



CORRELATION OF ABDOMINAL ULTRASONOGRAPHY FINDINGS WITH THE AGE OF CHILDREN WITH CULTURE POSITIVE URINARY TRACT INFECTION

Pediatrics

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ABSTRACT

Background: Urinary tract infection(UTI) is an important cause of mortality and morbidity in children, especially complicated UTI. In this study we have tried to see the correlation of Ultrasound abdomen findings with age of the culture positive UTI patients.

Objectives: to look at the age and sex distribution of patients with culture positive UTI and to look for the correlation of ultrasound abdomen findings with the age of culture positive UTI patients

Methods: It was a hospital based observational study conducted in one of the busiest hospitals of Jorhat over a period of 12 months. Urine culture reports of all patients were traced from the hospital laboratory data. Ultrasound abdomen was done in patients with positive urine culture report.

Results: Total 206 urine samples were tested from suspected cases out of which 43(21%) were culture positive urinary tract infection. UTI was more in girls as compared to boys. The male : female ratio was found to be 3:1 in children less than 2 years and in children more than 2 years female outnumbered males(1:2, 2:3 and 1:6 in children between the age group of 2 to 5 years, 6-9 years and 10 to 14 years respectively). Cystitis($p=0.22$) and hydronephrosis(0.27) had no significant correlation with the age of the UTI patients whereas Pyelonephritis($p=0.03$) had significant correlation with age of UTI patients. All the patients who had pyelonephritis were less than 5 years of age.

Conclusion: UTI is an important cause of mortality and morbidity in children and younger children are more prone to complications. So a collective effort should be made to diagnose such patients earlier and treat them adequately with judicious use of antibiotics.

KEYWORDS

Cystitis, pyelonephritis, UTI, complicated UTI

INTRODUCTION

Urinary tract infection(UTI) is an important cause of mortality and morbidity in children, especially complicated UTI^[1]. The incidence of UTI among girls is 7% and 2% in boys^[2]. Ultrasound is non-invasive and a cost effective mode of imaging the urinary system and can also be used to diagnose complications in UTI like pyelonephritis, renal abscess, etc. As children can deteriorate quickly, it has always been a controversy whether it is necessary to rule out complications early in UTI or one can wait for few days to see the response to antibiotic treatment or deterioration in patients condition. So in this study we have tried to find out the age and sex distribution of patients with culture positive UTI and the correlation of USG findings with the age of culture positive UTI cases. This will help us to know which group of patients with UTI are more prone for complications so that extra care can be taken in managing such patients. Studies have been done in the past on urinary tract infection in children but more studies are required to study the complications of UTI as it is an important cause of mortality and morbidity worldwide. Very few studies have been done in the past in our geographical area to see the correlation of Ultrasound abdomen findings with age of the culture positive UTI patients.

AIMS AND OBJECTIVES

- 1/ to look at the age and sex distribution of patients with culture positive urinary tract infection
- 2/ to look for the correlation of ultrasound abdomen findings with the age of culture positive urinary tract infection patients.

MATERIALS AND METHOD

Place of Study: the study was conducted at Sanjivani Hospital, Jorhat, which is one of the busiest hospitals of Jorhat, Assam.

Study Design: Hospital based observational study.

Duration of Study: 12 months (November 2019 – October 2020)

Method Of Study: It was a cross-sectional study conducted in the patients less than 14 years of age attending the hospital with symptoms and signs of urinary tract infection. Among the children who were toilet trained, mid-stream clean catch urine was collected maintaining strict aseptic and antiseptic procedure, from the younger children urine was collected after catheterisation maintaining aseptic and antiseptic procedure.

Urine was analysed in the laboratory as per standard hospital protocol. Quality assurance was strictly adhered to. Management of the patients

was done according to standard hospital protocol. Culture reports of all patients were traced from the hospital laboratory data. Urine with bacterial colony count more than 10^5 CFU/ml among the patients with mid-stream clean catch urine and more than 10^4 CFU/ml among the patients in whom catheter was used to collect urine was considered as culture positive urinary tract infection. Positive culture reports UTI were separated and analysed. Ultrasound abdomen was done in patients with positive urine culture report. Consent was taken from the patients and their guardians. Institutional ethics committee clearance was obtained.

