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The emerging threat of schistosomiasis spread in Pakistan

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Abstract. Schistosomiasis is among the thirteen neglected tropical diseases of the world. While prevalent in a number of countries, it has only rarely been reported in Pakistan. Here we report a 25 year old male who acquired the infection during travel to Malawi and presented with haematuria and dysuria. He was successfully treated with praziquantel. The possibility of schistosomiasis becoming endemic in the country is discussed. A number of risk factors are present including dams, irrigation, increased travel and geographical proximity to endemic countries. The local presence of at least one snail species of potential hosts for *Schistosoma mansoni* is confirmed. We see that schistosomiasis endemicity is a possible threat in Pakistan. Solutions to prevent this include reducing travel to endemic areas, prompt recognition and treatment of cases, and health education.

INTRODUCTION

Schistosomiasis is caused by a trematode belonging to the genus *Schistosoma* (Gryseels *et al.*, 1996). An aquatic snail is the intermediate host and the infection is acquired by human host by the penetration of the larval form (cercariae) of the parasite into the skin and the capillaries; these cercariae then transform into schistosomulae (adult worms) which breed in the blood vessels. The host immune response to the eggs produced causes of organ destruction. Transmission between humans requires certain freshwater snail species as intermediate hosts (Gryseels *et al.*, 1996) for the parasite to develop and multiply in the environment. Parasite species causing various forms of schistosomiasis include *Schistosoma mansoni* (Africa, Middle East, Caribbean, Brazil, Venezuela, Surinam), *Schistosoma japonicum* (China, Indonesia, Philippines), *Schistosoma mekongi* (Cambodia and Laos along the Mekong River) and *Schistosoma intercalatum* (rainforests of Central Africa). Urinary schistosomiasis is caused by *Schistosoma haematobium* (Africa and Middle East) (WHO fact sheet, 2012).

According to the World Health Organization, more than 230 million people require treatment for schistosomiasis annually, 90% of whom live in Africa. Fifty two countries are known to be at high risk of infection (WHO fact sheet, 2012). Schistosomiasis is not endemic in Pakistan and cases are invariably seen as a result of travel to endemic regions. However, since cases are infrequent, diagnosis may be missed if a relevant travel history is not obtained from patients.

We describe a Pakistani man with haematuria whose recent travel history led to the development of urinary schistosomiasis.

CASE REPORT

A 25 year old male, with no co-morbids, presented to the physician with complaints of gross haematuria, dysuria and fever since 2 weeks. The physical examination was significant for suprapubic tenderness. A urine sediment examination was done among other investigations, which revealed *S. haematobium* eggs with prominent terminal spine (Figure 1). Complete blood count showed a normal haemoglobin level. The genital tract was not involved and there was no reported haemospermia.

Although the photomicrograph shown is pathognomonic, the diagnosis of schistosomiasis in a non-endemic region baffled the microbiologists and physicians alike until a specific travel history was gleaned from the patient. He admitted to having swum in Lake Malawi in the East African Rift System 3 months prior to presentation. Although he was aware of the risk of associated schistosomiasis, he was reassured by the local guides that the lake waters had been treated and declared clear of the risk of acquiring schistosomiasis.

Fortunately, egg count in the urine was calculated to be <100 per 10 mL, and therefore the patient was categorized as having a light infection (Bichler *et al.*, 2006). An ultrasonogram of the urinary tract was also unremarkable. The patient was treated with oral praziquantel (40 mg/kg in two divided doses for one day). On follow-up, he reported resolution of haematuria and dysuria. A repeat urine examination after four weeks was negative for microhaematuria as well as for *S. haematobium* eggs.

