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Received 6 September 1996; revised 15 November 1996; accepted for publication 19 November 1996

TRANSACTIONS OF THE ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE (1997) **91**, 285–286

Short Report

Detection of urinary schistosomiasis in a low prevalence region

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Keywords: schistosomiasis, *Schistosoma haematobium*, diagnostic techniques, Morocco

In Morocco, the construction of modern surface irrigation schemes over the last few decades has led to the expansion of the distribution area of *Bulinus truncatus* and, as a result, of *Schistosoma haematobium* from the endemic southern oases to many parts of the country. A national control programme, based mainly on screening, treatment and health education, was launched in 1982. It has succeeded in decreasing prevalence and intensity of infection to very low levels in most areas. The objectives of the control programme are therefore now shifting from control to eradication. By now, most infections are of low intensity and therefore difficult to detect, whereas they may be important in the maintenance of transmission (ANONYMOUS, 1991). More sensitive methods than the currently used sedimentation technique might increase the number of detected cases and contribute to the eventual eradication of the disease. This study aimed at evaluating several alternative methods: large volume filtration, repeated filtration, and haematocrit determination by reagent strips, compared with the standard sedimentation method.

In the Tessaout Amont irrigation scheme near Attaouia, about 75 km north-east of Marrakech in Morocco, the prevalence decreased from 16.2% in 1981 to less than 5% after the start of the control campaign (ANONYMOUS, 1991, 1994). All inhabitants of 5 hamlets in this irrigation scheme, aged between 5 and 20 years, were

encouraged to participate in the present study. Urine samples (50 mL) were taken on 5 occasions during 10 d between 09:30 and 14:00. A standard sedimentation method was used, developed by the Moroccan Ministry of Public Health (LAZIRI & BENNOUNA, 1982). The first alternative method tested in this study was filtration of 50 mL of urine, based on the standard filtration technique (WHO, 1983). Filtration was carried out on all 5 sampling days. The first sample was left for sedimentation. In addition, sedimentation was carried out on all samples from children found to excrete eggs on former sampling days by any method. Microhaematuria was tested for in fresh urine samples using reagent strips (Labstix[®], Bayer Diagnostics) according to the manufacturer's instructions, immediately after collection of a sample. On the last sampling day, all infected subjects were treated with a single dose of 60 mg per kg body weight of praziquantel. To investigate the specificity of haematuria for schistosome infection, approximately one-third of the subjects with haematuria who were not found to be excreting *S. haematobium* eggs were treated with praziquantel on the second sampling day. As a second control, a single urine sample was taken of children aged 5 to 20 years in a hamlet in a non-endemic region near Tessaout Amont. The samples were tested for haematuria, and for eggs using the sedimentation method.

Of the 750 individuals included in the study, only 12 (1.6%) were found to be excreting eggs by sedimentation and/or filtration on at least one sampling day. Complete data (5 samples) were collected for 269 subjects, including 5 of those excreting eggs. The 12 egg counts ranged from one to 212 eggs per 50 mL of urine (median 5.9). The individual counts (average of all positive examinations) varied from 0.2 to 78.1 eggs per 50 mL per examination (median 7.4). Significantly more samples were identified as positive with 50 mL filtration (only samples from infected subjects included in analysis; $P < 0.05$). More eggs were counted on filters than in sediments ($P < 0.001$). The sensitivity of haematuria reagent strips compared to filtration was 39.6%. In addition, 25% of subjects not excreting eggs were positive for haematuria. The intensity of haematuria varied strongly from day to day. Within the group of infected subjects, a significant correlation was demonstrated between the intensity of haematuria and the number of eggs in the urine sample ($P < 0.001$). Treatment of subjects not excreting eggs but with haematuria did not result in a reduction of the haematuria. The prevalence of microhaematuria was 13%. In the non-endemic hamlet, 26% of the children had haematuria.

Filtration increased the positivity rate by 23%, compared with the sedimentation technique used by the

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Table. Estimated prevalence of urinary schistosomiasis using different diagnostic techniques

Technique	Prevalence sedimentation (%)	Relative improvement compared with single sedimentation (%)
Sedimentation	0.99	0
Repeated sedimentation (5x)	1.44	45
Filtration	1.22	23
Repeated filtration (5x)	1.60	62

Ministry of Public Health. Repeated sedimentation increased the positivity rate by 45% compared with single sedimentation, and repeated filtration increased it by 31% compared with single filtration (Table). However, repeated sampling is more time consuming and thus more expensive than single sampling. Therefore, single filtration is preferable to repeated sedimentation. (Micro)haematuria is frequently associated with *S. haematobium* infections (FELDMIEER & POGGENSEE, 1993). Some studies have led to the conclusion that detection of microhaematuria is more sensitive than urine filtration in certain regions (TAYLOR *et al.*, 1990). However, in our study, its sensitivity and specificity were very low. In contradiction to the findings of SAVIOLI *et al.* (1990), haematuria did not decrease following treatment with praziquantel. The prevalence of microhaematuria in a non-endemic hamlet was higher than that in the endemic hamlets. Thus, *S. haematobium* infections appear to account for at most a minor part of microhaematuria in this region, and microhaematuria is not a good indication of infection. Other aetiologies of haematuria may include bladder stones, infections, nephritis, neoplasms and trauma.

Over the last decade, very low prevalences of urinary schistosomiasis were found in the studied region (ANONYMOUS, 1991, 1994). In our study, the estimated overall prevalence in the study population increased

from 1% using single sedimentation to 1.6% using repeated 50 mL filtration. In terms of public health, the figures of the Ministry of Public Health thus do not grossly underestimate the true epidemiological situation in this region. As filtration is more time-consuming and more costly than sedimentation, replacing sedimentation by the filtration technique does not seem necessary. Increasing the compliance of the population is probably more important than increasing the sensitivity of the diagnostic technique in use to achieve eradication.

Acknowledgements

We thank Slimani Abderrahman and Hassan Amahmoud for their valuable assistance in this study. Mr Matloub and other officials of the Moroccan Ministry of Public Health are thanked for their support and appreciation. This study was part of the project 'Environmental control of schistosomiasis in irrigation schemes of the Mediterranean regions', financed by the European Union (grant AVI-CT93-0004).

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Received 21 August 1996; revised 22 November 1996; accepted for publication 26 November 1996

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