

ORIGINAL RESEARCH

ASSESSMENT OF URINARY TRACT INFECTIONS IN MALNOURISHED CHILDREN

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ABSTRACT

Background:Urinary tract infections (UTI) are common in children, with an estimated incidence of 1%–1.5% and 3%–8% in boys and girls, respectively. The present study was conducted to assess urinary tract infections in malnourished children.

Materials & Methods:84 children age ranged 6 months- 4 years of both genders diagnosed with moderate acute malnutrition (MAM) and severe acute malnutrition (SAM). Parental consent was obtained in each case.

Data such as name, age, gender etc. was recorded. After thorough clinical examination, mid-stream urine was collected and sent for rapid test and urine culture and sensitivity.

Results: Age group 6 months- 1 year had 7 males and 8 females, 1-2 years had 8 males and 10 females, 2-3 years had 10 males and 12 females, 3-4 years had 13 males and 5 females and 4-5 years had 2 males and 9 females. Type was MAM in 34 and SAM in 50, symptoms were fever in 52, nausea in 43, vomiting in 48, diarrhea in 62, urine albumin was present in 6, pyuria in 10, urine culture positive was seen in 12. Antimicrobial sensitivity pattern against ciprofloxacin was seen in 65, 6 for Cefotaxime and in 86 against Amikacin. The difference was significant ($P < 0.05$). Organism in urine culture positive subjects was Klebsiella in 3, E. coli in 6, Pseudomonas in 2 and Acinetobacter in 1 case. The difference was significant ($P < 0.05$).

Conclusion: The prevalence rate of UTI was higher in malnutrition children. The most common bacterial isolate from urine culture was E.coli and klebsiella.

Key words: Acinetobacter, Amikacin, Urine culture

Introduction

Unexplained fever and failure to thrive are the common presenting features in infants besides nausea, vomiting and diarrhea also. In older children, increased frequency of micturition and nocturnal enuresis can be other associated manifestations. Sometimes children are asymptomatic also. In malnutrition, urinary tract infection is very common.¹Urinary tract infections (UTI) are common in children, with an estimated incidence of 1%–1.5% and 3%–8% in boys and girls, respectively. UTI cause acute morbidity and may result in renal scarring and its complications.² A number of reports, mainly from developing countries, indicate a high incidence of bacteriuria in malnourished children. Almost 45% of children in

India, and a similar number in many developing countries, are undernourished. A moderately elevated risk of UTI and renal scarring would have important implications in these children.³ Urinary tract infections further increase the severity of malnutrition and leading to secondary complications like failure to thrive, pyelonephritis and chronic kidney disease. Hence, early diagnosis of urinary tract infections is very essential for starting the treatment which is helpful for child's improvement and preventing further complications.⁴ Studies reported that children diagnosed with malnutrition had impaired immunity status; these children were more vulnerable to various infections. Hence, the prevalence of urinary tract infection was reported to be higher among children with malnutrition.⁵ The present study was conducted to assess urinary tract infections in malnourished children.

Materials & Methods

The present study comprised of 84 children age ranged 6 months- 4 years of both genders diagnosed with moderate acute malnutrition (MAM) and severe acute malnutrition (SAM). Parental consent was obtained in each case.

Data such as name, age, gender etc. was recorded. After thorough clinical examination, mid-stream urine was collected and sent for rapid test and urine culture and sensitivity. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

Results

Table I Distribution based on age and gender

Age group	Males	Females
6 months- 1 year	7	8
1-2 years	8	10
2-3 years	10	12
3-4 years	13	5
4-5 years	2	9
Total	40	44

Table I shows that age group 6 months- 1 year had 7 males and 8 females, 1-2 years had 8 males and 10 females, 2-3 years had 10 males and 12 females, 3-4 years had 13 males and 5 females and 4-5 years had 2 males and 9 females.

Table II Assessment of parameters

Parameters	Variables	Number	P value
Type	MAM	34	0.05
	SAM	50	
Symptoms	Fever	52	0.09
	Nausea	43	
	Vomiting	48	
	Diarrhea	62	
Urine albumin	Yes	6	0.01
	No	78	
Pyuria	Yes	10	0.02
	No	74	
Urine C/S	Yes	12	0.02
	No	72	
Antimicrobial	Ciprofloxacin	65	0.01

sensitivity pattern	Ampicillin	0	
	Gentamycin	0	
	Cefotaxime	6	
	Amikacin	86	

Table II, graph I shows that type was MAM in 34 and SAM in 50, symptoms were fever in 52, nausea in 43, vomiting in 48, diarrhea in 62, urine albumin was present in 6, pyuria in 10, urine culture positive was seen in 12. Antimicrobial sensitivity pattern against ciprofloxacin was seen in 65, 6 for Cefotaxime and in 86 against Amikacin. The difference was significant ($P < 0.05$).

