinal nematodiasis (CSN) in sheep and goats in Sri Lanka. It was revealed that the disease is caused by the migration of the larvae of Setaria species in the central nervous system (CNS). Two species of Setaria, viz. S. digitata and S. labiato-papillosa were identified in cattle and buffaloes in this country.

Although 69.8 per cent of the adult cattle population in the dry zone of the island had adult setarial worms in their peritoneal cavity, only 32.1 per cent of them were found to be filaraemic. The microfilarial numbers in the blood of the infected cattle increased sharply during the period from October to December which corresponded with the rainy season in the dry zone. The prevalence of setarial microfilaraemia in the buffaloes in the dry zone and the cattle in the hill country were only 14.1 per cent and 2.5 per cent respectively. The annual incidence of CSN in goats (6.3 per cent) in the dry zone was considerably higher than in sheep (2.5 per cent) in the same locality. The exotic goat breeds over 12 months in the dry zone were found to be more vulnerable to CSN, particularly during the period from November to February.

Most of the sheep (81.3 per cent) and goats (94.9 per cent) with neurological disorders were found to have clinical signs suggestive of CSN. The remaining animals were diagnosed as cases of suppurative meningoencephalitis, encephalocoele, internal hydrocephalus, enterotoxaemia and viral encephalitis. The clinical history, and the findings of the general clinical examination and neurological examination were useful in the differentiation of CSN from the other neurological diseases. Clinical manifestations of most of the CSN cases were characterised by acute onset of the clinical signs including development of abnormal movements, e.g. ataxia, circling, tremor, and abnormal postures such as head tilt, torticollis and scoliosis. Different forms of paresis and paralysis, viz. paraparesis, tetraparesis, hemiparesis, paraplegia and tetraplegia accompanied with upper motor neuron (UMN) signs were commonly detected. The postural reactions and the local reflexes of the locomotor system and the body were often found to be defective. In most instances, the diseased animals remained bright and alert with a normal appetite, and had a normal rectal temperature. Neurological findings of majority of the cases indicated a focal lesion in the spinal segments of T3-L3, C1-C6 or in the brain stem.

Findings of the examination of the cerebrospinal fluid (CSF) samples collected from clinically normal goats and those with CSN indicated that there is a tendency for the total cell count (6-512 cells/µl) and protein content (10.8-40.0 mg/dl) to increase and for the sodium content to decrease (61.2-93.0 mmol/l) in CSF of the diseased animals. Presence of eosinophils and neutrophils was also a notable feature of CSF from the animals with CSN.

The necropsy findings were without relevant significance in most of the CSN cases. However, characteristic histological lesions were consistently found in the CNS, mainly in the spinal cord, brain stem or in the cerebellum. The acute lesions were seen as irregularly distributed linear microcavities containing mainly the damaged nervous tissue and occasionally the causative nematode larva. In addition to the microcavitation, axonal swelling, central chromatolysis, perivascular cuffing and leptomeningitis were found in the late acute lesions. The cell infiltrates were composed of mononuclear inflammatory cells and eosinophils. The chronic CSN lesions appeared as irregularly distributed areas of encephalomalacia and/or myelomalacia containing a large number of gitter cells and some active astrocytes. Wallarian type degeneration which often led to spongiform change in the surrounding white matter was also seen. The animals with residual signs of CSN showed irregularly distributed astrocytic scars in the CNS.

Some of the cattle infected with setariasis where the adult worms were present in the peritoneal cavity had granulomatous lesions in the omentum, mesentery or in the liver. These lesions contained adult setarial worms at the centre and were confined only to a small area of the affected tissue.

In control of CSN, three effective measures may be employed in, namely, the control of setariasis in cattle and buffaloes which serve as the main reservoir for setarial infection, control of mosquitoes which act as the intermediate host vector for Setaria species and treatment and prevention of the disease in the susceptible animals by chemotherapeutic means and management practices.