Exclusion Criteria:

- 1/ Patients with diagnosed pre-existing urinary tract disease
- 2/ Patients on antimicrobials for some other disease
- 3/ Children with pre-existing renal disease

Variables Studied Included

- 1/ Age and sex distribution of Culture positive urinary tract infection patients
- 2/ Ultrasound abdomen report in patients with positive urine culture report.

Statistical Methods: The data obtained was tabulated and analysed statistically using social science system version SPSS.16

RESULTS AND OBSERVATION

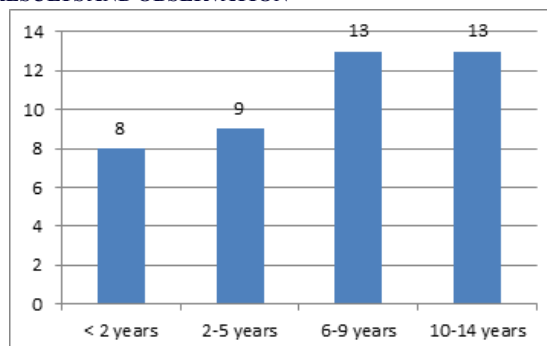


Figure 1: Age Distribution Of Culture Positive Urinary Tract Infection Patients

Total 206 urine samples were tested from suspected cases out of which

43 were culture positive urinary tract infection. The incidence of Urinary tract infection was 21% of which 27(63%) were females and 16(37%) were males

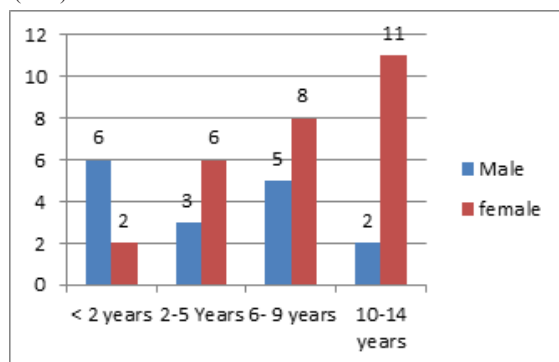


Figure II: Age And Sex Distribution Of Culture Positive Urinary Tract Infection

Analysis of the data showed that among the patients having culture positive urinary tract infection 8(19%) were children less than 2 years out of which 6 were males and 2 were females(male : female ratio is 3:1), 9(21%) were children between 2 to 5 years out of which 3 were males and 6 were females(male :female ratio was 1:2), 13(30%) were children between 6 to 9 years out of which 5 were males and 8 were females(male : female ratio 2:3) and 13(30%) were between the age group of 10-14 years out of which 2 were males and 11 were females (male : female ratio is 1:6).

Table 1: Correlation Of USG Abdomen Findings With Age Of The Culture Positive Urinary Tract Infection

	< 2 years (n=8)	2-5 years (n=9)	6-9 years (n=13)	10-14 years (n=13)	p value
Cystitis	3(38%)	5(56%)	6(46%)	2(15%)	0.22
Pyelonephritis	1(13%)	3(33%)	0(0%)	0(0%)	0.03
Hydroureteronephrosis	0(0%)	1(11%)	0(0%)	0(0%)	0.27

On analysing the Ultrasound Abdomen reports in patients with Culture positive UTI we found Cystitis in 37% of cases, Pyelonephritis in 9% of cases and Hydroureteronephrosis in 2 % cases. Cystitis ($p=0.22$) and hydronephrosis(0.27) had no significant correlation with the age of the UTI patients whereas Pyelonephritis ($p=0.03$) had significant correlation with age of UTI patients. All the patients who had pyelonephritis were less than 5 years of age. Thirteen percent(1 out of 8) of patients less than 2 years and 33%(3 out of 9) with culture positive UTI had pyelonephritis. One patient between 2 to 5 years age group was found to have hydroureteronephrosis. 38% (3 out of 8) patients less than 2 years, 56%(5 out of 9) patients between 2-5 years, 46%(6 out of 13) patients between 6-9 years and 15%(2 out of 13) patients between 10-14 years had Cystitis.

DISCUSSION

In our study we have tried to find out the age and sex distribution of culture positive urinary tract infection (UTI) patients among the patients who presented with signs and symptoms of UTI, the USG abdomen finding among the culture positive UTI patients and the correlation of USG Abdomen finding with the age of Culture positive UTI patients. We found that the incidence of urinary tract infections was more in girls as compared to boys. Girls have a shorter urethra close to the anus, this makes them more susceptible to urinary tract infections^[3].

