

ABSTRACT

Giardia lamblia was found to be a pathogenic parasite to human and some animals including rats. *Giardia* trophozoite established in the small intestine after ingestion of infective cysts. Subsequently, it caused intestinal lesion and possibly nutritional malabsorption in some hosts. The objective of the present study was to determine the alteration of Ht, Hb, plasma vitamin B₁₂, folic acid levels, red cell AChE, and plasma ChE activities in rats experimentally infected with G. lamblia obtained from human feces. The *Giardia* cysts output; AChE and ChE enzymes in the *Giardia* trophozoites were also determined in the present study.

The feces of 39 experimental rats were examined for parasites by using the simple smear and formalin-ether concentration methods. The rats that were free of parasites were infected with G. lamblia cysts orally. Blood samples obtained from the retro-orbital plexus and feces from these infected rats were examined at intervals, i.e. at every 3-4 days until 2 months after infection. The experiments were also performed on 15 control rats.

The cysts output determined by Stoll's dilution method in 23 infected rats showed variable results. In 5 rats infected with 5.0×10^5 *Giardia* cysts showed an incubation period of 10 days while in 19 rats infected with 1.0×10^6 *Giardia* cysts had a shorter incubation period, i.e. 4 days. The cysts output in these 2 groups showed fluctuation with high peak on day 4 to day 33 and decreased gradually on day 40 to day 58. The decrease in cysts output could be due to the host immunity against this parasitic infection.

The statistically significant lower levels of Ht in 18 experimental rats was clearly observed on day 16, 22, 33, and 37 postinfection when comparing to 13 control rats. The significantly lower levels of Hb concentration was also apparent in 18 experimental rats on day 13, 16, 22, and 37 postinfection. Furthermore, there was a reverse relationship between Giardia cysts output and Hb concentration in the experimental rats. These findings indicated that Giardia caused lower Hb and Ht in these infected rats.

The plasma vitamin B₁₂ level was determined by the modified method of radioisotope dilution techniques and PVP-coated charcoal. There was no significant difference of plasma vitamin B₁₂ level between 15 experimental and 15 control rats during each day throughout the experiments. In comparison, a mean value of plasma vitamin B₁₂ in 104 samples obtained from the infected rats was not statistically significant different from that of 105 control samples. Therefore, giardiasis had no effect on plasma vitamin B₁₂ levels in the infected rats.

The plasma folic acid was determined by using the biological assay. No statistically significant difference of plasma folic acid levels was observed in 12 experimental rats when comparing to 12 control rats during each day of the experiment. The lowest level of plasma folic acid in the experimental rats was observed on day 13 postinfection. In addition, a mean value of plasma folic acid in 97 samples obtained from the infected rats was not significantly lower than that of 93 control samples. These findings indicated that giardiasis did not affect the plasma folic acid in these infected rats.

III

The plasma ChE activities in 18 experimental rats were statistically significant higher than those of 15 control rats on day 10, 25, 29, 33, and 40 postinfection. The enzyme activities in the experimental rats were significantly higher than the initial value although there were no alteration of this enzyme in the control rats. After day 49, this enzyme activity in the experimental rats was relatively decreased to its initial values upto day 58 postinfection. There was no relationship between Giardia cysts output and plasma ChE activity in the experimental rats. It could be concluded that giardiasis in rats did not have liver involvement in these rats.

The red cell AChE activities in 15 control and 18 experimental rats were higher than the initial values. In comparison to the control rats, there was statistically significant higher values of this enzyme in the experimental rats on day 37, 55, and 58 postinfection. There was a reverse correlation between Giardia cysts output and red cell AChE activity in the experimental rats. This may indicate the enhancement of erythropoiesis secondary to anemia caused by Giardia infection.

Giardia trophozoites, 1.0×10^6 to 1.0×10^7 trophozoites per millilitre, obtained from cultivation in vitro were used for determination of ChE and AChE activities. A small amount of ChE and AChE enzymes could be detected in Giardia trophozoites. They were found in tissue-bound and tissue-free enzyme forms. Both tissue-bound and tissue-free ChE levels were found in a greater amount than tissue-bound and tissue-free AChE enzymes. The presence of these enzymes in Giardia trophozoites probably involved in the motility.