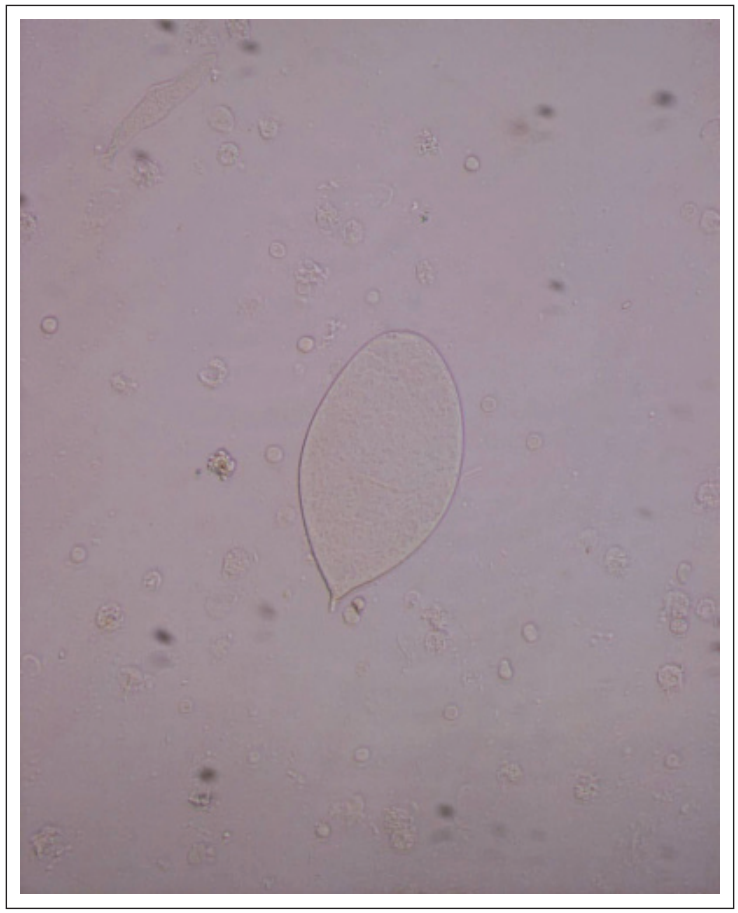

Figure 1. *Schistosoma haematobium* egg from the patient's urine sample. RBCs and WBCs are also present

DISCUSSION

The case we present highlights the importance of obtaining a travel history from patients presenting with haematuria and of considering imported schistosomiasis in the differential of all such cases. We reemphasize the recommendation made by Khalid & Mahmood (2001) that schistosomiasis be considered the main differential.

There is only one other case reported from Pakistan previously. Khalid & Mahmood (2001) have reported a Nigerian male presenting with haematuria and diagnosed to have urinary schistosomiasis. The infection had been acquired in the individual's country of origin.

Khalil *et al.* (1993) also reported a case of abdominal schistosomiasis in a 7-year-old girl of Pakistani origin with residence in New Delhi. It is however, unclear where or how the *Schistosoma mansoni* infection was acquired by this patient and whether the child travelled back to Pakistan before cure was achieved.

Assessment of the risk of schistosomiasis spread to Pakistan

Citizens' travel to endemic places like Africa as in this case, risks the introduction of the disease into the country. The critical question that needs answering is if these imported cases can lead to schistosomiasis endemicity in Pakistan. Since awareness of this travel risk appears negligible and since a number of schistosomiasis cases may be asymptomatic, Pakistan may be importing several other cases which can lead to propagation within the region. Such propagation is likely since the presence of *Schistosoma* spp. eggs in fecal samples from cows and buffaloes have been reported (Niaz *et al.*, 2010).

Aquatic snail species act as intermediate hosts in the life cycle of *Schistosoma*. In Pakistan, the presence of *Biomphalaria* species of snails, which can act as a host for *S. mansoni* is confirmed (Arijo *et al.*, 2007). As yet, snails in Pakistan are reported to transmit only *Schistosoma bovis*. However, other snail species previously unrelated to schistosomiasis transmission may emerge.

Transmission of schistosomiasis to Pakistan today may, in particular, occur via pilgrims returning from Saudi Arabia, as the area around Makkah is endemic for *S. mansoni* and S. *haematobium*. As the annual pilgrimage and Muslim holy month of Ramadan shift towards the monsoon season, the chances of transmission via pilgrims could increase (WHO Global Schistosomiasis Atlas, 1987). However, ongoing schistosomiasis control programs in Saudi Arabia may prevent a spillover of the disease into the country (Aqeel & Amin, 1997).

It is clear that risk factors for the disease's development are present in Pakistan. Unfortunately, as seen in the case of dengue which was also not native to Pakistan, potentially infectious diseases come into the limelight after an outbreak, when it is difficult to contain the disease. It is thus important that basic measures be taken by travelers and physicians to prevent schistosomiasis from following in the footsteps of the dengue virus.

The ideal prevention strategy is to educate people, especially travelers to endemic areas, regarding precautions to reduce the risk of acquiring the disease, such as avoiding swimming in high risk lakes. Provision of pre-travel advice to travellers headed to schistosomiasis endemic regions is therefore of utmost importance. Since this measure may not be 100% effective, it is imperative that to prevent imported schistosomiasis from spreading in Pakistan, all travellers from endemic regions be screened under an 'imported disease surveillance' initiative. Similar programs in the European Union have recently been introduced to monitor imported schistosomiasis (Grobusch *et al.*, 2003). Such surveys must especially focus on pregnant females who are at a higher risk of acquisition and miscarriage (Eyo *et al.*, 2012). Additionally, making *Schistosoma* asymptomatic carriage as well as acute schistosomiasis notifiable entities in Pakistan will also serve to hinder the introduction and spread in the region by ensuring that all diagnosed patients are treated appropriately.

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