Surgical Hepatosplenic Mansonic Schistosomiasis in Adolescents: Repercussions of the Post-treatment Schistosomotic Burden on the Hepatic Functional Reserve

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Schistosomiasis mansoni affects the hepatic functional reserve. Clinical treatment with oxamniquine is not 100% effective and there has been found strain of this parasite resistant to this drug. The aims of this investigation were: (1) to examine the presence of residual parasite burden after medical and surgical treatment on adolescents with surgical schistosomiasis mansoni and (2) to assess the effect on the hepatic functional reserve in patients with and without residual infection. Twenty nine children with hepatosplenic schistosomiasis mansoni and bleeding esophageal varices were treated with oxamniquine. They underwent splenectomy, ligature of the left gastric vein and autologous implantation of spleen tissue into the greater omentum. After a mean post-operative follow up of five years they underwent rectal biopsy for schistosomotic egg search. They were divided in patients with and without infection. In 20 patients the submucosal egg search was negative, however, in 9 it was positive. The hepatic functional reserve in the patients without infection was as follows: 17 were Child-Pugh A and 3 Child-Pugh B. In the patients who were still infected 6 were Child-Pugh A and 3 Child-Pugh B. The χ^2 *analysis of the hepatic functional reserve showed* $\chi^2 = 3.19$ *- p= 0.07. From the results the following conclusion can be drawn: residual infection or reinfection in the follow up period had not interfered with the distribution of the hepatic functional reserve of the patients in this series. However, there was a trend for a decrease of this parameter in patients with residual infection.*

Key words: mansonic schistosomiasis - schistosomotic egg burden - hepatic functional reserve

Schistosomiasis mansoni is an endemic disease in Northeastern, Brazil. In Pernambuco, this condition is the third mortality cause among the so-called rural endemic diseases. In this way it represents an important problem of public health (Amaral et al. 1994, Barbosa et al. 1996, 1997).

The patients who suffer from schistosomiasis mansoni in its hepatosplenic form represent about 2% to 7% of the infected northeastern Brazilian population (Barreto & Domingues 1996). About 100,000 of these patients present with recurrent upper digestive bleeding and may require medical and surgical treatments. Oxamniquine and praziquantel are the main drugs for this parasite (Cunha 1982, 1986, 1997, Cunha & Ferrari 1991).

Among the surgical approaches used in young patients is splenectomy, ligature of the left gastric vein and autologous implantation of spleen tissue in a pouch of the major omentum (Brandt et al. 1997). When bleeding recurrence occurs the patients undergo endoscopic sclerotherapy of the esophageal varicose veins (Sakai 1995, Brandt et al. 1997). This treatment results in cure of the hypersplenism, decreasing of the upper digestive bleeding bouts, improvement of the hepatic functional reserve, improvement of the somatic development and increment of the bone mineral content (Brandt et al. 1995a, b,1997, 1999).

The spleen tissue autoimplantation in the major omentum, original in the surgical treatment of the surgical form of schistosomiasis mansoni, has produced a significant decrease of the mortality rate due to overwhelming postsplenectomy infection (OPSI) in children with this disease. Historical mortality rate for children with this condition had been 30% to 40% and nowadays is 3.1%. In the past ten years there has been no patient with OPSI in the Department of Pediatric Surgery, Federal University of Pernambuco, Brazil (Brandt et al. 1997, 1995a, b, 1997, 1999).

In the follow up of the surgical patients who had previous medical treatment with oxamniquine it has been observed, in our series, that these pa-

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tients maintain high levels of eosinophil cells and immunoglobulins G and M, even among patients who had negative search, in stool, for *Schistosoma mansoni*. On the other hand, it has been reported the quantitative oogram – *S. mansoni* egg search and quantification in the submucosa – is more efficient in controlling the results of the medical treatment (Cunha & Carvalho 1966, Neves 1976, Cunha & Ferrari 1991, Vallada 1998).

The aims of this investigation were: (1) to examine the presence of residual parasite burden after medical and surgical treatment on adolescents with surgical schistosomiasis mansoni and (2) to assess the effect on the hepatic functional reserve in patients with and without residual infection.

