
ORIGINAL ARTICLE

Prevalence of Bacteriuria in Infants Suffering from Acute Gastroenteritis

Part I: Preliminary report on the possible prevalence rate of bacteriuria in infantile gastroenteritis with moderate and severe dehydration

by

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Abstract

Urinary tract infection in infancy when not early recognized can frequently cause parenchymal damage of the kidney. Symptoms like nausea, vomiting, fever and diarrhoea may in most instances resemble those of gastroenteritis.

A survey conducted from November to December 1975 on 25 infants admitted to the Dr. Soetomo Hospital Surabaya with acute gastroenteritis showed an incidence of bacteriuria in 8 patients (32%) with a colony count of more than $10^5/\text{mm}^3$ urine, of which 6 were of *E. Coli* type and 2 of *Aerobacter Aerogenes* type.

Related to this fairly high incidence of bacteriuria in gastroenteritis, further evaluations of the exact role of urinary tract infection in causing infantile diarrhoea diseases are mandatory.

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Introduction

Asymptomatic bacteriuria in infants, if untreated, may lead to renal damage with all its attendant long-term effects. Many problems are involved in making a diagnosis of urinary tract infection in infants, since they are unable to communicate such classic symptoms as flank or abdominal pain, dysuria and urinary frequency.

The diagnosis must often be suspected from such non-specific symptoms and signs as irritability, nausea, vomiting, severe diarrhea and fever. But the difficulty is that these symptoms may in most instances resemble those of gastroenteritis; and meanwhile not all infants with gastroenteritis may also suffer from urinary tract infection.

Uppal et al. (1974) proved that only six out of 80 infants with gastroenteritis had urinary tract infection. Pryles and Luders (1961) mentioned that 3 out of 41 (7.3%) patients with diarrhea had significant bacteriuria.

The purpose of this study was to determine the prevalence of bacteriuria as an indication of urinary tract infection in infants suffering from acute gastroenteritis.

Materials and Methods

Twenty-five infants suffering from acute gastroenteritis admitted to the pe-

diatric ward of the Dr. Soetomo Hospital in Surabaya were studied between November and December 1975. The material consisted of 15 boys and 10 girls who suffered from acute gastroenteritis without severe complication with the ages varying from 9 days to 18 months. Urine samples were taken by suprapubic aspiration (Pryles and Luders, 1961).

Except for intravenous fluid therapy to overcome the dehydration, no antibiotics were given prior to the urine collection. Immediately after collection, the urine was divided in two portions. One portion of the urine was tested for bacteriuria using a test kit (Bacteriuria*), while the other portion was used for the examination of protein in the urine, white blood cell count per 1 ml. of uncentrifuged urine; and after centrifugation to look for the presence of red blood cells, casts, epithelial cells, and bacteria in the urine by means of the Gram staining.

When the culture showed any growth of bacteria after incubation at 37°C for 24 hours, determination of the microorganism was followed by sensitivity test examination.

Results

The prevalence of urinary tract infection in infants with acute gastroenteritis

*) Available from Merckkognost Bacteriuria E. Merck Darmstadt.

was found to be 32% (8 patients); all of the children were boys. All of these cultures showed bacterial growth of more than 10^5 colonies per ml. of urine; 6 were of the E. Coli type and 2 of Aerobacter aerogenes type. No complaints of urinary tract infection were found in these patients before admission. One patient died of severe gastroenteritis and another one died with paralytic ileus.

Laboratory examination of the patients revealed that proteinuria was present in 17 infants, pyuria (white blood cells of more than 25 per ml. uncentrifuged urine in male patients or more than 50 per ml. in female patients) was present in only 3 patients, while bacteria in urine (Gram staining) were positive in 8 patients, all of them had also positive urine cultures.

Discussion

The incidence of bacteriuria in neonates at the Dr. Soetomo Hospital in Surabaya was 5.47% (11 out of 201 neonates), the culture showed E. coli in 5 neonates, Aerobacter aerogenes in 5 neonates and Alcaligenes aerogenes in 1 neonate (Sardjito et al., 1974).

The prevalence of bacteriuria has been variously reported as less than 1% in asymptomatic newborns (Mc. Carthy, 1963), 2% in asymptomatic infants (Randolph and Greenfield, 1964), 1.1% in asymptomatic schoolgirls and 0.03% of schoolboys (Kunin, 1968).

