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Full Length Research Paper

Urinary schistosomiasis in a rural community in Edo state, Nigeria: Eosinophiluria as a diagnostic marker

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The prevalence of urinary schistosomiasis in Ikpeshi, a rural community of Edo State, Nigeria showed that 195(65%) out of 300 volunteers harboured *Schistosoma haematobium* ova in their urine. Eosinophiluria was markedly significant > 5 eosinophilic leucocyturia/hpf and reported among 250 (83.3%) inhabitants. Of these, ova were absent in 55 (22.0%) of urine samples but had other associated urinary symptoms namely; proteinuria or haematuria or both. Eosinophiluria among the inhabitants with light infections as described by < 50 ova/10ml was 15.83 ± 15.98 x 10^9/L while heavy infections (≥50 ova/10ml of urine) was 107 ± 76.20 x 10^9/L. In all, the eosinophiluria showed a positive correlation with the *S. haematobium* ova excreted in their urine (r = 0.40046, p < 0.05). The sensitivities of the urinary symptoms are eosinophiluria (100%), proteinuria (56.0%), haematuria (80.0%), specific gravity (84.0%) and turbidity (76.0%). The eosinophiluria with the a relatively highest sensitivity can complement the use of ova in urine as a diagnostic marker especially in sub clinical cases and other periods when egg laying capacity of this fluke are suppressed or absent.

Key words: Eosinophiluria, urinary schistosomiasis, urinary symptoms, rural community, Nigeria.

INTRODUCTION

Urinary schistosomiasis caused by fluke worm *Schistosoma haematobium* is one of the most common tropical diseases which poses serious health hazard due to its associated morbidities. Globally, over 153 million are infected with this parasitic infection (WHO, 1999). In Nigeria, pocket of foci of infections have been documented in various part of country (Egwunyenga et al., 1994; Adeoye and Akabogu, 1996; Ofozie et al., 1996; Akogun and Obadiah, 1996; Useh, 1996).

In developing nations, the true epidemiological picture appears difficulty because of inadequate researches in this direction despite it's relevance in planning it control in any locality. This problem is compounded by the poor habits of people in developing countries like Nigeria in visiting hospitals for treatment. Also self-medication is still practiced as manifested by antihelminthic abuse.

This act is worsened by presence of inadequate health facilities. One of the consequences of the self-medication and antihelminthics abuse includes the suppression of the egg laying capacity of the worms. The net effect is erroneous diagnosis using ova in urine in any locality. This may also become evident in sub clinical cases and period of immaturity of the worms when they are yet to commence egg laying. Another obvious difficulty occurs during very low grade infections. Although the uses of serological diagnosis are available, poverty poses a serious impediment to the applications of serology in the epidemiological work in these countries.

To this end, this paper tends to evaluate the use of urinary symptoms especially eosinophiluria as a diagnostic marker in urinary schistosomiasis in an endemic community like Ikpeshi. Also it reports data on prevalence of urinary schistosomiasis, which will broaden the existing epidemiological picture of this parasitic infection in this part of the globe and has a direct consequence on planning adequate control programme.

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Table 1. Prevalence and Intensities of Urinary schistosomiasis among the volunteers in Ikpeshi, Nigeria.

Occupation	No Examined	Infection Rate (No.) (%)	Light Infection No	Intensity X± SD	Heavy Infection No	Intensity X± SD
School children	130	95(73.1)	20	20.75± 13.67	75	718±295.98
Petty Trading	80	40(50.0)	10	24.50± 6.50	30	599.15±250.15
Farming	90	60 (66.7)	20	30.5±8.58	40	397.13±304.02
Total	300	195 (65.0)	50		145	

Table 2. The sensitivities of some urinary symptoms *S. haematobium* infected volunteers.

Urinary Symptom	Light Infections	Heavy Infections	No. Infections (No. Ova in urine)	Total	Sensitivity (%)
Haematuria	25	145	30	200	80.0
Proteinuria	20	95	25	140	56.0
Specific Gravity	55	100	55	210	84.0
Turbidity	15	120	55	190	76.0
Eosinophiluria	50	145	55	250	100

MATERIALS AND METHODS

Study area

The study area is Ikpeshi in Akoko Edo Local Government Area of Edo State, Nigeria. It lies at 6°N and longitude 6°E. Ikpeshi draws water from both slowing flowing river and burrow pit which harbours schistosomiasis transmitting snail intermediate hosts. The drawn water is usually for drinking and cooking.

Study population (patients)

A total of 300 volunteers were recruited for this study. Their ages range between 5 - 60 years old. History and general body examinations were taken to exclude patients with allergy and skin infections. Also appropriate parasitological and bacteriological investigations/diagnosis was carried out to exclude other parasitic infections such as malaria, hookworm, urinary tract infection etc. The history of self medication and their contact with the water bodies in the locality which are infected with snail intermediate hosts were taken.

The patients were enlightened on the relevance of the study especially the public health significance. After the community mobilization, the mid stream urine of volunteers were collected after a physical exercises of about 20 to 30 minutes. These urine samples were transported to Tropical Diseases Research Laboratory of Department of Zoology, Ambrose Alli University, Ekpoma for further procession.

