Immunological And Histopathological Changes in Sheep Challenged With Echinococcus granulosus Protoscolices

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ABSTRACT

Cellular and humoral immunological changes as well as histopathological findings in sheep challenged intravenously with two different doses (0.5x10^6 PSC for sheep 1 and 2, 0.5x10^5 PSC for sheep 3 and 4) of live protoscolices of sheep origin were studied over a period of 10 months.

The lung were the main site for cyst development in all experimental animals. The total number of cysts developed in sheep 1 and 2 were 94 and 425 while, 1 and 34 cysts developed in sheep 3 and 4, respectively. Thus infection rates were 0.018, 0.085, 0.002 and 0.068% in sheep 1,2,3, and 4, respectively.

Following sheep challenge, there was an increase in the total number of leucocytes which remained elevated throughout the experiment. Such an increase has reflected by an increase in the percentages of both lymphocytes and eosinophils while the % neutrophils decrease and the % monocytes remained unchanged.

Immunoperoxidase staining showed that the increase in % lymphocytes was mainly due to an increase in T^h lymphocytes (80 and 72%) as well as an increase in lymphocytes bearing IgG molecules, while the % of T^s/c cells decreased during the experiment. Lymphocytes bearing MHC-II molecules also increased and showed a similar pattern to that observed in T^h lymphocytes.
The measurement of specific IgG using the ELISA technique revealed a significant elevation (O.D 1.39), 15 days post-challenge. Furthermore, test of immunoreactivity of specific IgG at the time of ELISA peak reactivity using immunoblotting revealed a strong reactivity against a 90.6 and 84.6 K.Da proteins in sheep 3 and against a 77.3 K.Da protein in sheep 1. The study of complement concentration (C₃) revealed a significant elevation at the early periods of the study (O.D 0.85) being accompanied with the elevation in specific IgG levels.

Histopathological studies of cysts revealed the presence of 3 layers typical of the hydatid cyst. In undeveloped cysts, only the laminated and host cellular layers were seen while the germinal layer was absent. The host cellular infiltrate was predominantly lymphocytes and macrophages with the latter being close to the proximal part of the cyst while lymphocytes were near the distal part.