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Praziquantel Treatment is Recommended: Active *Schistosoma mansoni* Infection among Patients Diagnosed with Oesophageal Varices at a Tertiary Referral Hospital, North-Western Tanzania

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Abstract

Background: The role of *Schistosoma mansoni* infection as one of the aetiological factors of oesophageal varices has received insignificant attention in clinical practices. In that context, the present study was conducted to determine the prevalence of *Schistosoma mansoni* in patients diagnosed with oesophageal varices at a tertiary referral hospital, north-western Tanzania.

Methods: Patients presenting with history of hematemesis and endoscopically diagnosed with oesophageal varices were recruited into the study after giving consent. A structured questionnaire was used to collect demographic, symptoms and clinical signs of the patients. A single urine sample was collected from each patient and examined for *S. mansoni* infection using Point-of-care Circulating Cathodic antigen test which detect active infection.

Results: A total of 319 patients with a mean age of 42.5 ± 12.07 years were enrolled into the study. The overall prevalence of active *S. mansoni* infection was 34.5% (111/319, 95% CI: 29.7-40.2). The prevalence of *S. mansoni* did not differ statistically by sex (χ^2=0.5458, *P*=0.46) individuals (37.7%, 95% CI: 28.5-47.8 *versus* 33.4%, 95% CI: 27.5-40.0) and age groups (χ^2=2.9986, *P*=0.39).

Conclusion: The finding confirms that *S. mansoni* is common among patients diagnosed with oesophageal varices at the present study area. Diagnosis of *S.mansoni* infection in patients presenting with oesophageal varices is warranted and praziquantel treatment is recommended as part of the management of oesophageal varices.

Keywords: Oesophageal varices; *Schistosoma mansoni;* Praziquantel; Tanzania

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Background

Upper Gastrointestinal Bleeding (UGIB) defined as intraluminal bleeding between the upper oesophagus and the duodenum at the ligament of Treitz [1] remains as a public health concern in schistosomiasis endemic areas [2]. The cause of UGIB is multi factorial and varies with geographical region and socio-economic status [3]. In sub-Saharan Africa, one of the aetiological factors which has received insignificant attention is *Schistosoma mansoni* [4]. Pathogenically, complications due to *S. mansoni* infection are mainly characterised by fibrosis, hepatomegaly and splenomegaly [4]. The hepatosplenic morbidities presents with increased portal vein system pressure due to deposition of parasite eggs in the intrahepatic branches of the portal vein, which initiates inflammatory process leading to progressive periportal fibrosis [4], portal hypertension and its sequelae such as portal venous shunts with increased risk of oesophageal varices, haematemesis and ascites formation [4]. Portal hypertension and variceal bleeding are principal cause of death in *S. mansoni* infected patients [4].

Tanzania rank the second after Nigeria in Sub-Saharan Africa for having high number of schistosomiasis cases [5]. The North-Western region, located along the shoreline of the Lake Victoria, is highly endemic to *S. mansoni* infection [5]. Bugando Medical Center (BMC) is located within this region and on average its Endoscopic unit receives four patients with history of hematemesis per week [5]. Past hospital records indicated that oesophageal varices were present in 51% of the

adult patients who underwent endoscopic examination [3]. The other noted causes of upper gastrointestinal bleeding included duodenal ulcers, gastric ulcers and gastritis [3]. The ideal treatment offered for patients diagnosed with oesophageal varices is oesophageal band ligation that reduces the risk of death [6]. However, the need to determine the underlying cause of oesophageal varices cannot be over emphasized. If the causes are treatable, then the pathological sequelae leading to oesophageal varices can be stopped. Despite the fact that the BMC is located in *S. mansoni* endemic region, the role of the parasite as among the aetiological factor of oesophageal varices has received insignificant attention. In that context, the main objective of the present study was to determine the prevalence of active *Schistosoma mansoni* infection in patients endoscopically diagnosed with oesophageal varices at Bugando Medical Centre, north-western Tanzania.

Methods

Study area

The study was conducted at Bugando Medical Centre, a tertiary referral hospital located in north-western Tanzania. The hospital serves a patient from almost seven regions located in north-western region of Tanzania [3]. The hospital is located on the southern shores of the Lake Victoria, an area known to be highly endemic to schistosomiasis (both urogenital and intestinal schistosomiasis), with prevalence of >50% [3,5]. The referral hospital has an endoscopy unit under the department of internal medicine, which is responsible for diagnosis and management of gastrointestinal conditions diagnosed using endoscopy [3].

Study population, design and inclusion criteria

This was a descriptive cross-sectional study which recruited patients who reported with history of hematemesis, endoscopically diagnosed with oesophageal varices and gave consent to be involved in the study and screened for *Schistosoma mansoni* infection. Enrolled patients were followed over one year to assess the outcome of medical or surgical intervention (death or recurrence of hematemesis. Between January, 2017 and August, 2018, a total of 319 patients presenting with history of hematemesis, aged 17-85 years and endoscopically diagnosed with oesophageal varices were recruited into the study.

Data collection

Interview: A questionnaire was used to interview patients and it collected the following information demographic information, clinical symptoms, physical examination signs and laboratory findings. Patients' mobile phone numbers were obtained for monitoring the outcome of treatment.

