

SHORT COMMUNICATION

## Specific Situations Related to Acute Schistosomiasis in Pernambuco, Brazil

Constança Simões Barbosa/<sup>+</sup>, Silvia Maria Lucena Montenegro, Frederico Guilherme Coutinho Abath, Ana Lúcia Coutinho Domingues\*

Centro de Pesquisas Aggeu Magalhães-Fiocruz \*Departamento de Medicina Clínica, Centro de Ciências da Saúde, UFPE, Cidade Universitária, 50670-420 Recife, PE, Brazil

*The present work reports on two epidemiological episodes resulting in acute schistosomiasis involving wealthy persons living in the State of Pernambuco, Brazil. The authors discuss the epidemiological, clinical and serologic characteristics of the acute infections and also the way in which the conditions for transmission occurred.*

Key words: acute schistosomiasis - environmental epidemiology - snail vectors - Pernambuco - Brazil

*Schistosoma mansoni* transmission may vary depending on the ecology of the disease and the social standing of the population in which it occurs. The prevalence and intensity of the infection is subject to cultural practices, specific for each locality or situation and usually associated to economic, domestic or leisure activities (Barbosa & Barbosa 1998)

Historically considered as a rural endemic disease, schistosomiasis is gradually expanding into the coastal regions of the State of Pernambuco due to the exodus of rural workers to the urban areas. This migratory process, caused by poverty in the rural areas, encourages people to go to the metropolitan region of Recife in search of work, medical assistance and education. Unemployed people and sugar cane workers infected with *S. mansoni* come to the urban areas yearning for a better life. Usually they find a position as auxiliary workers in the building market. They generally live in the shantytowns or temporary camps without any sanitation, resulting in the contamination of natural waters. Peridomicile or even domicile focus have been reported on the coastal regions of the state and new sites of active transmission are being detected in tourism and summer vacation resources (Barbosa et al. 1996, 2000).

In addition to the biological components, schistosomiasis has social and cultural determinants. The mechanisms of transmission of the disease are very complex when you take into account the biological factors together with the social components and human behaviour. In fact, man can modify the environment creating new transmission sites and specific risk situations for populations which have never been exposed to the disease.

This paper highlights the occurrence of two outbreaks of acute schistosomiasis characterized by distinct epidemiological features, related to the accidental transmission of *S. mansoni* to individuals from the middle to upper classes in Pernambuco. It also describes how the inadequate occupation and organization of space by groups of people may favour the establishment of new sites of active transmission of schistosomiasis.

### EPISODE 1

The first episode occurred in the summer of 1992 at Forte Orange beach, in the south of the island of Itamaraca, on the coast of Pernambuco, an area so far considered free of schistosomiasis. On this occasion 13 cases of acute schistosomiasis were reported in individuals who were accidentally exposed to cercariae contaminated water. This locality was originally a swampy mangrove area which was backfilled to make way for a summer residential project for the middle to upper class population. Houses were built without any planning for the proper drainage of rainwater. Of the original ecosystem remained two sweet water lagoons populated with *Biomphalaria glabrata*. Before 1970 there were no reported cases of schistosomiasis at Forte Orange beach. During this time

<sup>+</sup>Corresponding author. Fax: +55-81-3453.1911. E-mail: cbarbosa@cpqam.fiocruz.br  
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the backfilling changed the characteristic of the mangroves and surrounding area. Workers from rural areas of endemic schistosomiasis were the principal workers, establishing precarious dwellings near the lagoons, the only source of available sweet water. Probably the faecal contamination of the lagoon established the cycle of schistosomiasis transmission in the area. At present, because of the rain, the lagoons overflow spreading the vectors into the streets and backyards, locals which are not very permeable, allowing the persistence of the vector snails for many months.

