VIA MEDICA

CASE REPORT

Jakub K. Gałązka[1], Dorota Starownik[2], Beata Kasztelan-Szczerbińska[3], Halina Cichoż-Lach[3]

[1]Students Scientific Association at Chair and Department of Gastroenterology with Endoscopy Unit, Medical University of Lublin, Poland
[2]Primary Healthcare Clinic, Academic Public Hospital No 4 in Lublin, Poland
[3]Chair and Department of Gastroenterology with Endoscopy Unit, Medical University of Lublin, Poland

Imported parasitosis as a diagnostic challenge in Primary Healthcare Clinic in the non-endemic region — a case study of schistosomiasis in English Division student

Corresponding author:

Jakub K. Gałązka, Students Scientific Association at Chair and Department of Gastroenterology with Endoscopy Unit, Medical University of Lublin, Jaczewskiego 8, 20-090 Lublin; e-mail: jakubgalazka2@wp.pl

Medical Research Journal 2022; 10.5603/MRJ.a2022.0047

ISSN 2451-2591
e-ISSN 2451-4101

ABSTRACT

Schistosomiasis is a parasitosis, most commonly caused by *Schistosoma mansoni* or *Schistosoma haematobium*, eventually by other species from the genus *Schistosoma* (blood flukes). This study presents a case of schistosomiasis in an African-origin student cured in the Primary Healthcare Clinic (PHC) in Lublin, Poland.

The young adult male patient from Zimbabwe, studying in Poland, presented to the PHC, due to pain in the left down quadrant of the abdomen, bloody stools, and a single episode of drooling with a blood-stained jelly-like mass, without fever. In blood tests, there was neutropenia, lymphocytosis and eosinophilia. In a colonoscopy, numerous lymphoid nodules were observed with small regions of mucosal erythema, faded vascular drawing, and delayed small contact bleeding.

The patient had an elevated level of IgE (329,5 IU/mL; N < 158) and minor abnormalities in the proteinogram. Abdominal CT showed calcification of intestinal walls, suggesting infection of flukes from the *Schistosoma* genus. The result of histopathological examination confirmed the presence of structures interpreted as parasite eggs in intestinal crypts, lamina propria and the lumen of mesenteric vessels.

It is of great importance, that general medicine physicians working in schistosomiasis non-endemic regions are aware and pay attention to various risks as well as provide referrals to advanced imaging and endoscopic procedures in patients with unusual health problems. Keeping in mind, that early signs and symptoms of schistosomiasis, and results of blood tests may remain unspecific in contrast to a more complex gastrointestinal diagnostic approach, a chance of early diagnosis and successful therapeutic intervention may be facilitated.

Key words: schistosomiasis, imported parasitosis, travel medicine, parasitology, gastroenterology

Introduction

Schistosomiasis is a parasitosis, most commonly caused by *Schistosoma mansoni* or *Schistosoma haematobium*, eventually by other species from the genus *Schistosoma* (blood flukes).

According to World Health Organization WHO data, 90% of schistosomiasis occurs in Africa. Apart from this continent, the endemic occurrence of schistosomiasis is observed in South-Eastern Asia, Latin America, and French Corsica (the only European region) [1]. In recent years, due to climate changes, the occasional occur-

rence of *Schistosoma* intermediate hosts can be noticed in South-Western Europe. On the other hand, in Poland, according to the non-occurrence of intermediate hosts and long incubation period, schistosomiasis is reported only as an imported disease [2].

Intermediate hosts of flukes are freshwater snails, whereas final hosts are rodents, domestic pets, and humans. Infection takes place during bathing in water, where flukes eggs reside. Eggs invasion occurs transdermal to the circulatory system, where finally (in mesenteric veins) mature flakes lay eggs [3].

The article aims to present the diagnostic process of schistosomiasis in the case of an African-origin student cured in the Primary Healthcare Clinic (PHC) in Lublin, Poland.