Graph I Assessment of parameters

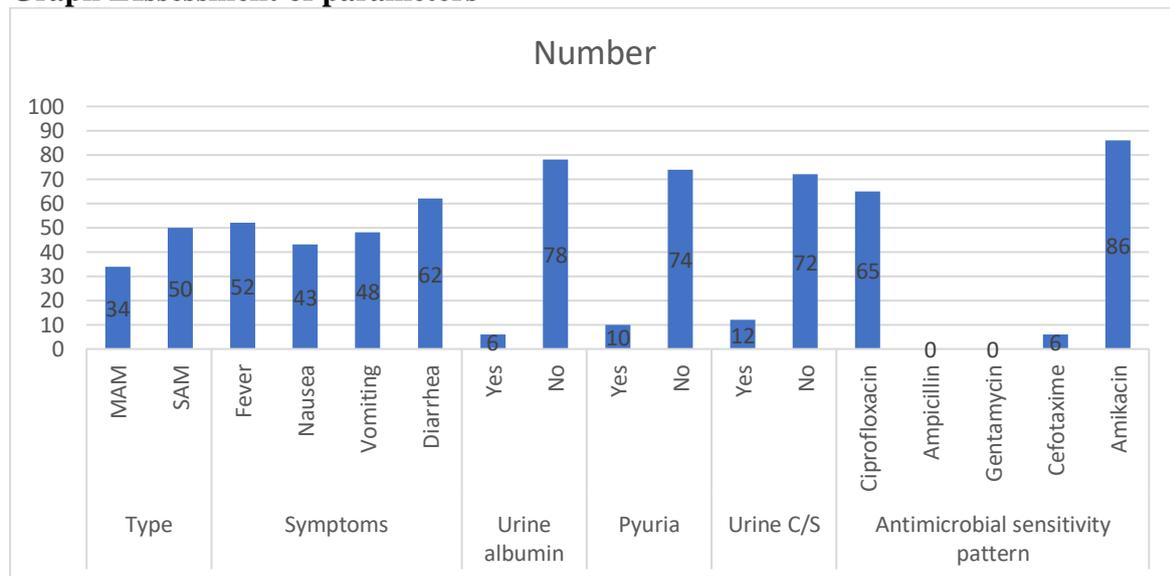


Table III Organism in urine culture positive subjects

Organism	Number	P value
Klebsiella	3	0.01
E. coli	6	
Pseudomonas	2	
Acinetobacter	1	

Table III shows that organism in urine culture positive subjects was Klebsiella in 3, E. coli in 6, Pseudomonas in 2 and Acinetobacter in 1 case. The difference was significant ($P < 0.05$).

Discussion

Urinary tract infection is the major cause of health-related morbidity among the children in various studies.^{6,7} The most common presenting signs and symptoms are unexplained fever, nausea, vomiting and also diarrhea and failure to thrive among infants.^{8,9} The present study was conducted to assess urinary tract infections in malnourished children.

We found that age group 6 months- 1 year had 7 males and 8 females, 1-2 years had 8 males and 10 females, 2-3 years had 10 males and 12 females, 3-4 years had 13 males and 5 females and 4-5 years had 2 males and 9 females. Bagga et al¹⁰ examined the incidence of bacteriuria in malnourished patients between 6 months and 5 years of age. For each patient, a normally nourished control matched for age, sex, and presence of fever and diarrhea was included. Of 112 patients (65 boys), 55 had moderate and 57 had severe malnutrition; 43 had diarrhea and

35 had fever. Clean-catch and suprapubic urine specimens were examined microscopically and cultured. Significant bacteriuria was found in 17 (15.2%) malnourished and 2 (1.8%) control subjects ($P<0.01$). The incidence of bacteriuria in malnourished and normally nourished subjects with fever was 28.6% and 5.7%, respectively ($P<0.05$). The risk of bacteriuria increased significantly with the severity of malnutrition and in patients with diarrhea. Bacteriuria was associated with symptoms (70.6%) and elevated levels of acute phase reactants (88.2%), indicating the presence of urinary tract infections (UTI) rather than asymptomatic colonization. Our observations show that malnourished children, particularly those with fever, are at risk for UTI. Urinalysis is useful for screening for UTI in these subjects. Urine culture should be performed in patients showing an abnormal urinalysis, and if the likelihood of detecting bacteriuria is high (as in patients with fever or diarrhea). Significant bacteriuria in malnourished subjects should be treated with appropriate antimicrobials.

We observed that type was MAM in 34 and SAM in 50, symptoms were fever in 52, nausea in 43, vomiting in 48, diarrhea in 62, urine albumin was present in 6, pyuria in 10, urine culture positive was seen in 12. Antimicrobial sensitivity pattern against ciprofloxacin was seen in 65, 6 for Cefotaxime and in 86 against Amikacin. Reddy et al¹¹ found that of 174 children, 27 (15.5%) children were having UTI. 37% of children were asymptomatic. *E. coli* was the commonest organism causing UTI 16 (59%). Other organisms were *Klebsiella pneumoniae* 4 (14.9%), *Proteus mirabilis* 3 (11.1%), and *Pseudomonas* 3 (11.1%). The order of antimicrobial sensitivity pattern was amikacin (100%)> ciprofloxacin (81.4%)> cefotaxime (7%). Other common drugs have developed resistance to these organisms. The findings of the study concluded that the prevalence rate of UTI is higher in malnutrition children.

We found that organism in urine culture positive subjects was *Klebsiella* in 3, *E. coli* in 6, *Pseudomonas* in 2 and *Acinetobacter* in 1 case. Shaw KN et al¹² in their prevalence survey of 2411 (83%) of all infants younger than 12 months and girls younger than 2 years of age presenting to the ED with a fever (≥ 38.5 degrees C) who did not have a definite source for their fever and who were not on antibiotics or immunosuppressed. Otitis media, gastroenteritis, and upper respiratory infection were considered potential but not definite sources of fever. Overall prevalence of UTI (growth of $\geq 10^4$ CFU/mL of a urinary tract pathogen) was 3.3%. Higher prevalences occurred in whites, girls, uncircumcised boys and those who did not have another potential source for their fever had a history of UTI, malodorous urine or hematuria, appeared "ill", had abdominal or suprapubic tenderness on examination, or had fever ≥ 39 degrees C. White girls had a 16.1% prevalence of UTI.

The limitation the study is small sample size.

Conclusion

Authors found that the prevalence rate of UTI was higher in malnutrition children. The most common bacterial isolate from urine culture was *E. coli* and *klebsiella*.

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