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Prevalence of asymptomatic phase of renal disease in slum school children

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Abstract

Routine use of diagnostic ultrasound in pregnancy has led to the detection of urologic abnormality in many fetuses. The most common abnormality detected is hydronephrosis caused by the P.U.J. obstruction followed by multicystic dysplastic kidney [4]. Bilateral renal dysplasia or agenesis may be associated with oligohydramnios. However antenatal diagnosis of posterior urethral valves may be missed unless a scan is undertaken late in pregnancy. A cross sectional study was conducted on 500 school going children of both sexes. An informed consent was obtained followed by a visit to the institution. Children were subjected to physical examination, blood pressure recording and urine was collected and further analyzed. Culture repeated on cases with significant have shown the growth of same organism in 7 cases. Thus asymptomatic bacteriuria was taken as 1.4%. E. coli (42.8%) was the most common isolated organism followed by Klebsiella (28.5%).

Keywords: asymptomatic phase, renal disease, school children

Introduction

The prevalence and pattern of renal diseases in children remain poorly defined in many developing countries. Accurate diagnosis cannot be made easily in many centers in the developing countries because of the unavailability of adequate investigative equipment and expertise required to identify and characterize renal disorders [1].

Urine analysis, a simple and inexpensive test, is the cornerstone in the evaluation of the kidney function. Serious renal diseases may present without any symptoms. Proteinuria as well as hematuria may be the only early signs of renal disease (membranous nephropathy, membranoproliferative glomerulonephritis, post infectious glomerulonephritis, IgA nephropathy and others). The presence of detectable nitrites in urine has been used to diagnose urinary tract infection [2].

The basic dipstick method is the most rapid screening procedure that could be helpful in the early detection of renal or urinary tract diseases among apparently healthy or asymptomatic subjects in the hope of preventing and retarding the progression to chronic renal failure [3].

The aim of urine screening programme in pediatric age group is to detect renal diseases in an early asymptomatic phase and treating the children adequately and thereby reduce the mortality and morbidity.

However, the issue is complicated because it can neither be assumed that the natural history of a disorder detected in this way is necessarily the same as one that presented symptomatically, nor that it requires the same protocol of investigation and treatment.

Routine use of diagnostic ultrasound in pregnancy has led to the detection of urologic abnormality in many fetuses. The most common abnormality detected is hydronephrosis caused by the P.U.J. obstruction followed by multicystic dysplastic kidney [4]. Bilateral renal dysplasia or agenesis may be associated with oligohydramnios. However antenatal diagnosis of posterior urethral valves may be missed unless a scan is undertaken late in pregnancy. Moreover most of the mothers in our country deliver at home and do not undergo regular antenatal checkups, and for the mothers attending to ANC at rural setup cannot have facilities for antenatal ultrasound. Hence, there is a possibility of these children remaining asymptomatic for a longer time which may present in later life with end stage renal disease.

Routine screening of children at schools has shown that 5% of school girls will at some stage develop bacteriuria [5].

Hence by screening children at schools we can detect renal diseases like urinary tract infections, obstructive uropathy, reflux nephropathy, hereditary nephritis and certain glomerulopathies. Early detection and treatment of these conditions can prevent development of chronic renal failure and development of end stage renal disease, which need expensive procedures like dialysis and renal transplant, which are out of reach of a common man in our country. Regular screening of school children is practiced in Japan. Studies have shown that persistent hematuria was detected in 0.5% to 6% of school children and hematuria associated with proteinuria was detected in 0.08% to 0.4% in school children. This has helped in detected 70 to 80% of IgA and non-IgA mesangial proliferative glomerulonephritis and 65 to 80% in MPGN [6].

Asymptomatic bacteriuria was detected in 1.1% of male children and 3% in female children at school. About 10 to 35% of infants and children with asymptomatic bacteriuria have V.U.R. and 6 to 37% have renal scarring.

As there were not many Indian studies done to screen asymptomatic children at school, hence, this study was undertaken to know the magnitude of problem in our country.

It is therefore appropriate to screen asymptomatic children for bacteriuria, proteinuria and hematuria for early diagnosis and prevention of progressive renal disease.

