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Case Report

Identification of Pediatric Schistosomiasis in Bokhol, Senegal: A Case Report to Aid Nurse Practitioners in Practice

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Abstract

Purpose: To appropriately identify a case of pediatric schistosomiasis within a local village in Senegal through history, physical examination, diagnostics, and management techniques.

Methods: This single patient retrospective description of pediatric schistosomiasis follows a step-wise approach to diagnosis. An acute medical care clinic was set up within the village in Bokhol. The medical provider was thorough in her approach to the patient and gathered a comprehensive history and physical examination. Differential diagnoses were considered, and diagnostics performed. A diagnosis was reached, and an appropriate management plan was developed for the patient.

Results: Through evaluation of a pediatric patient living within the rural village of Bokhol in Senegal, he was successfully diagnosed with having urinary schistosomiasis. Treatment with Praziquantel, an anti-parasitic medication was provided and non-pharmacologic methods to lessen the transmission of the parasite were discussed with patient and family.

Implications for Practice: Current evidence indicates that at this time, there are only 67 countries where this parasitic disease has been identified. With global travel into these endemic countries, the potential for spread of the parasite is possible. It is of great importance to practicing nurse practitioners to be aware of the signs and symptoms of schistosomiasis.

Keywords: Schistosomiasis; Pediatrics; West Africa

Introduction

Schistosomiasis is a widespread, public health parasitic infection [1,2]. Schistosomiasis is estimated to have infected over 200 million people worldwide in 67 countries [2]. Schistosomiasis is second to only malaria as the primary malady responsible for global loss of human productivity and mortality rate [1,2]. Infectious exposure occurs primarily in school aged children who swim or bathe in fresh water reservoirs polluted with Trematode cercariae; a parasitic larval flute, shed from an infected snail host, that penetrates the skin of waders to cause humanistic infection [2-5]. The five species of the taxonomic rank Schistosoma are

identified as: *Schistosoma mansoni*, *Schistosomes japonicum*, *Schistosomes haematobium*, *Schistosomes mekongi*, and *Schistosomes intercalatum*; however, the digenic trematodes specific to Africa are identified as *Schistosoma mansoni* and *Schistosoma haematobium* [3,5].

Within this report, a clinical case of Schistosomiasis was identified in the rural African village of Bokhol. Bokhol is geographically positioned bordering the African countries of Mauritania and Senegal. Residents of Bokhol have direct access to the neighboring Sénegal River which functions as the primary water source within the community. With the closest town being 7 miles away and limited access to transportation, the communal survival of the village is dependent upon direct access to the

Sénégal River. Per contra to Bokhol community's reliance on Sénégal River for survival; the reservoir, likewise, functions as a mode of transmission for exposing neighboring villagers to Schistosomiasis [3,4]. The purpose of the case presentation is to increase clinical awareness of the infectious parasite and optimize patient care in those diagnosed with Schistosomiasis. The authors will present the accentuated case presentation of Schistosomiasis through conducting a literature analysis, discussing the identified signs and symptoms, outlining determined examination findings, and identifying the recommended management and outcome. The purpose of this case study was to appropriately identify through patient and family history, physical examination, diagnostics, and management techniques, a case of pediatric schistosomiasis within a local village in Senegal.

Schistosomiasis (commonly known as Bilharziasis or Snail fever) is the second most significant parasitic disease (after malaria) in children in Africa, affecting their general health, growth, cognitive development, future reproductive health and reduces school performance in the high-risk age group (5-15 years) [6]. Mutapi [6] reports that sixty percent of African children carry *schistosome* infection. Schistosomiasis is caused by the infestation of the human body by flukes (flatworms). Commonly called blood flukes (trematode), the genus *Schistosoma* was first described by the German physician Theodor Bilharz in 1851 [7]. The disease is caused by an inflammatory reaction to the parasite eggs retained in the liver, bladder and reproductive organs [8]. According to Sacolo, et al. [9], despite numerous programs aimed at combating the global prevalence, infection rates remain high, particularly in sub-Saharan Africa which accounts for over 85% of people living with schistosomiasis in a population that only constitutes 13% of the world's population. The clinical presentation of acute schistosomiasis has not been utilized appropriately for infection diagnosis, especially in endemic areas where there are several other infections with similar clinical presentations [10]. In children and infants, the presentations may include fever, rigor, sweating, headache, general muscular pain, gastrointestinal disturbances, enlargement and tenderness of the liver, hematuria, eggs in stool or urine, and eosinophilia [10].

According to Sacolo, et al. [9], there is an increased risk of schistosomiasis in populations who have low socioeconomic status, limited access to clean water, poor sanitation, lack of knowledge, and negative attitudes and beliefs about schistosomiasis. Infection and disease are controlled by treatment of infected persons by using the antiparasitic, praziquantel. The approach to control schistosomiasis is based on regular treatment with a single, oral dose of 40mg/kg body weight with praziquantel [11]. The main target population for treatment are children of school age, ages 6 to 14 years via large-scale school-based campaigns [8]. Global initiatives from Partners of Parasite Control, including the World Health Organization (WHO), the Bill & Melinda Gates Foundation,

and the Schistosomiasis Control Initiative advocate regular deworming strategies to prevent schistosomiasis and promote child health and development [6].