Case report

The young adult male patient from Zimbabwe, studying in Poland, presented to the PHC, due to pain in the left down quadrant of the abdomen, bloody stools, and a single episode of drooling with a blood-stained jelly-like mass, without fever. According to physical examination, only tenderness in the projection of the sigmoid colon was present. Abdominal ultrasonography revealed no abnormalities. Symptomatic treatment was administrated and the patient received a referral for blood tests and a colonoscopy. The very first suspected disease was inflammatory bowel disease.

During the second visit, 2 weeks later, the patient presented with symptoms worsening, except for drooling the jelly-like mass. Second abdominal ultrasonography scanning confirmed previous results and revealed no abnormalities. In blood tests there was neutropenia, lymphocytosis and eosinophilia (Tab. 1). The faecal occult blood test was positive.

In a colonoscopy, numerous lymphoid nodules were observed with small regions of mucosal erythema, faded vascular drawing, and delayed small contact bleeding. The samples for histopathological examination were taken from mentioned regions. According to the presented endoscopic picture, parasitosis was suspected and the PHC Physician implemented treatment with albendazole, referring the patient to the genetic clinic for further evaluation.

The geneticist ordered the measurement of IgE, proteinogram, and computed tomography (CT) of the abdominal cavity. The patient had an elevated level of IgE (329,5 IU/mL; N < 158) and minor abnormalities in proteinogram (gamma-globulins 1,39 g/dL; N 0,8–1,35; alfa-1 globulins 0,2 g/dL; N 0,21–0,35). Abdominal CT showed calcification of intestinal walls, suggesting infection of flukes from the *Schistosoma* genus. The result of histopathological examination confirmed the presence of structures interpreted as parasite eggs in intestinal crypts, lamina propria and the lumen of mesenteric vessels.

Table 1. The results of the blood tests during the first PHC visit

Test	Result	Normal range (N)	Unit
Leukocytes (WBC)	4.04	4.0–10.0	10^9 /L
Erythrocytes (RBC)	4.77	4.7–6.1	10^{12} /L
Haemoglobin (HGB)	13.8	14.0–18.0	g/dL
Haematocrit (HCT)	40.6	40.0–54.0	%
Thrombocytes (PLT)	199	150–400	10^9 /L
Neutrocytes	1.5	2.5–8.0	10^9 /L
	37.1	55.0–70.0	%
Lymphocytes	1.73	1.0–4.0	10^9 /L
	42.8	20.0–40.0	%
Monocytes	0.3	0.1–0.7	10^9 /L
	7.3	2.0–8.0	%
Eosinophils	0.38	0.05–0.5	10^9 /L
	9.5	1.0–4.0	%
Basophils	0.01	0.00–0.10	10^9 /L
	0.4	0.5–1.0	%

According to the mentioned results and the improvement of the clinical condition after the albendazole therapy, the geneticist referred the patient to the Department of Tropical and Parasitic Diseases in Gdynia, where praziquantel therapy was ordered. After the hospitalization in Gdynia, the patient visited General Healthcare Clinic on a control visit, and no abnormalities on physical examination were reported.

Discussion

Outside the countries with the endemic existence of blood flukes, the diagnostics of the illness caused by them need much effort and skill to deal with, especially in PHC. This issue seems to have key importance in the era of globalization and frequent people migrations. For example, in one single-centre study focused on tourists returning to Turkey from foreign travel, 38.5% of those presenting symptoms from the gastrointestinal system, were a host of the parasite. The authors' conclusion underlines the higher risk of induced malaria or schistosomiasis when travelling to Africa [4]. Among migrant children from Africa in Paris, the prevalence of schistosomiasis estimates to be 24.3%, whereas half of those cases are asymptomatic [5].

The seriousness of schistosomiasis leads up to the development of the WHO program for the reduction of its transmission by promotion of prophylactic behaviours and mass testing of both people and snails. The goal of this program includes the global elimination of schisto-

somiasis by 2030 [6, 7]. The disease remains the most dangerous for non-immunocompetent patients, which is crucial according to the HIV epidemic in Africa [8].