Maximum number(60%) of children having culture positive sepsis were in the age group between 6 to 14 years in our study. In children less than 2 years of age, the incidence of UTI was found to be 19%. The incidence of culture positive UTI among the suspected cases in our study was found to be 21%. Nader Shaikh et al in their study found the incidence of UTI among infants was 7% and that of older children was 7.8%^[4].

The male :female ratio was found to be 3:1 in children less than 2 years in our study. In children between the age group of 2 to 5 years the male : female ratio was 1:2, while the ratio was 2:3 and 1:6 in children between the age group of 6-9 years and 10 to 14 years respectively. MS

Vinodkumar et al in their study found that the incidence of UTI among males was 63.4% and that among females were 36.6%. Males outnumbered females in children less than 5 years(71.4%) and females outnumbered the males (62.5%) in children more than 5 years in their study^[5].

On analysing the Ultrasound Abdomen reports in patients with Culture positive UTI we found Cystitis in 37% of cases, Pyelonephritis in 9% of cases and Hydroureteronephrosis in 2 % cases. USG was abnormal in 37% of culture positive UTI cases and 10% among all UTI suspected patients. Hoberman et al. in their study found abnormal USG findings in 12% of cases^[6] whereas Ali et al from Sudan found abnormal USG findings in 32.6% of cases^[7].

Cystitis($p=0.22$) and hydronephrosis(0.27) had no significant correlation with the age of the UTI patients whereas Pyelonephritis ($p=0.03$) had significant correlation with age of UTI patients. All the patients who had pyelonephritis were less than 5 years of age. Thirteen percent(1 out of 8) of patients less than 2 years and 33%(3 out of 9) with culture positive UTI had pyelonephritis. It has been found that the risk of pyelonephritis is 3 fold higher in children less than 5 years^[8] and is an important cause of mortality and morbidity in children specially in children less than 2 years because of risk of septicemia^[1]. One patient between 2 to 5 years age group was found to have hydroureteronephrosis. 38% (3 out of 8) patients less than 2 years, 56% (5 out of 9) patients between 2-5 years, 46%(6 out of 13) patients between 6-9 years and 15%(2 out of 13) patients between 10-14 years had Cystitis. Cystitis which is lower urinary tract infection does not have special age predilection in our study, all patients with positive urine culture report have equal chance of having cystitis.

In this study we tried to find the correlation of USG abdomen with age of Culture positive UTI patients. We found that pyelonephritis is more common in children less than 5 years of age. Thus complicated UTI is more common in younger children, hence an important cause of mortality and morbidity in younger children. Cystitis does not have a significant correlation with age of culture positive UTI patients. Studies have been done in the past but very few studies have been done in the past to see the correlation of USG findings with culture positive UTI cases. Also few studies are reported from our geographical area on urinary tract infection in children. As UTI is an important cause of mortality and morbidity in children especially in younger children due to complications, a collective effort should be made to diagnose such patients earlier and treating them adequately with judicious use of antibiotics.

Our study has one limitation, our sample size was comparatively less than some other studies, but we tried to gather as much information as possible. And this did not affect the study result as our findings are consistent with most other studies conducted worldwide.

CONCLUSION

In our study we tried to find out the age and sex distribution of culture positive urinary tract infection (UTI) patients among the patients who presented with signs and symptoms of UTI, the USG abdomen findings among the culture positive UTI patients and the correlation of USG Abdomen findings with the age of Culture positive UTI patients. We found that the incidence of Urinary tract infection was 21% and was more in girls as compared to boys. The male :female ratio was found to be 3:1 in children less than 2 years in our study and in children more than 2 years female outnumbered males. The Ultrasound Abdomen reports in patients with Culture positive UTI showed Cystitis in 37% of cases, Pyelonephritis in 9% of cases and Hydroureteronephrosis in 2 % cases. Pyelonephritis had significant correlation with age of UTI Patients. All the patients who had pyelonephritis were less than 5 years of age. Cystitis which is lower urinary tract infection does not have special age predilection in our study. Thus, children less than 5 years are more prone to developing complicated UTI. UTI is an important cause of mortality and morbidity in children and younger children are more prone for complications so a collective effort should be made to diagnose such patients earlier and treat them adequately with judicious use of antibiotics.

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