

A STUDY OF URINARY INFECTIONS IN SCHOOL GOING FEMALE CHILDREN

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Abstract

Benington, Fouty and Hugie (1972) were of the opinion that freedom between two sexes of school going girls and not the standard of living was directly related to urinary infection. Such infections, in western countries, ranged between 0.5-3.5% of girls. Present study reveals that a high percentage of significant bacteriuria were found in 8% positive cases among the school going girls and 20% infection in low-class girls, 12.5% in middle income group and 5.2% in upper income group. Low standard of living and ignorance may be attributed to higher percent of infection (JPMA 30:165, 1980).

Introduction

The infections of urinary tract occur next in order of frequency to the infection of the respiratory tract (Nelson, 1970). Infection of urinary tract was relatively common in children, its true incidence was not known. Among presumably healthy children Kunin and Halmagyi (1962) found significant bacteriuria in 1.2% of the girls (3.5% in adolescent negro girls). In most instances the infection involved the kidney substance pyelonephritis. However, much information was still lacking concerning the incidence, pathogenesis and natural history of related urinary infections. It is clear that urinary tract infections in childhood may result in chronic and progressive renal disease in a proportion of cases. Schwartz (1918) found a greater incidence of bacilluria in girls than in boys (Pryles and Lunders, 1961). This was readily understandable from the difference in anatomy of the two sexes. However, boys were more affected than girls in the obstructive groups, whereas in nonobstructive group girls were more affected than boys (Deluca et al., 1963).

In Pakistan, analysis of urinary tract infections had never been carried out in the female school-going population, therefore present studies were carried out.

Material and Methods

Culture Media

Blood agar medium and MacConkey's medium (Gould, 1968) were employed for analysis.

Method

Urine samples were collected in sterile, small glass bottles, having a holding capacity of about twenty five ml and bearing metal stoppers.

The samples were stored in the refrigerator to prevent the multiplication of the bacteria present in the urine, so that erroneous results could be avoided (Daley and Miller, 1971; Elliot and Sleight, 1963; Hnatko, 1964).

The urine sample were diluted serially to a thousand fold. 0.5 ml of this dilution was poured in a sterile plate, to which MacConkey's medium was added. In another plate containing blood agar 0.05 ml was streaked uniformly over the entire surface. The plates were incubated at 37°C for 48 hours.

Microscopic examination of centrifuged sediment of urine was done for the presence of pus cells,

R.B.C, casts, Crystals etc.

The plates were examined after incubation for the growth of bacteria. The number of colonies were counted, both, on blood agar and MacConkey's medium. The significant isolates were identified and recorded.

Results and Discussion

The 100 urine samples that were analysed, were from normal young females of the school going age. These girls showed no apparent symptomatic urinary infections. The observations regarding their age and date on the culture of urine have been recorded in Table I.

Table I: Age-wise Distribution of Bacteriuria

Ages of Children (in years)	No. of cases showing significant Bacteriuria ($\geq 10^5$ /ml)			No. of cases showing insignificant Bacteriuria ($\geq 10^5$ /ml)				
	Infection due to Grams negative organisms		Infection due to Grams positive organisms	Staph. albus	Staph. aureus	Staph. albus	Staph. aureus and E. coli	Staph. albus and E. coli
	E. coli	Pseudo- monas	Staph. aureus					
5-7	2	—	—	1	4*	1	2*	—
8-10	1	—	—	2	7	9	3	—
11-13	2	—	3	3	18*	15	4	1
14-16	2	1	2	1	9	4	—	3
Total	7	1	5	7	38	29	29	4
	85.2%		12.5%					

* In two cases the fourth isolates was Diphtheroid.

In one case the fourth isolates was Bacillus.

The urinary samples were collected from girls coming from different walks of life; facts about their urine samples i.e. number of infected cases and the organism isolated have been given in Table II.