Uppal et al. (1974) reported that in 80 children with acute gastroenteritis under 2 years, the prevalence of urinary tract infection was 7.5%, E. coli was found in 5 patients and Klebsiella in one patient.

Pryles and Luders (1961) reported that of 41 patients with diarrhea, 3 (7%) had significant bacteriuria. It is still not clear why the incidence of bacteriuria in our patients was so high, it might be due to the following factors:

- 1) The patients admitted to this study were selected cases, i.e. they suffered from moderate to severe gastroenteritis with dehydration while the mild cases were not included in this study.
- 2) Another possibility is that they came from the low socio-economic group with low hygienic habits.

Possibly if infants from the high socio-economic group were included in this study, the prevalence of bacteriuria in gastroenteritis patients might be lower.

But for explaining the high prevalence of bacteriuria in infants with gastroenteritis a further study is needed. When urine obtained by bladder puncture contained bacteria, infections is indicated regardless of the number of microorganisms present in the specimen (Rubin and Barratt, 1975). Since all of 8 patients with a positive urine culture had a colony count of more than 10^5 /ml. in their uncentrifuged urine, they should be considered as having frank evidence of urinary tract infection.

The microorganisms responsible for bacteriuria in our study appeared to be *E. coli* (6 patients, 75%) and *Aerobacter aerogenes* (2 patients, 25%). This finding was in accordance with the studies done by Uppal et al. (1974) and Pryles and Luders (1961) who found that urinary tract infection in children was mainly caused by *E. coli*. However we could not find as yet any association between the urinary tract infection and gastroenteritis, since stool cultures, blood cultures, and sero-typing of *E. coli* were not done in this study.

It is interesting to note that bacteriuria was found exclusively in male patients which is against the present knowledge that urinary tract infections are the result of bacteria ascending to the bladder transurethrally from the perineum.

Possibly haematogenic spread played a role, or the infants might have anatomical abnormalities that influenced the urinary flow which in turn might enhance the urinary tract infection.

TABLE 1: Laboratory data of the 8 patients with bacteriuria in Acute Gastroenteritis with Dehydration

Case No.	Sex	Urine examination				Urine culture
		Protein	WBC count/ml	Cast	Gram staining	
1	M	1+	4	1+	gram neg. bacteria	Aerob. aerog
2	M	2+	57	2+	gram neg. bacteria	<i>E. coli</i>
3	M	2+	695	—	gram neg. bacteria	<i>E. coli</i>
4	M	1+	298	—	gram neg. bacteria	<i>E. coli</i>
5	M	Neg	13	—	gram neg. bacteria	Aerob. aerog
6	M	Neg	9	—	gram neg. bacteria	<i>E. coli</i>
7	M	1+	16	1+	gram neg. bacteria	<i>E. coli</i>
8	M	1+	3	—	gram neg. bacteria	<i>E. coli</i>

REFERENCES

1. KUNIN, C. : Natural history of recurrent bacteriuria in schoolgirls. *N. Engl. J. Med.* 19 : 431 (1968).
2. Mc. CARTHY, J.M. : Clean voided and catheter nconatal urine specimens. Bacteriology in male and female neonates. *Am. J. Dis. Child.* 106 : 473 (1963).
3. PRYLES, C.V. and LUDERS, D. : The bacteriology of the urine in infants and children with gastroenteritis. *Pediatr.* 28 : 877 (1961).
4. RANDOLPH, M.F. and GREENFIELD, M. : The incidence of asymptomatic bacteriuria and pyuria in infancy. *J. Pediatr.* 65 : 57 (1964).
5. RUBIN, M.I. and BARRATT, I.M. : *Pediatric Nephrology*, 1st ed. pp. 607 (Williams & Wilkins, Baltimore 1975).
6. SARDJITO, D., HAMID, A., THAHIR, S., KARIM, A. and DARSONO, I. : Bladder puncture in newborns. A bacteriological study. *Proc. Third National Indonesian Pediatric Congress. Surabaya, Indonesia. Paediatr. Indones.* 16:527 (1976).
7. UPPAL, S.K., SRIVASTAVA, V.K., MULLICK, P. and VAISHNAVA, S. : Association of gastroenteritis with urinary tract infection in infancy. *Indian Pediatr.* 12 : 159 (1974).