

EFFECT OF PARASITIC INFECTIONS ON THE IMMUNE MODULATION AND CLINICAL PARAMETERS IN HIV-1 INFECTED PATIENTS IN KUMASI, GHANA.

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Pathogenic parasite infections have been implicated in chronic diarrhoea, anaemia, malnutrition and excessive immunological perturbation. These clinical and immunological disturbances have been suggested to play a role in HIV/AIDS pathogenesis in Sub-Saharan Africa due increased risk of co-infection. In this study, we investigated the prevalence of pathogenic parasite infections among HIV-1 infected patients and their effect on CD4 count, viral load, haemoglobin levels, immune activation and exhaustion in these patients.

A nested case-control study, conducted at the KATH among a cohort of HIV-1 infected patients involved 23 sampled patients, who were positive for pathogenic parasite microscopy or PCR and 42 controls who were negative for pathogenic parasite microscopy and PCR according to preset criteria. Venous blood from these patients was obtained for haematological analysis and peripheral blood mononuclear cells (PBMCs) isolation. Cryopreserved PBMCs from these patients were used for the analysis of immunological alterations including CD4+ CD8+ T-cell subsets, immune activation and exhaustion. These samples were stained with fluorochrome-conjugated monoclonal antibodies to various T-cell surface receptors. The results allowed the quantification and comparison of the various T-cell subsets, immune activation and exhaustion/dysfunction. Data on clinical and socio-demographic factors were obtained from the patients' hospital records and also compared between the study groups. The overall prevalence of

pathogenic parasite infections in the cohort was 10.2%, with *Giardia lamblia* (4.9%) and *Strongyloides stercoralis* (1.9%) being the most common parasitic infections. Pathogenic parasite infections did not significantly alter the clinical parameters of our HIV-1 infected patients. We found significantly elevated levels of activated CD8+ T-cell subsets in the cases compared to the controls and these activated subsets were significantly associated with the pathogenic parasite infections. Immune activation significantly correlated with viral load and inversely with CD4 count and this association was more pronounced in the patients with pathogenic parasite infections than their controls.

These results suggest that, pathogenic parasite infections could be a risk factor for increased T-cell activation in HIV-1 infected patients and could result in further immune dysregulation among these patients. It is recommended that HIV-1 patients should be monitored for pathogenic parasitic infections, particular *Giardia lamblia* and treated. The study results also lend support for the consideration of immune activation as prognostic tool for predicting disease progression and therapy initiation. Nevertheless, these results should be interpreted in the light of the study limitations including the limited study power and sample size. A longitudinal study design with strong power, representative sample and adequate time period should be able to further explore the potential clinical and immunological implications of pathogenic parasites and HIV/AIDS interaction in Ghana.

Key words: Pathogenic parasites; CD4 count; Viral load; Anaemia; Immune activation; Immune exhaustion