Katayama’s Syndrome Related to *Schistosoma intercalatum* in Two Travellers Returning from Mali

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ABSTRACT

Katayama syndrome associated with *Schistosoma intercalatum* has been reported in few cases in the literature. In this study we indicate the clinical characteristics, the diagnostic methods (parasitological and serological) and the therapeutic management in two patients with this syndrome after a trip to Mali.

Keywords: *Schistosoma Intercalatum*, Katayama’s Syndrome

1. INTRODUCTION

Schistosomiasis is a parasitic disease widespread in tropical and subtropical regions of the world. Africa, South America, the Caribbean and Asia are endemic areas which morbidity and mortality are common.

Katayama syndrome and cercarial dermatitis are the two main forms of acute schistosomiasis in non-immune individuals. Katayama syndrome (also known as Katayama fever) is characterized by nocturnal fever, cough, myalgia, headache and abdominal tenderness (Ross *et al.*, 2007). This clinical picture is usually associated with pulmonary infiltrates and eosinophilia (Ross *et al.*, 2007).

Pathogenesis of acute schistosomiasis is due to the immune response against cercariae and schistosomula antigens (migratory phases). In this period of time eggs are not yet eliminated by faeces or urine and immunological or molecular detection may be used.

In this study we report two cases of Katayama syndrome in a couple returning from Mali. Although no causal agent could be demonstrated in the male, probably due to early treatment, his wife presented a milder clinical picture being *S. intercalatum* detected in faeces.

1.1. Case Report 1

A 30-years old male living in Las Palmas de Gran Canaria (Spain) was referred to the Emergency Unit of Hospital Insular (Gran Canaria, Spain) without relevant medical history or pathological habits. He complained of diarrhea with visible mucus in number of 3-4 stools/day, without blood and low-grade fever (38°C) after 4 days of returning from Mali, where he had traveled as a tourist for 15 days (Fig. 1).

The patient had been vaccinated properly and had made adequate malaria chemoprophylaxis. The main epidemiological history was non-potable water consumption and bathing in fresh water 17 days before the medical attention. In addition, the patient reported...
cough and wheeze in two days earlier. Complementary
tests performed at baseline (blood count, coagulation,
blood chemistry, including liver function tests and
urinalysis) were normal. *Giardia intestinalis*
were
detected in stool analysis and the patient was treated with
tinidazole. He came back a week later with stopping
diarrhea and starting paroxysmal cough. At this point,
blood tests showed eosinophilia (1.100 µL\(^{-1}\)) and stool
examination (Kato and Ritchie), urine sediment and
serological studies of *Schistosoma* spp. (indirect
hemagglutination) were negatives. Katayama syndrome
was suspected and praziquantel was prescribed at
conventional doses, attending the patient three days later
due to the onset of abdominal pain, fever of 38-39\(^\circ\),
malaise and myalgia. At this moment, his blood samples
showed intense eosinophilia (4.100 µL\(^{-1}\)) and elevated
serum alanine aminotransferase and aspartate
aminotransferase levels (80 and 199 U/L respectively).
Treatment was started with prednisone at tapered doses,
with the disappearance of clinical symptoms and a
decrease in eosinophilia in the following months.

1.2. Case Report 2

A 34-years old, living in Las Palmas de Gran Canaria
(Spain) which had made the same trip and the same
activities (bathing in fresh water and consumption of
untreated water) than your partner (case report n° 1)
came to the emergency room in the same time (Fig. 1).

The initial clinical picture was characterized by
diarrhea and fever being treated empirically with
ciprofloxacin. Subsequently the patient made a new trip
to Morocco presenting a febrile syndrome with diarrhea
and intermittent pruritic and erythematous skin lesions.
When the patient returned from the trip, asymptomatic,
came to our unit and eosinophilia (4.030 µL\(^{-1}\)) were found
in analytical study. Moreover, Kato technique showed
showed large eggs with terminal spur, positive Ziehl-
Neelsen, suggesting *S. intercalatum* infection (Fig. 2).
Specific antibodies to *Schistosoma* spp. detection were
confirmed using two techniques: Indirect hemagglutination (IAH Fumouze) and ELISA
(SciMedx corporation). Although no antibodies were
detected by IHA, ELISA was positive. Conventional
treatment was initiated with praziquantel and corticosteroids, which was well tolerated. In later
revisions, the patient was asymptomatic, blood tests
showed mild eosinophilia (800 µL\(^{-1}\)). *Blastocystis
hominis* were observed in fecal analysis. In a new study
also IHA detected antibodies to *Schistosoma* spp.