Determination of urinary symptoms

Each urine sample was observed for any visible evidence of turbidity. Haematuria and proteinuria were determined and documented using the simple reagent strips (Heamastrix® and Albustrix®, AMES laboratories respectively. The urine specific gravity was measured by the use of Urinometer (M 201) and values > 1.020 were considered significant (Berkow and Fletcher, 1987). About 10 ml of each urine sample was used to detect the presence of eosinophils. Each commercially prepared reagent strip combi 9 (Macherey, Nagel, ch.B.Lot 32215) was dipped into each urine sample and the colour was matched with standard colours by the side of the container of the reagent strips. The urine was centrifuged for 5 min at 3000 rpm and the sediments were examined for blood corpuscles at X40 objectives/ high power field (hpf) of the light microscope and >5 leucocyturic eosinophils/ hpf were considered as significant (Stoller and Carrol, 2003).

The centrifuged sediments was diluted 1 in 20 and quantified as previously described (Dacie and Lewis, 1991) and expressed as 10^9/L (Haslett et al., 2002; Macfarlance et al., 2000) The data from the results were analyzed statistically using Microsoft Excel.

RESULTS

The prevalence of Urinary schistosomiasis in Ikpeshi showed that 195 (65.0%) out of 300 volunteers harbored *S. haematobium* ova in their urine. The highest intensity of 718 ± 295.98 ova/10 ml of urine was observed among the school children while the least occurred among the farmers with 397.13 ± 304.02 (Table 1).

The sensitivities of the urinary symptoms associated urinary schistosomiasis are proteinuria (56.0%), turbidity (76.0%), haematuria (80.0%), specific gravity (84.0%) and eosinophiluria (100%) are indicated in Table 2. Eosinophiluria was markedly high and significant, > 5 cells at X100 objective/hpf. Also the mean value of eosinophiluria for the light infections was 15.83 ± 15.98 x 10^9/L while 107 ± 107 x 10^9/L was the mean value of eosinophiluria for inhabitants with heavy infection. In all,

the eosinophiluria showed a positive correlation with the *S. haematobium* ova excreted with their urine ($r = 0.40046$, $p < 0.05$).

Eosinophiluria was reported among 55 (22.0%) volunteers who had absence of ova in their urine. These individuals however, had other associated urinary symptoms namely: proteinuria among 25 volunteers, heamaturia among 30 inhabitants while 13 of them had both haematuria and proteinuria.

DISCUSSION

The data on the prevalence of urinary schistosomiasis where 65.0% of the volunteers examined harboured *S. haematobium* ova in their urine indicated mesoendemicity of infection. This rate contrasts the values reported by Nmorsi et al. (2001a) and Nmorsi et al. (2001b) in the same zoogeographical zone where they reported a lower values of 32.6% and 21.4% respectively. The higher rate of prevalence of urinary schistosomiasis in this present study reflects the higher level of exposure and dependence of the inhabitants of Ikpeshi on the infected water bodies namely; the burrow pits and stream. These water bodies are the sources of water supply for the all their recreational and domestic need.

The pattern of infections among the three occupational groups studied indicated that the school children were more infected than others. This observation had been reported earlier (Egwunyenga et al., 1994). High exposure factor among the children (Nmorsi et al., 2001a; Woolhouse et al., 1991) and age acquired immunity could be responsible for this pattern of infections among the inhabitants of Ikpeshi.

Proteinuria and haematuria reported in this present study had been documented in earlier reports of (Eltoum et al., 1992a; Feldmeier and Poggense, 1993; Tiemersma et al., 1997; Nmorsi et al., 2001a). The sensitivities of these symptoms as well as that of specific gravity and turbidity were also high. High prevalence of the volunteers with these symptoms is a reflection of the level of renal involvement and morbidities, which may also need further investigations. It is also an indication of predisposition of these rural dwellers to renal complications associated with urinary schistosomiasis. The evaluation of these parameters as diagnostic index for schistosomiasis appears lacking or scanty as the only information existing from these parts of the globe is our previous work (Nmorsi et al., 2001b) using proteinuria and haematuria as well as that of Traguinho et al. (1998), Eltoum et al. (1992a) who used haematuria. However, Eltoum et al. (1992b) evaluated the use of eosinophiluria as a diagnostic marker for urinary schistosomiasis in Sudan. In Ikpeshi although the sensitivities of the urinary symptoms appear high only the eosinophiluria can significantly be used as a diagnostic marker as it has the highest sensitivity value and persistently occurred in other individuals who did not have ova in their urine but had other urinary symptoms. These individuals no doubt are infected but may represent sub clinical cases and those whose worm burden may have suppressed egg laying capacity arising from self medication and the anthelminthics abuse. Also the correlation of the level of eosinophiluria and the ova of *S. haematobium* excreted by the infected volunteers in this rural community further supports it usage as a diagnostic marker. This assertion has been documented earlier (Doehring et al., 1975) where the level of leucocyturia as detected reagent strips was directly related to the *S. haematobium* ova and infections in endemic areas.

In addition to the diagnostic value of eosinophiluria reported in the present study, this investigation will broaden the known foci of urinary schistosomiasis in Nigeria which is invaluable in planning control programme for urinary schistosomiasis in this part of the globe.

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