Diagnosis of *Schistosoma mansoni*: A single urine sample was requested from each of the participating patient and examined for Circulating Cathodic Antigen (CCA) released by live *S. mansoni* worms in blood circulation and detected in human urine [7]. A Point-of-Care Circulating Cathodic Antigen (POC-CCA) test (Rapid Medical Diagnostic- http://www.rapid-diagnostics.com/) was used for the diagnosis of *S. mansoni* infection [7]. Positive results of Point-of-Care Circulating Cathodic Antigen test indicates active *S. mansoni* infection and it has high sensitivity than Kato Katz technique which detects the eggs of the parasite in stool samples [7]. Based on the manufacturer instruction, any positive line in the "test" which is based on the colour change is considered positive. In the present study, no classification of positive results based on intensities of the test line was done [3] and trace results was considered positive.

Table 1: Shows age and sex distribution of study participants.

	Age in years			
Sex	17 - 20	21 - 40	41- 60	≥ 61
Female	2(33.3%)	44(33.6%)	44(28.2%)	8(30.8%)
Male	4(66.7%)	87(66.4%)	122(71.8%)	18(69.2)
Total	6	131	156	26

Treatment: Endoscopic examination and oesophageal banding was performed to all patients who had bleeding varices. All patients who had POC-CCA positive results received 40 mg/kg BWT of praziquantel drug.

Data analysis: Data were entered into Microsoft excel file and analysed using Stata version 15 (College Station, Texas). Descriptive statistics were used to describe categorical variables using frequencies and percentages. Mean and medians were used to describe continuous variables. Statistical tests between categorical dependent and independent variables were done using a Chi-square or Fisher's exact test where appropriate. The association between age, sex and *S. mansoni* infection was assessed using Chi-square tests.

Ethical consideration

Ethical approval was obtained from the Catholic University of Health and Allied Sciences/Bugando Medical Centre. Permission to conduct this study was given by office of the Director, Bugando Medical Centre, Mwanza, Tanzania. Participants were informed of their right to withdraw their consent at any time.

Results

Demographic information

A total of 319 patients diagnosed with oesophageal varices participated in this study. Of these participants, 30.7% (98/319) and 69.3% (221/310) were female and male respectively. The mean age of participants was 42.5 ± 12.07 years. Table 1 shows age and sex distribution of study participants.

Prevalence of *Schistosoma mansoni* infection

Based on this test, the overall prevalence of active *S. mansoni* infection was 34.5% (111/319, 95% CI: 29.7-40.2). In relation to sex, there was no difference in prevalence of active *S. mansoni* infection, (χ^2=0.5458, *P*=0.46), however, female individuals had high prevalence than male individuals (37.7%, 95% CI: 28.5-47.8 *vs.* 33.4%, 95% CI: 27.5-40.0).

In relation to age, the age group 21-40 years had high prevalence of active *S. mansoni* infection, but there was no age difference in relation to prevalence of infection (χ^2=2.9986, *P*=0.39), However, the youngest age group had high prevalence. Table 2 shows age and sex distribution in relation to *S. mansoni* infection.

Management of oesophageal varices

For management of oesophageal varices, 96.7% (308/319) underwent oesophageal band ligation procedures in concurrent with secondary prophylaxis using beta blockers. Majority of them had repeated cycle of the oesophageal band ligation and almost 32% of them had three cycles. The highest number of oesophageal band ligation cycle was 11 cycles. Assessment of the outcome of the band ligation intervention indicated that, 99.4% (317/319) of the patients recovered very successfully with no recurrent hematemesis and only 0.6% (2/319) died.

Table 2: shows age and sex distribution in relation to *S.mansoni* infection.

	POC-CCA test			
Variable	**Positive**	**Negative**	**χ^2 test**	***P*-value**
Sex				
Female	37(37.8%)	61(62.2%		
Male	74(33.5%)	147(66.5%)	0.5458	0.46
Age groups				
17 - 20	4(66.7%)	2 (33.3%)		
21 - 40	45(34.3%)	86(65.6%)	2.9986	0.39
41 - 60	52(33.3%)	104(66.7%)		
≥ 61	10(38.5%)	16(61.5%)		

Discussion

Our finding suggests that active *S. mansoni* is highly common among patients presenting with history of hematemesis and endoscopically diagnosed with oesophageal varices. Our findings corroborate our previous small prospective study in the same unit [3]. It is worthwhile noting that in our referral hospital and other hospitals in schistosomiasis endemic areas, management of the oesophageal varices comprises of mainly diagnostic endoscopy, sclera therapy and band ligation [8]. The underlying causes of oesophageal varices such as *S. Mansoni* infection are always undermined.

Praziquantel (PZQ) treatment in *S. mansoni* infected patients has been demonstrated to results into regression of periportal fibrosis, portal vein thickness and general liver size [9]. Alternatively, PZQ treatment can reduce portal hypertension which in turn can control oesophageal variceal bleeding [9]. Combination of oesophageal band ligation, beta blockers and PZQ treatment could improve the outcome of oesophageal variceal bleeding [8,10]. However, more research is warranted in this area.

Conclusion

The findings of the present study show that active *Schistosoma mansoni* infection is a health concern among patients diagnosed with oesophageal varices in a single tertiary referral hospital in north-western Tanzania. Given the knowledge that *S. mansoni* infection is associated with oesophageal varices and the fact that, the mass drug administration using praziquantel drug against schistosomiasis in Tanzania do not include adult individuals who are likely to develop asymptomatic/symptomatic oesophageal varices, diagnosis of *S.mansoni* infection at point of consultation using POC-CCA test and empiric praziquantel treatment in patients presenting with history of hematemesis in schistosomiasis endemic settings is recommended.

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