MALIGNANT THEILERIOSIS OF SHEEP AND GOATS

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SUMMARY

Clinical, pathological and epizootiological studies were carried out in an experimental flock of 39 sheep that was exposed to natural infection of Theileria hirci in an enzootic area. A morbidity rate of 100 per cent and a mortality rate of 89.74 per cent were observed in this flock which had been transferred from another enzootic region. No Theileria hirci infection was observed, during the same period, in the control sheep which were sprayed regularly. The high morbidity and mortality rate in the flock might have been due to the existence of antigenically different strains in different localities. Almost all the ticks collected from the sheep during the course of the study were Hyalomma spp.

INTRODUCTION

Malignant sheep and goat theileriosis is a highly fatal, acute or sub-acute protozoan tick-borne disease which is caused by Theileria hirci. Except for the early works of authors such as Littlewood (1915), Mason (1915) and Baumann (1939) that are quoted by Neitz (1957) it has not been studied in depth and some aspects of the infection and the parasite have been left obscure. The disease is widespread in tropical and sub-tropical countries and it is believed to be the cause of heavy losses. During a period of one year from 1st January 1970 to 1st January 1971, 1648 smears from blood and internal organs of sheep which had died and been suspected of theileriosis were sent to the Veterinary Laboratory and Research Institute, Baghdad for diagnosis. The parasite was found in 592 of these smears. This paper describes experimental work on a flock of sheep designed to shed more light on the disease and the causative agent and presents morbidity and mortality rates, certain characteristics of the parasite itself and observations on the ticks infesting a flock of sheep during the period under review.

MATERIALS AND METHODS

Animals. Except for one goat, the rest of the animals used were Awassi sheep, a breed dominant in Central and South Iraq. They were approximately four months of age and showed no Theileria in their blood smears. The sheep were randomly divided into two groups. The first group, consisting of ten sheep was kept in a pen and sprayed regularly by hand at weekly intervals with an acaricide.** The second group, which consisted of 39 sheep, was kept in a fenced yard adjacent to the pen containing the first group. These animals were not sprayed.

Body temperature. Rectal temperatures of five randomly selected sheep were taken daily. Those with a high temperature were checked again next day, together with a further five animals.

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**Azuntol, Bayer 21/199, emulsion.
Blood smears. Blood smears were prepared daily by ear vein puncture from those sheep whose body temperatures were recorded. The smears after being air dried were fixed in absolute methyl alcohol and then stained with a solution of 5 per cent Gurr R66 Giemsa stain for 45 minutes.

Lymph node and liver biopsies. Lymph node and liver biopsies were carried out in the sheep showing high temperature for two consecutive days. Needles of gauge 20 and length 5 cm were used for lymph nodes and needles of gauge 18 and length 10 cm were used for the liver. The methods used were similar to those described by Sergent, Donatien, Parrot and Lestoquard (1945) for cattle. Smears were prepared from lymph node juice and liver pulp and stained as described for the blood smears.

Gross pathology. Post-mortem examinations were carried out on the sheep which died and smears were prepared from internal organs and were stained with Giemsa stain for microscopical examination.

Preparation of inoculum from liver. A part of the liver which contained numerous schizonts was cut into small pieces to which three times the volume of phosphate-buffered saline (pH 7.4) was added and all were homogenised in a Waring blender. Ten ml of this suspension were used as the inoculum.

Tick collection. Five sheep selected at random were searched at weekly intervals for ticks during the course of the study. The ticks were collected and placed in 70 per cent ethyl alcohol for preservation until identification was made according to Hoogstraal and Kaiser (1958).

RESULTS

1. Morbidity and mortality rate

Of the 39 sheep kept in the yard where malignant sheep and goat theileriosis had occurred in previous years, all were afflicted with theileriosis as shown by biopsy, blood smears and post-mortem examinations (morbidity 100 per cent). Thirty-five of the sheep died of theileriosis (a mortality rate of 89.74 per cent). The first sheep died on the 13th day and the last one on the 58th day after introduction of the flock into the enzootic area. During the period of the study none of the control flock which was sprayed regularly at weekly intervals died.

2. Pathological findings

(a) Macroscopic

Most of the carcases showed emaciation and a variable degree of icterus. Intramuscular and sub-cutaneous tissues appeared gelatinous. The lungs were congested to a variable degree and, in some, hepatized areas could be seen. In most animals hydropneumothorax was present and the heart muscles were flabby but the petechiae, usually seen in tropical theileriosis, were not observed. Livers were enlarged, brown-yellowish or yellow in colour, and very friable. Gall bladders were distended and full of thick bile. Enlargement of spleens was outstanding. The spleens were so swollen that they appeared to be inflated. The pulp on incision was very soft. The abomasum, generally, was empty and the mucous membrane showed slight to severe congestion but the necrotic ulcers, as seen in tropical theileriosis, were not observed. Intestines were congested and showed petechiae. The mucous membrane of the intestines, particularly the last part, showed severe congestion and in some cases haemorrhagic patches were observed. The contents of the intestines were sparse in volume and were mixed with blood. The mesentric lymph nodes were all enlarged and reddish in colour.

(b) Microscopic

The blood showed changes characteristic of anaemia. Up to 15 per cent of the red corpuscles were infected with the parasite. In the majority of cases smears prepared