We systematically searched Cumulative Index to Nursing and Allied Health Literature (CINAHL), MEDLINE and ProQuest databases for articles with the following keywords: *schistosomiasis, West Africa, pediatrics*. We limited our search to English language articles published after 2012. Titles and abstracts were screened for all articles. According to the pre-identified inclusion criteria, articles were excluded if they included a diagnosis of schistosomiasis in Europe, North America or Central America, or articles other than a primary source, student dissertations and theses. We identified 261 articles, from which 22 full texts were reviewed according to the pre-defined inclusion and exclusion criteria. Ten articles met inclusion criteria and information was abstracted regarding pediatric cases of schistosomiasis diagnosed in West Africa. We did not attempt to contact authors to identify additional studies.

Case Report

Presenting Signs and Symptoms

An 8-year-old boy presented with his mother and three other siblings (aged 3, 4, and 6) to an acute mobile medical health post in Bokhol, Senegal, of the health district of Dagana, within the region of Saint-Louis. A village interpreter was utilized for the interview because the local people speak the Wolof language. The patient complained of generalized pain in his joints, specifically to his knees and ankles, with no injury or known overuse to account for symptoms. He also complained of blood in his urine, urinary frequency, and lower abdominal pain. Symptoms had been ongoing for 2 months and the mother also felt as if her children were not eating as much as usual and had a poor appetite. According to the Wong-Baker FACES Pain Rating Scale that was utilized in clinic, the patient picked a 4 (0-10 scale). The abdominal pain was crampy and intermittent, lasting for periods of up to 8 hours, and worse with eating. The patient had no known medical problems, no previous surgeries, and was not taking any medications. The mother described her son as being healthy and has not been sick enough to require hospitalization. The mother was interviewed as to whether he had done anything different outside of his normal routine as a child within the last couple of months. She did report that he had been swimming within the Sénégal River more frequently with his siblings. The mother also reported that the patient's cousin had been recently diagnosed with schistosomiasis within the last month and had also been swimming within the Sénégal River. The interpreter then pointed out that there had been several recent diagnoses of schistosomiasis within the neighboring village after swimming within the Sénégal River. It is important to note that the patient's other siblings were also being evaluated for similar complaints at the health post.

Examination

On physical examination, the patient exhibited the following vital signs: blood pressure 102/77, heart rate 97 beats per minute, oral temperature 99.2, respirations 24 breaths per minute, and oxygen saturation 99% by portable pulse oximetry. The patient was alert and oriented. He could verbalize his first and last name, the name of the village he lived in, and the current month of the year and date. He appeared adequately dressed and was not wearing shoes. Abdominal exam revealed normoactive bowel sounds in all four quadrants and mild palpation tenderness to suprapubic region. Inspection of the knee joints were normal without any noted scars, erythema, or edema. Full active range of motion was elicited without noted crepitus. Palpation tenderness to bilateral knees throughout entire knee joint was recorded. Patient was able to fully bear weight without assistance but noted a slow mildly antalgic gait, due to pain.

After completing the physical examination, the village interpreter stated that over the past year, there have been several diagnosed cases of schistosomiasis within the village of Bokhol due to its close proximity to the Sénégäl River. The provider caring for this patient ordered a dipstick urinalysis to evaluate the stated hematuria and urinary frequency. Results demonstrated 3+ blood and trace protein, with no evidence of leukocytes or nitrites, which could indicate a urinary tract infection, a potential etiology for the symptoms. Formal diagnosis through microscopic evaluation of the urine sample for eggs was not available in this remote village due to inadequate supplies and resources. The medical provider and attending physician decided to diagnose by the patient's history and exam findings, the mother's report of the patient's cousin receiving a diagnosis of schistosomiasis with comparable symptoms, the village interpreter's report that the surrounding villages experienced several matching diagnoses, and the common denominator of having all swam in the nearby Sénégäl River. With adequate resources and a longer duration within the village, a microscopic analysis of urine and stool samples on different days could have provided a diagnosis. In some cases, a blood sample is required to evaluate antibodies developed to the disease.

Management and Outcome

The patient was treated for schistosomiasis with an antiparasitic agent, Praziquantel. This particular medication is most effective in treating the adult worm, which requires that the presence of antibodies have been developed by the human host. Normally, in the life cycle of the parasite, this equates to a time period of 6-8 weeks for efficient treatment. It was presumed by the provider that due to the timeline of symptom onset of two months, treatment would be effective. Dosing was initiated as a one-time dose of 40 mg/kg in two divided doses for one total day. The patient and mother were educated on methods to prevent

contamination with the parasite. These recommendations included minimizing contact with infected freshwater sources, such as the Sénégäl River, and wearing protective clothing and footwear when in freshwater contact. Boiling water for food preparation was also discussed as a technique to lessen the transmission of the parasite.

Discussion

Schistosomiasis is a parasitic infection and all healthcare personnel should be aware of its existence and be able to recognize the symptoms. Although it has been diagnosed in only 67 countries, with widespread open travel, this parasite could be present globally. The patient's prognosis will depend on the ability to properly diagnosis and treat. In children and infants, the presentations may include fever, rigor, sweating, headache, general muscular pain, gastrointestinal disturbances, enlargement and tenderness of the liver, hematuria, eggs in stool or urine, and eosinophilia [10]. The clinical presentation of acute schistosomiasis has not been utilized appropriately for infection diagnosis, especially in endemic areas where there are several other infections with similar clinical presentations [10]. This patient presented with some of the classic symptoms of Schistosomiasis: generalized pain in his joints, lower abdominal pain, and fever. He also had urinary symptoms similar to a classic urinary tract infection. During review of systems, the provider did obtain valuable information in that his cousin was recently diagnosed with schistosomiasis, which could alert the provider to rule out that diagnosis.

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