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Study on *Schistosomiasis mansoni* and Comorbidity with Hepatitis B and C Virus Infection

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1. Introduction

1.1. Comorbidity of *S. mansoni* infection and hepatitis B

In Brazil, despite decreases in the prevalence rates of schistosomiasis and in the frequency of severe forms, the targets for transmission control have not been reached. This should be taken to be a warning sign indicating that schistosomiasis must not be neglected in this country (Conceição & Coura 2012). It is also important to emphasize that co-infections such as the hepatitis B and C viruses play a role.

One of the few studies involving comorbidity with hepatitis B was conducted by Serufo et al. (1998). Two areas with schistosomiasis infection in Minas Gerais were correlated: one endemic and the other, a controlled non-endemic area, where it was shown that schistosomiasis did not change the course of hepatitis B. This had previously been emphasized by Andrade (1965) and Prince (1970), in studies on patients in different geographical regions.

Lyra et al. (1976) compared cases of hepatosplenic schistosomiasis (HSS) and control cases of the hepatointestinal form of the disease, including cases with a variety of illnesses. They found that the patients with HSS were carriers for HBsAg more frequently than the other groups were. Bassily et al. (1979, 1983) detected hepatitis B surface antigen in cases of hepatosplenic schistosomiasis. Pereira et al. (1994) did not find any significant difference in the frequency of these markers for hepatitis B between patients with the hepatointestinal form of schistosomiasis, the hepatosplenic form and controls. Conceição et al. (1998) evaluated the prognosis for individuals infected with *S. mansoni* and carriers of hepatitis B virus, among patients attended at the Teaching Hospital of the Federal University of Rio de Janeiro, Brazil. Non-significant predominance of HBsAg, anti-HBsAg and anti-HBc was detected among patients with the hepatosplenic form of schistosomiasis, who presented greater severity of clinical

evolution, with a higher frequency of hematemesis and/or melena. In addition, development of macronodular cirrhosis was observed, with worse prognosis than for patients with the toxemic and hepatointestinal forms. However, Serufo (2000) considered that this kind of association was a fallacy.

Al-Shamiri et al. (2011) determined the disease prevalence and its relationship with hepatitis B and C viruses among 1484 school children aged between 5 and 16 years in five areas endemic for *S. mansoni* and *S. haematobium*. The overall prevalence was 20.76% for *S. mansoni* and 7.41% for *S. haematobium*. There was a correlation between *S. haematobium* and hepatitis B, but no association between *S. mansoni* infection and the hepatitis B and C viruses.

1.2. Association between *S. mansoni* infection and hepatitis C

In Egypt, HCV together with schistosomal parasite infection is the biggest risk factor for chronic liver disease. In most Egyptian patients, HCV genotype 4 is highly prevalent (Halim et al. 1999).

Kamal et al. (2000a) showed that patients with concomitant HCV and schistosomiasis were characterized by more advanced liver disease, higher HCV RNA titers, higher incidence of cirrhosis and hepatocellular carcinoma, and higher incidence of liver-related morbidity and mortality. Kamal et al. (2000b) concluded that patients with chronic hepatitis C and schistosomiasis co-infection responded poorly to interferon therapy and had higher relapse rates than among patients solely infected with chronic HCV.

However, some authors like Gad et al. (2001) and Kamel et al. (2002), in Egypt, mentioned that there appeared to be no epidemiological association between hepatic schistosomiasis and infection by the hepatitis C virus. Also in Egypt, Madwar et al. (1989) evaluated the hepatosplenic forms of the disease and did not show any correlation with serological indicators for hepatitis.

Lambertucci et al. (2005) emphasized that the studies on comorbidity of schistosomiasis and viral hepatitis lacked representative samples of inhabitants and control groups. They concluded that the evolution to chronic hepatitis and hepatic cirrhosis was related to the natural history of hepatitis.

Conceição et al. (2008) presented previous results from a study developed in Itaobim, a rural area of Minas Gerais, Brazil, with the aim of identifying the clinical repercussions of *S. mansoni* infection associated with hepatitis due to the B and C viruses. There was no statistical difference in the viral hepatitis B and C rates among *S. mansoni* infected patients, in comparison with a control group without positive parasitological examinations. From an investigation in the rural area of Jequitinhonha Valley, in Minas Gerais, Conceição et al. (2009) did not find any positive association between serological indicators for hepatitis B or C and severe clinical forms of Manson's schistosomiasis.

The comorbidities that affect the course and response to anti-hepatitis C therapy include schistosomiasis, iron overload, alcohol abuse and excessive smoking. These co-infections negatively affect the course and outcome of liver disease, often reducing the chance of

achieving a sustained virological response with PEGylated interferon and ribavirin treatments. Patients with chronic hepatitis C (CHC) infection and concomitant schistosomiasis respond poorly to IFN therapy and have higher relapse rates than among patients with HCV infection only (El-Zayadi 2009). There was no interaction between *S. mansoni* infection or disease and the prevalence or severity of hepatitis C in surveys that were conducted among 2038 Egyptians and 2120 Kenyans (El-Zayad 2009).

2. Research methods

The research methods used for preparing this chapter were based on articles written by our group and by other authors in the literature on the topic of Epidemiology of Schistosomiasis in Brazil, which were published in journals and books in Brazil and worldwide, and in MSc and PhD theses that are available through the internet, in the Oswaldo Cruz Foundation (Fiocruz) libraries, and in the School of Medicine of the Federal University of Rio de Janeiro (UFRJ). Reference was made to protocols and records used in clinical studies and in endemic areas, among the inhabitants, with clinical specifications and socioeconomic conditions. This work also used statistical analysis methods to evaluate whether the results obtained presented significant differences.

3. Conclusions

- Most authors have not found any positive association between serological indicators for hepatitis B or C and the severe clinical forms of schistosomiasis mansoni;
- Comorbidities such as infections due to the hepatitis B and C viruses may worsen the prognosis for the clinical evolution of hepatosplenic schistosomiasis.

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