

Impact of *Schistosoma mansoni* co-infection on serum profile of interferon-gamma, interleukin-4 and interleukin-10 in patients with chronic hepatitis C virus infection

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T cell immunoregulatory cytokines may play a crucial role in the host response to hepatitis C virus infection. While T-helper type 1 (Th1) cytokines are required for host antiviral immune responses, T-helper type 2 (Th2) cytokines can inhibit the development of these effector mechanisms. The aim of this study was to investigate the serum levels of IFN-gamma, IL-4 and IL-10 and their roles in the pathogenesis of chronic HCV infection. Also, to explore the influence of *Schistosoma mansoni* co-infection on that profile of cytokines. Serum levels of IFN-gamma, IL-4 and IL-10 were measured by ELISA in 15 healthy control subjects (group I), 18 patients with chronic HCV infection (group II) and 17 patients with chronic HCV co-infected with *S. mansoni* (group III). Routine liver function tests were performed for all groups. All patients had positive HCV RNA by reverse transcription polymerase chain reaction and elevated alanine amino transferase (ALT) levels for more than 6 months. Diagnosis of *S. mansoni* infection was based on detection of the parasite in the stools and/or rectal snips and seropositivity for schistosomal antibodies by ELISA. Hematoxylin and eosin stained liver biopsy sections were available and were examined for 25 patients (12 of group II and 13 of group III). There was no statistical difference in serum IFN-gamma levels between patients with chronic HCV infection and healthy controls. IL-4 and IL-10 serum levels were significantly elevated in chronic HCV patients compared to controls ($P < 0.05$). Chronic HCV patients co-infected with *S. mansoni* had significantly lower IFN-gamma and significantly higher IL-4 and IL-10 serum levels compared to the other groups ($P < 0.05$). Serum levels of IL-4 and IL-10 did not correlate to each others in both groups of patients ($r = 0.29$, $P > 0.05$ for group II, $r = 0.30$, $P > 0.05$ for group III). Patients co-infected with HCV and *S. mansoni* had necro-inflammatory scores significantly higher in comparison to patients infected with HCV alone ($P < 0.05$). Serum levels of IFN-gamma, IL-4 and IL-10 did not correlate with the different laboratory parameters, histological activity index or HCV-RNA viral load for all patients population ($P > 0.05$ for all comparisons). In Conclusions, Th1/Th2 cytokines imbalance is probably involved in the pathogenesis of chronic HCV infection. *S. mansoni* co-infection induces more alteration in the cytokine milieu, along with more-severe liver disease.