

Covert Bacteriuria and Asymptomatic Proteinuria in Healthy School Children

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Summary

Onifade EU, Grange AO. Covert Bacteriuria and Asymptomatic Proteinuria in Healthy School Children. *Nigerian Journal of Paediatrics* 1997; 24 : 20. Sixtyfour healthy rural primary school children, aged between five and fifteen years with asymptomatic proteinuria, were studied for urinary tract infection. Nine (15.5 percent) of 58 subjects had significant bacteriuria and they were mostly older than 10 years of age. More females than males had significant bacteriuria ($P < 0.05$). There was no significant relationship between severity of asymptomatic proteinuria and significant bacteriuria ($P > 0.05$). The infecting organisms namely: *Escherichia coli* (*E. coli*), *Klebsiella aeruginosa* and *Staphylococcus aureus* (*Staph aureus*) were no different from those organisms that usually cause symptomatic urinary tract infections.

Introduction

BACTERIURIA in many instances, is covert, but symptomatic or otherwise, urinary tract infections are an important cause of chronic renal disease.¹ There are reports that one in every five adolescents or young adults presenting with end-stage renal disease had a pyelonephritis earlier on in life² and it is suggested that this undesirable progression from urinary tract infection to chronic renal

failure may have been halted by earlier diagnosis and appropriate treatment. In the developing world, the use of cultures as a diagnostic tool is not always feasible because of unsustained availability of facilities. This makes it necessary sometimes to employ other methods including quantitation of pus cells, presence of haematuria and/or proteinuria as diagnostic adjuncts. None of these by itself alone is however diagnostic. Corresponding findings will enhance the diagnostic value of the tests. Indeed, proteinuria is believed to be an unreliable index in the interpretation of urinary tract infections.³

The present study of children with

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asymptomatic proteinuria was aimed at demonstrating the relationship, if any, between asymptomatic proteinuria and covert urinary tract infection, as well as identifying any associated aetiological agents.

Subjects and Methods

The study was conducted on children from five randomly selected primary schools in the primary healthcare practice area of the College of Medicine, University of Lagos, situated in Ifo/Ota Local Government area of Ogun State. A total of 859 children in primary classes I to V of the selected schools had earlier been screened for asymptomatic proteinuria and 64 of them were found to have 1+(30mg/decilitre) or more proteinuria on a single test of early morning urine samples.⁴ These 64 children constituted the subjects of the present study. Midstream urine sample was collected from each subject aseptically into a sterile bottle. Urine collection in each case was personally supervised by one of the authors. The collected clean urine specimen was subjected to microscopy, culture and sensitivity test at the Microbiology Laboratory, Lagos University Teaching Hospital, not later than 45 minutes after each collection.

For microscopy, the urine was allowed to settle for 30 minutes, the supernatant discarded and a drop examined under the microscope using a x40 objective. The standard loop method was used for culture. The diameter of the loop used was 3.5mm and this delivered 10 microlitre of urine onto the Blood and Mackonkey agar plates which were then incubated overnight at 37°C. According to Kass' criteria,⁵ a pure colony count of $>10^5$ organisms/ml of urine was considered a significant growth.

Sensitivity tests were also performed on positive urine samples and the children were treated with appropriate antibiotics, based on these reports. Those children whose urine had significant growths had repeat cultures on completion of a one-week antibiotic therapy. The results were computer analysed, using the SPSS statistical package and significance between groups was determined by means of the chi-square test.

Results

Urine microscopy and culture were carried out on 58 subjects (90.6 percent) of the 64 with proteinuria. Six subjects failed to produce urine while under supervision; they were therefore, excluded from the study. Of the 58 subjects, nine (15.5 percent) had pure bacteria colony counts $>10^5$ organisms/ml, indicating urinary tract infection. Two of the subjects had associated *Schistosoma haematobium* infection. Seven of the subjects with urinary tract infection were aged 10 years and above and they were mostly females. There was a significant difference between the proportions of females (7/22) and males (2/36) who had positive urine cultures ($\chi^2=7.18$; $P<0.05$). *E. coli* (6), coagulase-positive *Staph aureus* (2) and *Klebsiella aeruginosa* (1) were the organisms cultured from the urine samples. All the *E. coli* were recovered from the females. Paradoxically, there was no evidence of urinary tract infection in the three subjects with marked proteinuria (3+). Of the 16 subjects with proteinuria 2+, five (31.3 percent) had positive bacterial cultures. There was no significant relationship between the severity of asymptomatic proteinuria and significant bacteriuria.

Discussion

The causative organisms, sex distribution and age distribution of bacteriuria in this sub-population of healthy children with asymptomatic proteinuria are similar to those reported in subjects with symptomatic bacteriuria.⁶ Similarly, they are akin to those in other reported populations of children with asymptomatic proteinuria.⁷⁻⁹ Many more females than males had significant bacteriuria, thus agreeing with the studies from Kaduna,⁷ Ibadan,⁸ Ile-Ife⁹ and Newcastle.¹⁰ The explanation for the female preponderance is the location of the short female urethra in the perineum, which allows easy ascent of gut flora. In addition, the bacterial organisms found in the urine of these children were the usual Gram negative organisms that are known to cause urinary tract infections. *E coli* expectedly was responsible for two-thirds of the infections, a pattern similar to those reported from Ife,¹¹ Kaduna⁷ and Ibadan.⁸ The next in descending order of prevalence were *Staph aureus* and *Klebsiella aeruginosa*. The two children from whose urine *Staph aureus* was isolated had concomitant *Schistosoma haematobium* infestation. There is a well-known association between urinary schistosomiasis and bacteriuria. The organisms most commonly incriminated is *Salmonella typhi*,¹² although others, including *Streptococcus faecalis*, *E. coli* and *Staph albus* have been identified.^{13 14} Another addition to this list as shown in this study is *Staph aureus*.

One striking finding in the present study was the prevalence of bacteriuria of 15.5 percent in the subjects with asymptomatic proteinuria. This value is far greater than the prevalence value (1.5 percent) of covert bacteriuria

obtained by other workers among unselected populations of healthy children in the same age range.^{8 10} It would thus seem that asymptomatic proteinuria may be useful in screening for covert bacteriuria among healthy children. Our study however did not address this issue, but looked at the relationship between increasing severity of asymptomatic proteinuria and bacteriuria; it had shown no significant association. In view of the present findings, a controlled study of the relationship between proteinuria and bacteriuria is strongly recommended as a positive correlation could further minimise the costs involved in the diagnosis of urinary tract infections.

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