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### REFERÊNCIA

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## ARTIGOS

### A FIELD STUDY OF PROTEINURIA IN INDIVIDUALS INFECTED WITH *SCHISTOSOMA MANSONI*

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*Proteinuria was detected in 24.7% of 89 individuals with hepatosplenic schistosomiasis and in only 4.6% of 86 subjects with mild hepato-intestinal schistosomiasis, all of them living in comparable conditions in two endemic areas in Bahia, Brazil. From nine individuals who had proteinuria over 30 mg/100ml, eight had hepatosplenic schistosomiasis. These findings may be related to the presence of schistosomal nephropathy and reveal the significance of this condition in the field in endemic areas of schistosomiasis.*

Key words: *Schistosoma mansoni*. Proteinuria. Field study. Schistosomal nephropathy.

It has been documented that renal lesions appear to be associated with hepatosplenic schistosomiasis *mansoni* in man<sup>1 2 3</sup>. There are many types of glomerular changes present but usually they are represented by chronic diffuse membrano-proliferative glomerulonephritis with lobular accentuation, and the nephrotic syndrome is the main form of clinical presentation<sup>6 15 16</sup>. Schistosomal antigens and several classes of immunoglobulins and complement have been detected in the glomerular lesions both in humans<sup>8 11</sup> and in experimental animals<sup>4 7 12 14</sup>. Therefore, this feature of hepatosplenic schistosomiasis is considered a good example of immunocomplex disease produced by a parasitic infection. However, the clinical significance of renal involvement in subjects living in endemic areas, as opposed to hospitalized patients, has not been determined. The only previous attempt was that of Lehman et al<sup>10</sup>.

The present study represents an attempt to investigate the significance of proteinuria in infected people living in two endemic areas of schistosomiasis in Bahia, Brazil.

#### MATERIAL AND METHODS

This study involved the quantitative estimation of proteinuria and arterial blood pressure from 175 individuals living in Taquarendi and Caatinga do

Moura, Bahia-Brazil, two highly endemic areas of schistosomiasis. These individuals were all included in a longitudinal study and have been observed during several years. The majority have been treated, but re-infection seems to occur frequently. All the subjects were infected with *S. mansoni* as determined by fecal examination performed by a quantitative method<sup>9</sup>. Following the criteria of Prata and Bina<sup>13</sup> for the clinical classification of schistosomiasis, subjects were divided into two groups: a) hepatointestinal group with 86 cases, and b) hepatosplenic group with 89 cases. All the patients with hepatosplenic schistosomiasis were included in the study. They showed an enlarged, sometimes nodular and hard liver, with prominent hypertrophy of the left lobe, and splenomegaly. Actually, some of them have had splenectomy in the past. For the purpose of the present study the hepato-intestinal (mild, usually asymptomatic infection) and hepatosplenic cases were paired whenever possible by age, sex and preferentially included those individuals from the same family or living in the same house. For the determination of proteinuria, urine was collected in clean glass bottles, and tested immediately by Labstix (Ames Co.), at the time the patients were clinically re-examined. All the individuals examined were performing their usual work routine, only had mild, vague complaints, and at clinical examination did not seem to have any major associated diseases. Results of proteinuria were quantitatively expressed as "traces", 30, 100, 300 and above 2,000mg per 100ml.

Arterial blood pressure was taken by the usual sphygmomanometer method with the subject seated. Values above 140 x 90mmHg were considered as hypertension.

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**RESULTS**

Age and sex of the individuals studied appear in Table 1. The youngest was 9 years old and the two groups considered are shown in Table 2. The total prevalence of proteinuria reached 14.8%, with 24.7% for hepatosplenic and 4.6% for the hepato-intestinal cases ( $\chi^2 = 13.41 < 0.001$ ), with no difference due to sex. Of the 26 individuals with proteinuria, 9 of them could be considered to have striking proteinuria (above

30mg/100ml), and only one of the latter did not belong to the hepatosplenic group. The prevalence of arterial hypertension was 22.2% (39/175). Among the hypertensive subjects with proteinuria, 6.2% belonged to the hepato-intestinal group and 26.0% to the hepatosplenic group, as can be observed in Table 3. It can also be observed that from the 39 subjects showing high blood pressure only 7 of them (17.9%) presented proteinuria.

*Table 1 – Age and sex of 175 cases of schistosomiasis presented in this study*

Age (years)	Sex						Total	%
	Male		Female		Nº			
	case	control	case	control				
< 20	6	9	6	8	29		(16,6)	
20 – 29	6	13	5	6	30		(17,1)	
30 – 39	10	8	11	12	41		(23,5)	
40 – 49	5	9	14	6	34		(19,4)	
50 – 59	5	8	17	1	31		(17,7)	
60 or over	2	2	3	3	10		( 5,7)	
<b>Total</b>	<b>34</b>	<b>49</b>	<b>56</b>	<b>36</b>	<b>175</b>		<b>(100,0)</b>	

*Table 2 – Prevalence of proteinuria according to clinical forms of schistosomiasis*

Clinical forms	Nº	Proteinuria			
		Cases	Positive	(%)	Negative
Hepato-intestinal	86	4	(4.6)	82	(95.4)
Hepatosplenic	89	22	(24.7)	67	(75.3)
<b>Total</b>	<b>175</b>	<b>26</b>	<b>(14.8)</b>	<b>149</b>	<b>(85.2)</b>

$\chi^2 = 13.91 < 0.001$

The egg-load varied from 24 to 9,120 eggs per gram of feces, and did not seem to correlate with the presence or degree of proteinuria, as can

be observed in Table 4. It can be noted that all people with proteinuria had less than 500 eggs per gram of feces.