Looking at the clinical picture, the first symptoms of schistosomiasis remain unspecific — the most common ones include (according to a cohort study on preschool children with schistosomiasis): pruritic rash (93%), fever (98%), abdominal pain (62%), pallor (81%), facial/body swelling within the month (64%), and inguinal lymphadenopathy (33%) [9]. In the presented case the early symptomatology does not correspond with the presented results – having only abdominal pain in common. On the other hand, the authors of the aforementioned study (based on the diagnostic algorithm used in schistosomiasis endemic regions) do not describe the presence of drooling the jelly-like mass, which appeals to be the most unique symptom in the presented case.

The most common results of blood tests in schistosomiasis include (based on a cohort study on infected children): mild hypochromic anaemia, low haematocrit, thrombocythemia and leucocytosis [10]. In the presented case, only minimal mild anaemia was presented (13.8 mg/dL of haemoglobin), whereas other pathologies are described using subpopulations of leucocytes (neutropenia, lymphocytosis and eosinophilia). There should also be underlined that eosinophilia is a unique symptom of parasitosis.

Due to difficulties in schistosomiasis diagnostics, various novel diagnostic methods are considered to be used. The blood markers that were checked in screening research on African children appointed soluble triggering receptors expressed on myeloid (sTREM) cells and soluble CD23 (sCD23) as useful biomarkers, whereas sTREM correlated also with egg density in intestines walls. On the other hand, the levels of IL-6, eotaxin-1, fatty acid-binding protein (FABP), and LPS remained unchanged between the study and control groups [11]. Unfortunately, of the aforementioned biomarkers, only IL-6 deals with high affordability (used for example in cytokine storm analysis), whereas other ones are presently used mainly in scientific research.

On the other side, the biomarker used as the diagnostic tool in the non-endemic regions is schistosomula crude antigen (SCA), which serves as a method for the detection of antibodies for *Schistosoma mansoni*. The aforementioned method has revealed promising results as compared with ELISAs and dot blots immunoassays [12]. The study performed on Belgian travellers also showed and confirmed that testing against Schistosoma antibodies and circulating anodic antigen (CAA) is helpful in the early detection of acute schistosomiasis [13]. Similar research from the Netherlands shows that high CAA positivity in travellers, active infections often is not established, or they have a very low worm burden. Based on the observation of high seroconversion rates, the adult worm antigen immunofluorescence assay (AWA-IFA) seems to be the most sensitive test to detect Schistosoma exposure [14].

Also, mass metabolomics might be used in the diagnostic approach to patients with schistosomiasis suspicion, but at present, it is limited only to clinical research [15,16].

In urogenital schistosomiasis, the most promising diagnostic tool is S. haematobium recombinase polymerase amplification (Sh-RPA), which is both rapid and portable. The method uses samples of cervicovaginal lavage (CVL) or less-invasive vaginal self-swab (VSS) for evaluation [17]. Amplification methods used in schistosomiasis diagnostics do not limit only to Sh-RPA, at present, they are under extensive research with promising results [18]. Furthermore, schistosomiasis remains a possible cause of isolated haematuria in its endemic regions [19].

Considering schistosomiasis screening, various methods may have different usage be considered. Although in the presented case the ultrasonography of the abdominal cavity remained inconclusive, a large meta-analysis from China indicates the usefulness of this method in the diagnostics of schistosomiasis that affects the liver and is caused by *Schistosoma japonicum* [20].

In the presented case, abdominal CT scanning was crucial for revealing intestinal wall calcification. Although this symptom seems to be pathognomonic for schistosomiasis (and crucial for the differential diagnosis), it is present only in 21.7% of patients [21].

The most common findings of schistosomiasis on endoscopy include inflammatory pseudopolyps, sessile, pedunculated or cauliflower-like, ranging in size from 1 to even above ≥ 20 mm. The endoscopic presentation of the intestinal wall may be challenging to diagnose and in non-endemic regions may suggest ulcerative colitis, Crohn's disease, or ischaemic colitis [21, 22]. According to more casuistic situations, schistosomiasis mimicking neuroendocrine tumours was reported [23]. In the presented case, inflammatory bowel disease was the first suspicion, although the results of endoscopy (and especially the samples sent to histopathology) were the first suggestion of parasitosis.