![Fig. 1. Clinical evolution in case 1 (dark gray) and case 2 (gray)](image-url)
2. DISCUSSION

Penetration through the intact skin of free-living cercariae is the main mode of transmission of Schistosoma infection (Ross et al., 2007). Thus, all cases of Katayama syndrome among travelers appear with a history of bathing in rivers or lakes contaminated (i.e., Dogon Country, Lake Malawi, Omo River) (Ross et al., 2007; Grobusch et al., 2003). S. mansoni and S. haematobium are the main species involved of the imported cases in Europe (Grobusch et al., 2003). However, Katayama syndrome caused by S. intercalatum has been reported in few cases (Grobusch et al., 2003; Visser et al., 1995; Croft et al., 2005). Although S. intercalatum is endemic in several African regions (i.e., Cameroon, Congo, Nigeria and Mali), coexistence with S. haematobium and/or S. mansoni by interspecific sexual interactions between human schistosomes could have a role in limiting the distribution of S. intercalatum. Thus, the competitive sexual processes acting among human schistosomes show that S. haematobium and S. mansoni are always competitively dominant over S. intercalatum (Jourdane et al., 2001).

The cases described in this study also illustrate two important aspects of Katayama syndrome. Firstly, after a single exposure, both patients presented some different clinical manifestations (respiratory in case 1, cutaneous in case 2) and a different incubation period (56 days in case 1, 79 days in case 2). Secondly, as was observed in both cases, it is not uncommon coexistence of schistosomiasis with other parasites.

Diagnosis of Acute Schistosomiasis (AS) is based on clinical data and detection of antibodies against Schistosoma spp. Symptomatic AS was defined as a raised eosinophil count associated with at least one of the following symptoms appearing within 3 months from primary exposure to schistosomiasis: Urticaria, angioedema, fever, diarrhea, abdominal pain and cough. Several types of serological techniques are useful in the diagnosis of Katayama syndrome, although some isolated techniques (i.e., IHA) have low sensitivity, especially in early stages (Gool et al., 2002). Additionally, this study checks the value of commercial techniques used in cases of infection with S. intercalatum.

The diagnosis of the species involved is based on various data: The geographic area of infection, the biological sample which eggs of Schistosoma are detected (S. mansoni and S. intercalatum in the faeces, S. haematobium in urine), the egg size and the location of the spike of the eggs (lateral in S. mansoni, terminal in S. haematobium and S. intercalatum). However, both fecal contamination of the patient’s urine as the variable size of the eggs of S. intercalatum limit the accurate diagnosis (Croft et al., 2005; Almeda et al., 1996). In this sense, the Ziehl-Neelsen (positive in S. intercalatum, negative in the other species) has a clear diagnostic utility (Muller and Taylor, 1972). Clearly, PCR techniques are more specific, although they are not easily accessible in clinical practice (Gomes et al., 2010).

The treatment of Katayama syndrome is controversial (Jaureguiberry and Caumes, 2011). Randomised controlled trials have also shown that the effective praziquantel dosage regimen is 40 mg kg$^{-1}$ orally in divided doses over one day (2×20 mg kg$^{-1}$ doses 4-hourly) for S. mansoni, S. haematobium and S. intercalatum.

Fig. 2. Schistosoma intercalatum (a) Kato technique (b) Ziehl-Neelsen stain
intercalatum. However, young schistosomulae (7-28 days) are not sensitive to praziquantel. Moreover, treatment with praziquantel frequently (40-60%) results in a paradoxical reaction (Jarisch-Herxheimer-like), as described in Case 1. Therefore, some authors add corticosteroids to minimize this reaction. However, two types of data arguing against this combination: (i) corticosteroids decrease plasma concentrations by 50% and (ii) concomitant occult strongyloidosis may be present and corticosteroid treatment could trigger hyperinfection. Taking into account that the incubation period of acute schistosomiasis is very variable (18-84 days) (1), it seems reasonable to use artesunate in early cases (this drug is effective against the schistosomula) and praziquantel associated with corticosteroids in late or complicated cases (neurological or cardiac).

3. REFERENCES