*Table 3 – Prevalence of proteinuria in cases of schistosomiasis in relation to clinical forms and the presence of arterial hypertension*

Clinical forms	Hypertension						No hypertension					
	no		no		Total		no		no		Total	
	proteinuria	proteinuria	proteinuria	proteinuria			proteinuria	proteinuria				
	Nº	(%)	Nº	(%)	Nº	(%)	Nº	(%)	Nº	(%)	Nº	(%)
Hepato-intestinal	1	( 6.2)	15	(93.8)	16	(100.0)	3	( 4.3)	67	(95.7)	70	(100.0)
Hepatosplenic	6	(26.0)	17	(74.0)	23	(100.0)	16	(24.3)	50	(75.7)	66	(100.0)
<b>Total</b>	<b>7</b>	<b>(17.9)</b>	<b>32</b>	<b>(82.1)</b>	<b>39</b>	<b>(100.0)</b>	<b>19</b>	<b>(13.9)</b>	<b>117</b>	<b>(86.1)</b>	<b>136</b>	<b>(100.0)</b>

Table 4—Prevalence of proteinuria in relation to fecal egg-load in 175 subjects with schistosomiasis

Proteinuria	Nº eggs per gram of feces				Total
	not done	< 500	500 - 1000	> 1000	
Present	2	24	0	0	26
Absent	10	121	11	7	149
Total	12	145	11	7	175

## DISCUSSION

Proteinuria, but not arterial hypertension, was found in the present study to be more prevalent in hepatosplenic than in mild or asymptomatic schistosomiasis. These findings are apparently in disagreement with those of Lehman et al<sup>10</sup> who found no correlation between proteinuria and splenomegaly in subjects infected with *S. mansoni* and living in the field. However, they found an incidence of 35.4% of people with splenomegaly in their series. This is well above the usual 4-6% incidence of hepatosplenic schistosomiasis observed in endemic areas of Brazil<sup>5</sup> and probably indicates that not all cases of splenomegaly included in the study of Lehman et al<sup>10</sup> represented hepatosplenic schistosomiasis. This is an important point, because schistosomal glomerulopathy seems to be restricted to patients with hepatosplenic schistosomiasis<sup>15</sup>. Apparently portal hypertension and the consequent collateral circulation are critical changes that serve to divert antigens, and/or immunocomplexes, generated in the portal system, from the Kupffer cell filter to the kidneys<sup>18 19</sup>.

The prevalence of proteinuria found in this field study amongst hepatosplenic cases was 24.7% which is more impressive than the 15.0% of renal disease present in patients with hepatosplenic schistosomiasis seen in our hospitals<sup>15</sup> or the 12.0% incidence of chronic glomerulonephritis observed in autopsied cases<sup>2</sup>. Our study is therefore in keeping with the concept of schistosomal nephropathy and shows that renal involvement could be an important feature to be considered in hepatosplenic schistosomiasis in the endemic areas. Although proteinuria defined as "traces" may not be significant, a clear cut difference of its prevalence was seen for the two groups. It represents values from 10 to 15mg per 100ml and can be considered as the upper physiological limits according to Souza et al<sup>17</sup>, who studied the elimination of urinary protein in Brazilians. However when we consider expressive proteinuria (above 30mg/100ml) the dif-

ference between hepatosplenic to hepato-intestinal schistosomiasis becomes striking, despite the small number of cases considered.

From our own experience, arterial hypertension seems to be a frequent occurrence in people living in the interior of the state of Bahia, Brazil. Its causes and significance needs investigation. It did not correlate with hepatosplenic schistosomiasis in this present study, although one single blood pressure determination is not an adequate method to completely exclude this condition.

## RESUMO

*Proteinúria foi detectada em 24,7% de 89 pacientes com a forma hepatoesplênica da esquistosomose e em apenas 4,6% de 86 pacientes com a forma hepatointestinal dessa parasitose. Todos os pacientes viviam em condições epidemiológicas semelhantes em duas áreas endêmicas da Bahia, Brasil. Dos nove indivíduos que tinham proteinúria acima de 30mg/100ml, oito tinham a forma hepatoesplênica da doença. Estes achados podem estar relacionados à presença de uma glomerulopatia esquistossomótica e mostra o significado desta condição no campo, em áreas endêmicas de esquistosomose.*

*Palavras chaves:* *Schistosoma mansoni. Proteinúria. Estudo de campo. Nefropatia esquistossomótica.*

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