Conclusion

Despite the present state-of-the-art results with the development of numerous immunological assays, their usage in PHC is negligible. Therefore, it is of great importance, that general medicine physicians working in schistosomiasis non-endemic regions are aware of and pay attention to various risk factors (eg. African origin of their patients, recent voyages to the high-risk areas) as well as provide referrals to the advanced imaging

and endoscopic procedures in patients with unusual health problems. Keeping in mind that early signs and symptoms of schistosomiasis and results of blood tests may remain unspecific in contrast to a more complex gastrointestinal diagnostic approach, a chance of early diagnosis and successful therapeutic intervention may be facilitated.

Conflict of interests: *None.*

Funding: *None.*

References

1. Schistosomiasis. https://www.who.int/news-room/fact-sheets/detail/schistosomiasis (9 June 2022).
2. SCHISTOSOMATOZA - Główny Inspektorat Sanitarny - Portal Gov.pl. https://www.gov.pl/web/gis/schistosomatoza (9 June 2022).
3. Ross AGP, Bartley PB, Sleigh AC, et al. Schistosomiasis. N Engl J Med. 2002; 346(16): 1212–1220, doi: 10.1056/NEJMra012396, indexed in Pubmed: 11961151.
4. Ekici A, Gürbüz E, Ünlü AH, et al. Investigation of intestinal and blood parasites in people returning to Turkey with a history of traveling abroad during the pandemic. Turkiye Parazitol Derg. 2022; 46(2): 108–113, doi: 10.4274/tpd.galenos.2021.02886, indexed in Pubmed: 35604187.
5. Leblanc C, Brun S, Bouchaud O, et al. Imported schistosomiasis in Paris region of France: A multicenter study of prevalence and diagnostic methods. Travel Med Infect Dis. 2021; 41: 102041, doi: 10.1016/j.tmaid.2021.102041, indexed in Pubmed: 33785455.
6. Trippler L, Hattendorf J, Ali SM, et al. Novel tools and strategies for breaking schistosomiasis transmission: study protocol for an intervention study. BMC Infect Dis. 2021; 21(1): 1024, doi: 10.1186/s12879-021-06620-8, indexed in Pubmed: 34592960.
7. Rebollo MP, Onyeze AN, Tiendrebeogo A, et al. Baseline mapping of neglected tropical diseases in Africa: the accelerated WHO/AFRO mapping project. Am J Trop Med Hyg. 2021; 104(6): 2298–2304, doi: 10.4269/ajtmh.20-1538, indexed in Pubmed: 33901001.
8. Becker SL, Weber SF, de Forest A, et al. Application of a POCCCA rapid diagnostic test and serology for detection of schistosomiasis in HIV-positive individuals in urban Malawi. Acta Trop. 2021; 224: 106142, doi: 10.1016/j.actatropica.2021.106142, indexed in Pubmed: 34562420.
9. Mduluza-Jokonya TL, Vengesai A, Midzi H, et al. Algorithm for diagnosis of early Schistosoma haematobium using prodromal signs and symptoms in pre-school age children in an endemic district in Zimbabwe. PLoS Negl Trop Dis. 2021; 15(8): e0009599, doi: 10.1371/journal.pntd.0009599, indexed in Pubmed: 34339415.
10. Dejon-Agobé JC, Adegnika AA, Grobusch MP. Haematological changes in Schistosoma haematobium infections in school children in Gabon. Infection. 2021; 49(4): 645–651, doi: 10.1007/s15010-020-01575-5, indexed in Pubmed: 33486713.
11. Ondigo BN, Hamilton RE, Magomere EO, et al. Potential utility of systemic plasma biomarkers for evaluation of pediatric schistosomiasis in western Kenya. Front Immunol. 2022; 13: 887213, doi: 10.3389/fimmu.2022.887213, indexed in Pubmed: 35603171.