MATERIALS AND METHODS

Patients - It was selected, at random, 29 out of 63 patients suffering from hepatosplenic schistosomiasis mansoni who had undergone medical and surgical treatments in the past ten years, cared for at the Department of Pediatric Surgery, University Hospital (Hospital das Clínicas), Federal University of Pernambuco, Recife, Brazil. These patients have received a single dose (20 mg/kg) of oxamniquine and after 30 days they underwent splenectomy, ligature of the left gastric vein and autoimplantation of spleen tissue into an omental pouch of the greater omentum. Symmers' fibrosis was confirmed in wedge liver biopsy, done in all patients.

Submucosal rectal biopsy was done under sedation. The tissue was sent for non staining microscopy examination following the steps of the oogram quantification technique (Cunha 1963, Cançado et al. 1965, Cunha & Ferrari 1991, Vallada 1998). The *S. mansoni* egg search and quantification were done in the submucosa. The eggs were classified as viable (matures and non matures) and non viable.

Routine Kato-Katz was done in all patients.

The hepatic functional reserve was estimated using the parameters of the Child-Pugh classification.

Statistical analysis and ethical considerations: The chi square (χ^2) was used for measuring the difference among quality frequencies. $p < 0.05$ was used to reject the null hypothesis. The hospital ethical committee approved this study.

RESULTS

In 20 patients the submucosal egg search was negative, however, it was positive in 9 patients. From these positive oograms, viable eggs (all mature) was seen in 6 patients, and in 3 the eggs were non viable.

The hepatic functional reserve in the patients without infection was as follows: 17 were Child-Pugh A and 3 Child-Pugh B. In the patients who were still infected 6 were Child-Pugh A and 3 Child-Pugh B. The χ^2 analysis of the hepatic functional reserve showed $\chi^2 = 3.19$ - $p = 0.07$.

As regard to the Kato-Katz investigation 6 were positive and viable eggs account for 4 patients. There was no statistical difference between the quantitative oogram and the Kato-Katz results.

DISCUSSION

It is still subject of discussion and controversy the ideal way of detecting active *S. mansoni* infection, specially after medical treatment. The Kato-Katz stool investigation has been used more frequently, however, as it happens in this investigation it is less accurate than the quantitative oogram (Cunha 1963, Cançado et al. 1965, Cunha & Carvalho 1966, Neves 1976, Rabello 1997, Vallada 1998).

Other way of measuring the efficacy of medical treatment is looking for *S. mansoni* eggs in the histology of wedge liver biopsy taken at the surgical procedure time. Domingues (1998), for example, has shown, in 22.5% of the adult patients, the presence of granuloma with portal inflamatory activity, indicating active disease. These patients had received medical treatment prior to surgery (Domingues 1998). This result represents no statistical difference from the oogram investigation in the present study – 20.7% with viable eggs and 10.3% with non viable eggs.

It has been reported strains of *S. mansoni* resistant to oxamniquine (Coelho et al. 1997). On the other hand, the dose of this drug has varied from treatment to treatment. Cunha (1997) has reported a residual parasite burden of 61.7% in the patients when a single dose of 15 mg to 18 g/kg was used. This result is worse than the result of this investigation. It is likely that a more ideal dose of oxamniquine may reduce the residual parasite burden.

Other relevant fact is that the treated patients go back to their usual habitat with *S. mansoni* infested rivers and they may become re-infected. Domingues (1998), for example, showed that 7 out of 14 patients previously treated with oxamniquine and living in the same endemic habitat presented with active disease in their wedge liver biopsies which were taken at operation time (Domingues 1998).

Traditionally, the seniors surgeons with great experience in the treatment of the surgical form of *S. mansoni* disease do not take into account the residual parasite burden as a parameter of influencing the overall end result of the treatment of this condition (Kelner et al. 1982, Kelner 1992).

Although not reaching statistical significance, residual infection or re-infection in the post treatment period could have affected the distribution of

the hepatic functional reserve of the patients from this series, as it can be observed that there was a trend for a decrease of this parameter in patients with residual active infection.

We have already demonstrated that there is an association between *S. mansoni* positive oogram and the highest serum levels of immunoglobulin G (IgG) (Brandt et al. 1998). Furthermore, these high serum levels of IgG may be associated to the high B lymphocyte cell counts in these patients (Brandt et al. 1993). Based on these observations we should recommend rectal biopsy and submucosal search for *S. mansoni* eggs in patients who maintain high levels of IgG after medical treatment. In our institution we are giving a second treatment for the patients with active eggs in the quantitative oogram.

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