

SUMMARY

ACTIVE AND INACTIVE NEUROCYSTICERCOSIS IMMUNE RESPONSE BASED ON THE PATTERN OF LYMPHOCYTE SUBSET TH1 AND TH2 (AN OBSERVATIONAL ANALYTIC STUDY IN SWINE)

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Neurocysticercosis (NCC) is an infectious disease of the central nervous system (CNS) that results cysticercal form of the larvae of the parasite *Taenia solium* (*T. solium*) (Wadia, 1996). NCC may be fatal and produces a high morbidity rate. It is considered as the primary cause of neurological disease in several developing countries where the infection is endemic. Although the cause of NCC had been well recognized, some aspects of the disease remains unclear. One of these is the immunopathogenesis of active and inactive NCC

This study was aimed to disclose the immunopathogenesis of active and inactive NCC required for diagnosis and immunotherapy development. This was an observational cross sectional analytic design in swine. Samples were taken using purposive sampling, presenting as active and inactive NCC that met macroscopic as well as microscopic criteria. The active and inactive NCC criteria were based on combined criteria suggested by Carpio A (1994) and Aluja (1999). Samples were obtained from two sources, i.e., cysts in brain obtained from laboratory experiment and those from naturally-infected

swine. The dependent variable was IL-10 and IFN- γ -producing lymphocytes which were examined using immunohistochemical staining; eosinophil, astrocyte, and microglia, which were observed using hematoxylin eosin staining. The five variables were examined locally in active NCC, inactive NCC, and normal porcine brain as control. This was undertaken due to the reason that local immune response reflects biological changes occurred in injured area.

Data analysis was undertaken multivariately using statistical test with significance level of 0.05. The tests used in this study were validity test to test the consistence of the results of observation to studied variables; normal distribution test as requirement to undertake statistical analysis; Manova differential test, which was done to the result of dependent variable that used multivariate concept; and discriminant analysis to obtain discriminant variable of immune response that had the highest contribution to the biological process of immunity modulation. Based on the variables resulted from discriminant test, the author described the pattern that would be used to disclose the immunopathogenesis of active and inactive NCC.

Results of statistical test revealed significant difference in immune response modulation between active and inactive NCC. In active and inactive NCC, there was a simultaneous increase in the contribution of immune response modulation function in IL-10 as well as IFN- γ producing lymphocyte. In active NCC IL-10 producing lymphocyte was more predominant, that reflecting the activity of Th2 subset lymphocyte. In

contrast, in inactive NCC, IFN- γ -producing lymphocyte was more predominant, that reflecting the activity of Th1 subset lymphocyte. There was a difference in the percentage of eosinophil count between active and inactive NCC, in which the percentage in active NSS was more predominant. In active NCC, the percentage of astrocyte and microglial count were not significantly different. However, in inactive NCC significant difference was found in astrocyte between active and inactive NCC and control. Astrocyte significant increase in inactive NCC indicating astrocyte important role in the occurrence of parasite degeneration from active NCC to inactive NCC. Results of discriminant analysis revealed three discriminators, i.e., IFN- γ producing lymphocyte, eosinophil, and IL-10 producing lymphocyte. The classification of the subjects using discriminant function had successfully assigned the subjects into the respective groups with 100% precision.

Based on the results of this study, it is apparent that an intervention can be undertaken to the change from active to inactive NCC by providing IFN- γ antagonist and IL-10 agonist.

ABSTRACT

**ACTIVE AND INACTIVE NEUROCYSTICERCOSIS
IMMUNE RESPONSE BASED ON THE PATTERN OF
LYMPHOCYTE SUBSETS TH1 AND TH2
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AA Raka Sudewi

This study was aimed to disclose active and inactive neurocysticercosis (NCC) based on the pattern of lymphocyte subsets Th1 and Th2. The change of immune response in hosts is related to parasite viability, which plays an important role in the pathogenesis of NCC.

This was an observational cross sectional analytic design in swine. Samples were taken using purposive sampling, i.e., active and inactive NCC that met macroscopic as well as microscopic criteria. These criteria were based on combined criteria suggested by Carpio A (1994) and Aluja (1999). The dependent variable was IL-10 and IFN- γ -producing lymphocytes which were examined using immunohistochemical staining: eosinophil, astrocyte, and microglia, which were observed using hematoxylin eosin staining. The five variables were examined locally in active NCC, inactive NCC, and normal porcine brain as control. This was undertaken due to the reason that local immune response reflects biological changes occurred in injured area.

Data analysis was undergone multivariately with statistical test at significance level of 0.05. Results of statistical test revealed significant difference in immune response modulation between active and inactive NCC in all five variables, except microglia. In active and inactive NCC, there was a simultaneous increase in the contribution of immune response modulation function in IL-10 as well as IFN- γ producing lymphocytes. In active NCC the contribution of immune response modulation function in IL-10 producing lymphocyte was more predominant, that reflecting the activity of Th2 subset lymphocyte, while, conversely, in inactive NCC the contribution of immune response modulation function in IFN- γ producing lymphocyte was more predominant, that reflecting the activity of Th1 subset lymphocyte. Astrocyte significant increase in inactive NCC indicating astrocyte important role in the occurrence of parasite degeneration from active to inactive NCC. Results of discriminant analysis revealed three discriminators, i.e., IFN- γ producing lymphocyte, eosinophil, and IL-10 producing lymphocyte. The classification of the subjects using discriminant function had successfully assigned the subjects into respective groups with 100% precision.

Keywords: *immunopathogenesis, active and inactive neurocysticercosis, immune response modulation.*