12. Oyeyemi OT, Corsini CA, Gonçalves G, et al. Evaluation of schistosomula crude antigen (SCA) as a diagnostic tool for Schistosoma mansoni in low endemic human population. Sci Rep. 2021; 11(1): 10530, doi: 10.1038/s41598-021-89929-3, indexed in Pubmed: 34006964.
13. Hoekstra PT, van Esbroeck M, de Dood CJ, et al. Early diagnosis and follow-up of acute schistosomiasis in a cluster of infected Belgian travellers by detection of antibodies and circulating anodic antigen (CAA): A diagnostic evaluation study. Travel Med Infect Dis. 2021; 41: 102053, doi: 10.1016/j.tmaid.2021.102053, indexed in Pubmed: 33823289.
14. Casacuberta-Partal M, Janse JJ, van Schuijlenburg R, et al. Antigen-based diagnosis of Schistosoma infection in travellers: a prospective study. J Travel Med. 2020; 27(4), doi: 10.1093/jtm/taaa055, indexed in Pubmed: 32307517.
15. Ndolo SM, Zachariah M, Molefi L, et al. Mass spectrometry based metabolomics for small molecule metabolites mining and confirmation as potential biomarkers for schistosomiasis - case of the Okavango Delta communities in Botswana. Expert Rev Proteomics. 2022; 19(1): 61–71, doi: 10.1080/14789450.2021.2012454, indexed in Pubmed: 34846232.
16. Ganief T, Calder B, Blackburn JM. Protocols for preparation and mass spectrometry analysis of clinical urine samples to identify candidate biomarkers of schistosoma-associated bladder cancer. Methods Mol Biol. 2021; 2292: 143–150, doi: 10.1007/978-1-0716-1354-2_13, indexed in Pubmed: 33651359.
17. Archer J, Patwary FK, Sturt AS, et al. Validation of the isothermal Schistosoma haematobium Recombinase Polymerase Amplification (RPA) assay, coupled with simplified sample preparation, for diagnosing female genital schistosomiasis using cervicovaginal lavage and vaginal self-swab samples. PLoS Negl Trop Dis. 2022; 16(3): e0010276, doi: 10.1371/journal.pntd.0010276, indexed in Pubmed: 35286336.
18. Li HM, Qin ZQ, Bergquist R, et al. Nucleic acid amplification techniques for the detection of Schistosoma mansoni infection in humans and the intermediate snail host: a structured review and meta-analysis of diagnostic accuracy. Int J Infect Dis. 2021; 112: 152–164, doi: 10.1016/j.ijid.2021.08.061, indexed in Pubmed: 34474147.
19. Currin SD, Gondwe MS, Mayindi NB, et al. ARK Consortium. Diagnostic accuracy of semiquantitative point of care urine albumin to creatinine ratio and urine dipstick analysis in a primary care resource limited setting in South Africa. BMC Nephrol. 2021; 22(1): 103, doi: 10.1186/s12882-021-02290-5, indexed in Pubmed: 33743616.
20. Gu MM, Sun MT, Zhang JY, et al. The prevalence of liver abnormalities in humans due to Schistosoma japonicum by ultrasonography in China: a meta-analysis. BMC Infect Dis. 2022; 22(1): 236, doi: 10.1186/s12879-022-07241-5, indexed in Pubmed: 35260103.
21. Cai L, Chen Y, Xiao SY. Clinicopathologic features of chronic intestinal schistosomiasis and its distinction from crohn disease. Am J Surg Pathol. 2021; 45(3): 430–438, doi: 10.1097/PAS.0000000000001594, indexed in Pubmed: 32991343.
22. Grillo F, Campora M, Carlin L, et al. "Stranger things" in the gut: uncommon items in gastrointestinal specimens. Virchows Arch. 2022; 480(2): 231–245, doi: 10.1007/s00428-021-03188-1, indexed in Pubmed: 34599376.
23. Marín-Martínez L, Kyriakos G, Sánchez-Gutiérrez D. Pseudotumoral form of schistosomiasis mimicking neuroendocrine tumor: a case report and brief review of the differential diagnosis of retroperitoneal masses. Pan Afr Med J. 2020; 37: 186, doi: 10.11604/pamj.2020.37.186.26344, indexed in Pubmed: 33447341.