

Seroconversion following empiric praziquantel treatment as confirmatory diagnostic tool for chronic schistosomiasis

Davide Marangoni¹, Tommaso Manciuilli¹, Anna Barbiero¹, Antonia Mantella¹, Michele Spinicci^{1,2}, Alessandro Bartoloni^{1,2}, Lorenzo Zammarchi^{1,2}

¹Department of Experimental and Clinical Medicine, University of Florence, Florence, Italy.
²Department of Infectious and Tropical Diseases, Careggi University Hospital, Florence, Italy.



Full article
available

INTRODUCTION

The diagnosis of chronic schistosomiasis usually requires the detection of *Schistosoma* eggs in biological samples or a positive antigen or serology. Urine and stool microscopy have suboptimal sensitivity, while molecular-based tests and antigen testing have higher sensitivity but are not widely available. Serology has been considered the most sensitive diagnostic tool for chronic schistosomiasis, however adult worms may escape the host immune system, inducing a seronegative status even in case of established infection. In such cases, the worm’s death upon anthelmintic treatment might induce parasitic antigens exposure which could lead to a seroconversion, as reported for other helminthic infections. No data on this phenomenon are available for *Schistosoma* infection.

METHODS

We reviewed all serological tests for *Schistosoma* IgG carried out at the Careggi University Hospital, Florence, Italy over a 14- year timespan ranging from January 2008 and September 2022. All serological tests were performed with commercial SCHISTO Western Blot IgG tests manufactured by LDBIO Diagnostics, Lyon, France and SCHISTO II Western Blot IgG tests manufactured by LDBIO Diagnostics, Lyon, France. Patients were included in the analysis if seroconversion was documented to have happened following an empiric treatment with praziquantel (PZQ) for chronic schistosomiasis. In the case that serology was first performed with the SCHISTO I kit and subsequently repeated with the SCHISTO II kit, the first frozen sample was recovered and tested again with the newer kit.

RESULTS

In the study period, *Schistosoma* IgG testing was performed on 1,414 distinct patients. Among them, six were patients with chronic schistosomiasis who showed a seroconversion after receiving treatment in our clinic. Interestingly, the only *Schistosoma*-specific band present in post-seroconversion sera was P22-24. The six patients and their clinical features are summarized in the table below. All the patients presented here were likely to harbour a chronic infection based on travel history and urinary symptoms, and their initial seronegativity might be explained by the immunological features of *Schistosoma* infection.

	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6
Age	18	28	22	26	19	27
Country of birth	Mali	Mali	Senegal	Senegal	Gambia	Togo
Parasitological examination of urine	3 negative samples	3 negative samples	1 negative sample	1 positive and 1 negative sample	1 negative sample	Not performed
Signs and symptoms	Recurring UTIs, microhaematuria, hypereosinophilia	Abdominal pain, macroscopic haematuria	Dysuria, microhaematuria	Macroscopic haematuria	Macroscopic haematuria, eosinophilia	Eosinophilia
Imaging findings suggestive for schistosomiasis?	No	Yes (urogenital calcifications, grade IV hydronephrosis)	Yes (calcifications, urinary stones, bilateral hydronephrosis)	Yes (bladder wall thickening)	No	No
Treatment before seroconversion	PZQ 40 mg/kg 2-days course of PZQ 40 mg/kg/die one month later	Right laparoscopic nephrectomy 3-days course of PZQ 40 mg/kg/die	PZQ 40 mg/kg single dose	3-days course of PZQ 40 mg/kg/die	3-days course of PZQ 40 mg/kg/die	PZQ 40 mg/kg
Time between treatment and seroconversion	1 month after the second administration of PZQ	20 days	1 month	1 month	2 months	2 months
Parasitological confirmation of schistosomiasis diagnosis?	Yes, after treatment (bladder biopsy)	Yes, after treatment (surgical specimen)	No	Yes, before treatment (urine filtration) and after treatment (bladder biopsy)	No	No

CONCLUSIONS

As in other chronic helminth infections, the host-parasite interplay produces an immune reaction aimed at containing the parasite. Factors favouring the immune detection of parasites include treatment, as the damage caused by treatment induce the release of parasitic antigens. Similar phenomena have already been reported for cystic echinococcosis, neurocysticercosis and gnathostomiasis. We believe that our findings suggest that a low threshold for treatment should be adopted in patients with clinical manifestations indicative of chronic schistosomiasis and a negative serology, as treatment is generally well tolerated and undertreatment can lead to potential harms in the long term.