Table II: Distribution of Significant Bacteria Amongst Various Living Standards

Occupation	No. of samples analyzed	No. of Infected cases. (colony count $\geq 10^5$ /ml)	Main causative bacteria Isolated	Secondary Bac- teria Associated	Tertiary Bac- teria Associated
1. Poor house	15*	3	Escherichia coli	Staph. aureus	Staph. albus
2. Business (assorted)	57**	3	Escherichia coli	Staph. aureus	Staph. albus
3. Professor (Education)	20	1	Escherichia coli	Staph. aureus	Staph. albus
4. Service (Private)	8	1	Pseudomonas	Staph. aureus	Staph. albus
Total	100	8	7% E. coli 1% Pseudomonas	Staph. aureus	Staph. albus

*Only in two cases the fourth isolant was Diphtheroids. ** Only in one case the fourth isolant was Bacillus.

The majority of cases with bacteriuria found in population surveys unaware that they had a urinary infection, and all the girls questioned, generally had good health, or were apparently of unrelated problems. However, symptoms of urgency and frequency are common in the general female population. It was therefore reasonable to describe most bacteriurias as asymptomatic. The significance of asymptomatic bacteriuria could not be over estimated, since such children may grow up to be chronic patients of pyelonephritis.

Kunin and Halmagyi (1962) found significant bacteriuria in 1.2% of girls, and 3.5% among adolescent negro girls (Nelson, 1970). It was reported by Kass et al (1965), Asscher et al (1969) and Freedom et al (1965) that 3-4% of young females harboured U.T.I. asymptotically in S. Wales, Jamaica and Japan (Asscher et al., 1971). There were about 7,500 girls starting school for the first time, and 105 girls at school were present with such a condition (Arneil, 1971); and it is estimated that one girl in ten have had an episode of urinary infection by the time she leaves school (Daley and Miller, 1971).

It was shown by Cox (1966) that normal female urethra harbours bacteria in 100% of cases. From this it could be concluded that there were an inexhaustible supply of bacteria in the urethra attempting to establish themselves in the bladder.

During the last decade, workers collected midstream urine samples in wide mouthed bottles (Daley and Miller, 1971; Gould, 1968). To avoid unnecessary contamination, this precaution was followed in these studies. If these samples could not be plated out immediately they were stored in the refrigerator (Cruickshank, 1968; Gould, 1968). It was wise to use both, blood agar and MacConkey's medium (Burke, 1961; Gould, 1968), as the gram negative organisms are almost invariably involved in infection. The plates were poured, and incubated at 37°C for 24-48 hours (Cruickshank, 1968).

The enumeration of bacteria in each ml of freshly voided urine allow the development of the concept of 'in-significant bacterium' and the principle of finding 10⁵ bacteria per ml in U.T.I. was universally accepted; counts lower than that indicating contamination (Asscher et al., 1968). In 8% of cases bacteriuria was significant, significance being attached only to the gram negative bacteria 6% showed equivocal counts and 7% had in-significant counts however, such cases could not be considered unimportant, as low counts may indicate chronic pyelonephritis; brisk diuresis; U.T.I. in early stages; or intake of antibacterial drugs (Daley and Miller, 1971).

The organisms isolated in 75-91% of U.T.I. was E. Coli (Nelson, 1979; Cruickshank, 1968; Bennington et al., 1972; Daley and Miller, 1971; Price, 1966). In this study 87.5% of infections were due to E. Coli, and in 12.15% due to Pseudomonas.

Besides, there were secondary organism in every specimen of urine (Bennington et al., 1972); the organisms most frequently encountered were Staph. aureus and Staph. albus, and a fewer other organisms like Diphtheroids, Bacillus, etc.

Certain E. coli serotypes tend to predominate, and these tend to be identical to those found in the intestinal tract, suggesting that to be the source of organisms infecting the urinary tracts; another route of infection may be via the lymphatics and blood stream. It was often observed that people suffering from constipation are rather prone to U.T.I., by the same strain of organisms as found in the intestine (Nelson, 1970).

Previously, too much importance had been given to the presence or absence of pyuria, recently it has been found that pyuria may be absent in as many as 50% of U.T.I. (Nelson, 1970; Price, 1966), however, pyuria in only 25% of infections was found in present study.

In the more advanced places of world U.T.I. above the age of 12 years almost invariably indicates sexual activity (Bennington et al., 1972); in Pakistan, we would not attribute this high rate of infection to sexual freedom, because coeducation is not common, and freedom between the two sexes is not encouraged. No case of gonococci, or any such organisms indicating venereal diseases was found.

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