Methodology

A cross sectional study was conducted on 500 school going children of both sexes. An informed consent was obtained followed by a visit to the institution. Children were subjected to physical examination, blood pressure recording and urine was collected and further analyzed.

All children were advised to collect mid stream clean catch urine sample under strict aseptic precautions. The collected urine samples were tested for protein, blood and bacteria by dipstick method and microscopy rapid screening test like griess nitrate test was done.

Children with positive findings were further evaluated for cause of proteinuria, bacteriuria and hematuria.

Cases were selected on the basis of probability proportionate to the sample size. (Probability Proportionate Sampling technique). From each school students of both sexes were selected on the basis of probability proportionate sampling till the required sample size was obtained.

Inclusion Criteria

1. Slum school children

Exclusion Criteria

1. Post adolescent school children
2. Non slum school children
3. Children under 5 years of age
4. Children who already had a history of renal disease

Results

Table 1: Distribution of study population according to presence of Bacteriuria

	Male	Female	Percentage
Positive	12	11	4.6
Negative	284	193	95.4
Total	296	204	

Chi square value: 0.49 P value: 0.48

Bacteriuria was positive in 4.6% (23 cases), negative in 95.4% (477 cases)

Table 2: Distribution of study population according to presence of pus cells in urine

	Male	Female	Percentage
<2	288	196	96.8
2 to 5	7	5	2.4
>5	1	3	0.8
Total	296	204	

Chi square value: 1.95 P value: 0.37

Pyuria with > 5 pus cells / HPF were seen in 0.8% of cases. 2-5 pus cells/HPF were seen in 2.4% of cases

Table 3: Distribution of study population according to result of urine culture

Growth	Percentage	No of cases
No growth	68.5	37
No significant growth	16.6	9
Significant growth	14.8	8
Total		54

Culture was done on 54 samples, 85.1% of the sample were negative on culture and 14.9% of the samples were positive on culture with significant growth in 8 cases & no significant growth (< 10⁵ CFU/ ml) in 9 cases. No growth in 37 cases

Table 4: Distribution of study population according to growth of organisms in cultures

Organism	First culture		Second culture	
	Cases	%	Cases	%
<i>E. Coli</i>	3	37.5	3	42.8
<i>Klebsiella</i>	2	25	2	28.5
<i>Proteus</i>	1	12.5	0	
<i>Streptococci</i>	1	12.5	1	14.2
<i>Staphylococci</i>	1	12.5	1	14.2
	8		7	

Culture repeated on cases with significant have shown the growth of same organism in 7 cases. Thus asymptomatic bacteriuria was taken as 1.4%.

E. coli (42.8%) was the most common isolated organism followed by *Klebsiella* (28.5%).

Discussion

In the present study 0.8% of the children had > 5 pus cells / HPF. 50% of the cases had shown significant growth & 50% of the cases showed insignificant growth.

In the present study 4.6% children were positive for bacteriuria out of which 1.4% of children had significant growth.

Detection of urinary nitrate has been used as a screening test for urinary tract infection. Major problem with this test is high number of the false negative results. Its specificity is known to be good.

In the present study griess nitrate test was positive in 6 of the 7 culture positive cases.

Incidence of the asymptomatic bacteriuria in our study was found to be 1.4%, the results were comparable with that of Jha B K *et al.* [7] Kumar CSV *et al.* [8] & Kondapaneni SL *et al.* [9] studies have shown high incidence rate which can be explained by variation in defining asymptomatic bacteriuria. *E. Coli* (42.8%) was the most common isolated organism

followed by klebsiella (28.5%), staphylococci (14.2%) & streptococci (14.2%). The results were comparable with that of Kumar CSV *et al.*^[8] & Kondapaneni S L *et al.* and other study^[10].

Conclusion

- E. Coli (42.8%) was the most common isolated organism followed by klebsiella (28.5%), staphylococci (14.2%) & streptococci (14.2%).
- Incidence of the asymptomatic bacteriuria in our study was found to be 1.4%
- Children with significant growth (8 cases) & non significant growth (9 cases) on culture were subjected to ultrasound. Out of 17 children, 4 children had cystitis, one child had calculus, one had PSGN and 11 had no findings.

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