CHANGES IN SERUM ENZYME ACTIVITIES IN PIGS NATURALLY INFECTED WITH THE METACESTODES OF *TAENIA SOLIUM*

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(Accepted 7 November 1984)

ABSTRACT


The serum enzymes of pigs naturally infected with the metacestodes of *Taenia solium* and of uninfected pigs were assayed. Aspartate aminotransferase, alanine aminotransferase, ornithine carbamyl transferase, sorbitol dehydrogenase, lactate dehydrogenase, isocitrate dehydrogenase, alkaline phosphatase and ceruloplasmin activities were significantly increased in the serum of the infected pigs.

INTRODUCTION

Porcine cysticercosis due to infection with the metacestodes of *Taenia solium* is usually detected only after death or slaughter, whereas activity of the serum enzymes associated with *Taenia saginata* (*Cysticercus bovis*) infection in cattle (Dewhirst and Cramer, 1965) and *Taenia hydatigena* (*Cysticercus tenuicollis*) infection in goats (Pathak and Gaur, 1981) provides indirect evidence of these conditions even at an early stage of infection. As it would also be desirable to know the enzymatic profile in pigs naturally infected with *T. solium*, the present study was undertaken.

MATERIALS AND METHODS

One hundred and twenty locally bred male pigs, aged one year, kept under identical managemental conditions and comparable nutritional status, slaughtered at a bacon factory in Uttar Pradesh, India, were examined between January 1982 and January 1983. Blood samples from all of these pigs were collected in clean vials using sodium and potassium oxalate as anticoagulant. The pigs were
stunned before blood collection and blood was taken from the posterior aorta. On the basis of subsequent post mortem examinations, 60 pigs found to harbour a heavy load of *T. solium* were regarded as the infected group and 60 pigs, subsequently demonstrated to be free from infection with *T. solium*, formed the non-infected controls. Each clotted blood sample was centrifuged at 400 g for 5 minutes and the serum which was separated was transported on ice to the laboratory. The serum samples were stored at -20°C for 6 hours before analysis.

**Enzyme estimation**

The activities of the enzymes in the serum samples were estimated by the methods indicated: aspartate aminotransferase (AST) and alanine aminotransferase (ALT) (Reitman and Frankel, 1957); ornithine carbamyl transferase (OCT) (Ceriotti, 1958); sorbitol dehydrogenase (SD), lactate dehydrogenase (LDH) and isocitrate dehydrogenase (ICD) (Bergmeyer, 1974); ceruloplasmin (Ravin, 1958) and alkaline phosphatase (AP) (Kind and King, 1954). The results were analysed by "t" test as described by Snedecor and Cochran (1967).

**RESULTS**

The mean values of enzyme activities in the sera of the infected and non-infected animals are presented in Table I. Analysis of these results indicated a statistically significant increase (*P >0.01*) in enzyme activities in the infected pigs. It is noteworthy that the OCT and SD activities in the infected pigs were about four times greater than those of the non-infected controls.

**DISCUSSION**

The increased enzyme concentrations in the sera of pigs infected with *T. solium* may be of value in the diagnosis of porcine cysticercosis. These increases suggest the presence of extensive damage to the tissues and necrosis of cells. It is already recognised that young migrating *T. solium* do cause such damage to muscle (Soulsby, 1982). Our pathological examination revealed that these larval cestodes caused extensive damage to the organs during their migration. Cornelius (1970) suggested that pathological involvement of cardiac muscles and hepatic parenchyma caused leakage of large amounts of AST and ALT into the blood.

Our results in naturally infected pigs are in agreement with our findings in the goat (Pathak and Gaur, 1981), namely that an increase in AST and ALT values occurred in goats experimentally infected with the metacestodes of *T. hydatigena*. The increase in AP activity was also considered as a satisfactory parameter of