In 11 July 1992, 12 medical students, accompanied by one professor, got together for a day out to play football and have a barbecue. On their return home, as they tried to free a car stuck in the mud, their lower limbs were in contact with contaminated water, followed by intense itching. Of the 13 individuals exposed one was not infected and one was infected but did not show any symptoms (he had a previous history of contact with the river) and 11 had heavy manifestations of acute schistosomiasis. In this latter group, 8 had symptoms from the pre-postural phase (two weeks after infection) which ceased spontaneously in about a week. After two weeks, the symptoms returned with greater intensity in all patients, coinciding with the oviposition stage (Table I).

TABLE I  
Clinical manifestations for the 11 symptomatic patients from episode 1

Symptoms	Patients	%
Fever	11	100
Asthenia	11	100
Dry cough	10	90.9
Anorexia	9	81.8
Weight loss	8	72.7
Myalgia	7	63.6
Diarrhoea	7	63.6
Colic	7	63.6
Headache	4	36.4
Rash	2	18.2

In four patients, due to the intensity of the symptoms, it was necessary to prescribe cortisone at a dosage of 0.5 mg/kg for the first two weeks until the symptoms disappeared. All infected subjects were treated three months after the infection with oxamniquine at a dosage of 15 mg/kg. In 10 patients it was also necessary to combine the treatment with prednisone for two-three weeks because symptoms were still present and they had high eosinophil counts.

After the treatment there was a gradual clinical improvement in all patients although three patients continued to have high eosinophil counts and one patient had a stool egg count positive, six months after the treatment. Two patients had slightly enlarged liver and spleen for five months after treatment. All patients were retreated with praziquantel, six months after the first treatment.

Six patients were submitted to more detailed immunological tests and showed higher IFN- $\gamma$ , IL-4 and IL-5 levels than patients with chronic forms of schistosomiasis (Williams et al. 1994).

## EPISODE 2

The second episode resulted in 13 patients with acute schistosomiasis, all members of the same family of middle-upper class, and was also caused by transmission associated to leisure activity. This occurred on a private rural property in the district of Escada, Pernambuco, endemic for schistosomiasis and where the vector is *B. straminea*. According to the last parasitological survey carried out by the Fundação Nacional de Saúde in 1994, the prevalence of schistosomiasis in the district of Escada was 50.7%, which is considered high respecting to the average prevalence in the State of Pernambuco (20.5%) (Barbosa 1996).

The owner of the farm built a swimming pool using the water from the stream, that is a tributary of the Una river, implicated in the transmission of schistosomiasis. About 20 days after a single exposure, 12 people showed characteristic symptoms described in Table III. Only one of the infected persons did not show any symptoms (he had a previous history of bath in the river).

The treatment prescribed was oxamniquine in 9 patients and praziquantel in 3 patients 60 days after the infection and repeated after six months. Two patients that had no eggs of *S. mansoni* in their serial stool samples, but had eosinophilia and showed symptoms, were positive by specific immunofluorescence (Table IV).

Seven patients of this episode were submitted to detailed immunological evaluation. These tests showed that the production of IFN- $\gamma$ , in response to SEA (soluble egg antigen) and SWAP (soluble adult worm antigen) appeared early after infection. The same happened with IL-5, stimulated by SEA suggesting that the cytokine profile in acute patients is characterised by a mixed type 1 and 2 response. This, is in agreement with Williams et al. (1994), showing that patients with an acute form of illness respond to specific antigens with high cytokine levels, resulting in a mixed type 1 and 2 response (type 0) (Montenegro et al. 1999)

