COMPARATIVE STUDY OF SUBCLINICAL FASCIOLIASIS

IN

SHEEP AND GOATS

A THESIS PRESENTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR
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ABSTRACT

The literature on the identification of Fasciola spp. and their intermediate hosts, the general life cycle of Fasciola and aspects of the epidemiology, clinical signs, diagnosis and treatment of infections is reviewed.

Two experiments were carried out. The first involved 18 weeks observations on 5 adult male goats each infected with 150 metacercariae of F.hepatica and 5 uninfected controls. The second involved groups of 10 sheep and 10 goats each infected with 200 metacercariae with 5 uninfected controls of each species. In both experiments, faecal, haematological, biochemical and pathological examinations were conducted. The animals were also weighed regularly.

In the first experiment, although only 15-35 flukes were established, measurable and, in many cases, statistically significant changes in a variety of parameters were observed. A depression in packed cell volumes relative to controls of approximately 20% occurred. Though haemoglobin, mean corpuscular volume and mean corpuscular haemoglobin concentration levels remained within the normal ranges, erythrocyte levels in the infected group were significantly lower than in the controls and there was a tendency for the anaemia to become macrocytic. This suggests that goats may be particularly susceptible to the effects of blood loss associated with Fasciola infections though further work is needed to confirm this.

A marked peripheral eosinophilia and elevation in fibrinogen levels were observed in infected animals. Albumin levels decreased, globulin levels increased and the A/G ratio decreased significantly relative to the control group but all levels remained within the normal ranges.

In infected animals, gamma glutamyl transferase (GGT) and glutamyl dehydrogenase (GD) levels rose to beyond the limits of the normal ranges although aspartate aminotransferase (AST) levels, which were also significantly elevated, did not. The results indicate that serum GD and GGT are particularly sensitive indicators of damage to the liver parenchyma and bile ducts caused by F.hepatica in goats and that GD is more sensitive than AST. Serum bile acids were estimated but no significant change was detected.

The ratio between faecal egg counts and the numbers of adult flukes present at necropsy was consistently lower than described for sheep with a mean of approximately 13epg/fluke (range 9-23) at the final sampling and 18epg/fluke (range 11-29) in the previous week when the egg counts were highest. This is potentially of considerable diagnostic importance and needs further investigation.

In the second experiment, the number of flukes established was extremely low in both species (mean 0.85% & 2.95% in the sheep and goats respectively) although more goats than sheep became infected. Pre-existing liver pathology in the sheep was a further complication. Consequently, little information of value was generated by the infection of goats and no data that could be used for comparative purposes were obtained from the sheep infection.

However, combination of the data from the 13 infected goats from both experiments yielded some useful information in relation to serum enzyme levels. Correlations between the numbers of flukes recovered at necropsy and peak levels of serum enzymes and various haematological parameters in individual animals were examined though only those relating to enzyme levels were statistically significant. The correlation coefficients between peak enzyme levels and fluke numbers indicated that the relationship was strongest with GGT and weakest with AST. However, regression analysis showed that there was no predictive value in the relationship with any of the enzymes because of extremely wide confidence intervals for predicted fluke numbers.

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