TABLE II  
Clinical characteristics and laboratory results from episode 1

No	Age	Leucocytes (/mm <sup>3</sup> )	Eosinophil (/mm <sup>3</sup> )	Eosinophil %	AST (5-20 U/ml)	ALT (5-25 U/ml)	FA (60-170 U)	Thorax RX	USG	Urea protein
1	22	11.000	3.520	32	25	60	262	Light infiltration inflamed	Liver ↑	Absent
2	23	20.900	14.212	68	22	39	271	Congestion	Liver ↑	Absent
3	22	28.900	12.716	44	21	61	409	Normal	Liver ↑	Present
4	22	11.900	2.142	18	5	5	Nf	Nf	Liver ↑	Absent
5	22	11.000	2.530	23	51	57	423	Normal	Liver ↑ Spleen ↑	Present
6	22	13.000	5.850	45	34	48	343	Enlarged hilar	Liver ↑	Present
7	23	13.000	5.850	45	10	14	47	Normal	Liver ↑	Absent
8	28	8.000	880	11	18	23	86	Nf	Liver ↑	Nf
9	23	9.000	3.060	34	12	16	172	Congested hilar	Liver ↑ Spleen ↑	Nf
10	22	9.200	1.748	19	7	6	43	Normal	Nf	Nf
11	40	11.700	6.201	53	205	367	276	Nf	Nf	Nf
12	22	11.526	3.458	30	22	40	172	Nf	Nf	Nf

Nf: not done; USG : ultrasonography; AST: aspartate amino transferase; ALT: alkaline amino transferase; FA: alkaline phosphatase

TABLE III

Clinical manifestation for the symptomatic patients from episode 2

Principal symptoms	No . of patients	%
Fever	7	53.8
Headache	4	33.3
Dry cough	4	33.3
Vomiting	3	25
Asthenia	3	25
Anorexia	3	25
Body pain	3	25
Diarrhoea	3	25
Rash	1	8.3

CONCLUSION

There are similarities between the two episodes, both resulted in acute schistosomiasis, suggesting the infected individuals had not been exposed before. However, they show distinct characteristics due to different environmental changes caused by the action of man, leading to the creation of new transmission sites. In addition, the way by which transmission occurred resulted in different infection intensities.

In the first episode, the patients had a smaller body area exposed and the time of exposure was lower than in episode 2. However, the intensity of the symptoms was greater than in episode 2. Although the number of eggs in the stool of the patients were not available, factors related to the biological transmission potential of the vectors involved (*B. glabrata* x *B. straminea*) and the peculiarities of the two sites of transmission together with the features respecting infections in both episodes, suggest the acquired parasite burdens were different as we will discuss.

It is reasonable to propose that the group infected in this first episode acquired a higher number of cercaria because the infected larvae were concentrated in a small water collection and *B. glabrata* has a high potential to release large number of cercaria. The patients infected in episode 2 showed light symptoms which suggested that they had received low parasite burdens even though they had a longer exposure time. This is explained by the fact that *B. straminea*, although considered responsible for the high incidence of schistosomiasis in the rural areas of Pernambuco, is biologically less efficient in cercaria production than *B. glabrata*. Moreover, we should consider the fact that the infection was in running water.

With reference to episode 1, the migration of infected rural workers per se was not sufficient for the introduction of the disease in that area. In fact,

TABLE IV  
Clinical characteristics and laboratory results from episode 2

Patient number	Sex	Age	Eosinophil (mm <sup>3</sup> )	SP (Hoffmann's method)	TTO
1	F	43	1.266	+	Predisone + oxamniquine
2	M	16	-	+	Praziquantel
3	M	14	-	+	Predisone + oxamniquine
4	M	12	-	+	Predisone + oxamniquine
5	M	7	-	+	Praziquantel
6	F	47	-	-	Praziquantel
7 <sup>a</sup>	M	69	-	+	No treatment
8	F	33	-	+	Predisone + oxamniquine
9	M	9	2.788	+	Predisone + oxamniquine
10	M	9	2.079	+	Predisone + oxamniquine
11	F	45	994	-	Predisone + oxamniquine
12	F	13	-	+	Predisone + oxamniquine
13	M	4	-	+	Predisone + oxamniquine

a: patient refused the treatment; SP: stool parasitological; TTO: treatment; M: male; F: female

the participation of many factors and the involvement of those who can establish the transmission and guarantee the maintenance of the active sites of transmission of the disease is also necessary.

In addition to the epidemiology and public health problems related reported herein, the paper also highlights the fact that the acute manifestations of schistosomiasis are usually observed in individuals not previously infected, and thus, without any degree of immunoprotection.

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