

## Sensitivity and Antibiogram of Culture Positive UTI in a Tertiary Urban Centre

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### Abstract:

**Background:** Urinary tract infection is common among children of significant concern in paediatric healthcare. The study was designed to know the prevalence, clinical, microbial profile and antibiotic susceptibility pattern of uropathogens isolated.

**Methods:** This is a hospital based prospective observational study done in the department of pediatrics, Vijay Marie hospital, Hyderabad over a period of 9 months from February 2023 to October 2023. The study was accepted by institutional ethics committee. Written and informed consent was obtained from children's parent. Children in whom urine culture was sent based on significant urine microscopic finding among the admitted patients were included in the study

**Results:** A total of 134 patients were included in the study, out of which 74(55.22%) was culture negative, 19(14.17%) was with insignificant colony count and 41(30.59%) was culture positive. Among culture positive cases 13(31.7%) were males and 28(68.3%) were females. The clinical features observed were fever (95.12%), cry while micturition/dysuria (12.19%), diarrhoea (19.5%), abdominal pain (14.63%), vomiting (29.26%), seizures (9.75%) and cough/cold (12.19%). Elevated CRP was seen in 80.48% children and leucocytosis in 34.14% cases. The most common organism isolated was *E. coli* constituting 75.6% followed by *Klebsiella* 9.75%, proteus 4.87% and morganella, enterococci and CONS 2.43% each. 40 culture positive case was started with ceftriaxone as first line empiric antibiotic therapy except one, which started with amikacin from outside hospital. 16(39%) were ESBL, in which 12(75%) responded to ceftriaxone within 48hrs of antibiotic and 2(12.5%) responded within 72 hours of antibiotic therapy and in 2 cases antibiotic upgraded to Piperacillin-Tazobactam based on sensitivity pattern, since there was no response after 72hrs of treatment.

**Conclusion:** Prevalence and isolates of culture positive UTI cases was similar to that reported in literature. Most common symptoms with children presented was fever, vomiting, abdominal pain, diarrhoea and cry while micturition/dysuria. It was observed that even though there is increased ESBL organisms and increased invitro resistance to cephalosporins there is in vivo sensitivity. Hence cephalosporins can be continued as a first line empiric antibiotic treatment.

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### Introduction

Urinary Tract Infections (UTIs) in children are a common yet concerning health issue, impacting the well-being of pediatric populations worldwide. Unlike adults, diagnosing and managing UTIs in children pose unique challenges due to their diverse clinical presentations and the potential long-term consequences if left untreated. Using appropriate antibiotics in accordance with antimicrobial stewardship principles is crucial to prevent the development of resistance in current era, promoting effective treatment while preserving the efficacy of these vital medications.[1]

In a study conducted in rural Vellore it was concluded that cephalosporins should not be used in treating UTI due to its increasing resistance and nitrofurantoin can be started as first line empiric antibiotic, another similar study suggested Amikacin/Piperacillin-Tazobactam may be used as first line empiric treatment. In this perspective, this present study delves into a comprehensive analysis of the clinical characteristics' causative agents, antibiotic sensitivity and their susceptibility to first line empiric antibiotic therapy.[2]

## Methods

This prospective observational study was carried out in the department of paediatrics, Vijay Marie hospital during 9 months period

All paediatric patients with significant pyuria were included in the study. Positive urine culture with colony counts of  $>10^5$  CFU/ml of midstream urine or  $>10^4$  for samples collected by a catheter considered significant growth.

Antibiotic sensitivity testing was done by Modified Kirby-Bauer disc diffusion method according to the Clinical and Laboratory Standards Institute guidelines.

The ESBL detection was done by double disc synergy test testing the strain against ceftazidime and ceftazidime/clavulanic acid. The synergy was determined between a disc of amoxicillin-clavulanate (20 µg/10 µg) and a 30 µg disc of each

third-generation cephalosporin test antibiotic placed at a distance of 20 mm from center to center on a Muller-Hinton agar plate swabbed with the test isolate. A clear extension of the edge of the inhibition zone of cephalosporin toward the amoxicillin-clavulanate disc was interpreted as positive for ESBL production. Patients in whom alternate diagnosis found was excluded from the study.

After obtaining the informed and written consent, the patients' demographic data, clinical features, investigation, clinical response to treatment were noted in pre-validated proformas and analysed.

## Results

During the study period, 134 patients with significant pyuria subjected to the study and 41 was culture positive.

Sex	Number	Percentage
Male	13	31.7%
Female	28	68.3%
Clinical Features	Numbers	Percentage
Fever	39	95.12%
Vomiting	12	29.26%
Diarrhoea	8	19.5%
Abdominal Pain	6	14.63%
Cry While Micturition/Dysuria	5	12.19%
Cold/Cough	5	12.19%
Febrile Seizure	4	9.75%

	Numbers	Percentage
Elevated CRP	33	80.48%
Low CRP	8	19.51%
Leucocytosis	14	34.14%

## Organisms Isolated

Organism	Numbers	Percentage
<i>E. coli</i>	31	75.60%
<i>Klebsiella</i>	4	9.75%
<i>Proteus</i>	2	4.87%
<i>Enterococci</i>	1	2.43%
<i>Morganella morganii</i>	1	2.43%
<i>Cons</i>	1	2.43%

Antibiotic	Sensitivity	Resistance
Ceftazidime	13	20
Cefotaxim	13	20
Aztreonam	14	20
Gentamicin	30	9
Amikacin	28	7
Nitrofurantoin	28	8
Amoxicillin-Clavulanic Acid	20	10
Piperacillin-Tazobactam	26	10

Response to Antibiotics	Numbers	Percentage
0-48hrs	35	85.36%
48-72hrs	4	9.75%
Change Of Antibiotic	2	4.87%

### Discussion

This study showed out of 134 cases with significant pyuria 30.59% showed culture positive UTI with significant colony count, in which male to female ratio is 1:2.1 and elevated CRP and leucocytosis seen in 80.48% and 34.14% respectively. [3]

Clinical spectrum of the disease varied from fever, vomiting, diarrhoea, abdominal pain, cry while micturition, dysuria and febrile seizures.

*E. coli* is the major organism to isolate followed by *klebsiella*, *proteus*, *enterococcus* and *morganella* and there was increased trend of resistance to cephalosporins. [4]

All the culture positive cases received ceftriaxone as first line empiric antibiotic therapy except one which received amikacin from outside hospital. All responded to first line empiric antibiotic therapy except 2 cases for which Piperacillin-Tazobactam upgradation done, since there was no clinical response after 72 hrs of receiving antibiotics.

### Conclusion

Prevalence and isolates of culture positive UTI cases was similar to that reported in literature.

From the present study we conclude that in UTI most common presentation are fever, vomiting, diarrhoea, abdominal pain, cry while micturition and dysuria with laboratory evidence of increased CRP and leucocytosis.

It was observed that even though there is increased ESBL organisms and increased invitro resistance to cephalosporins there is in vivo sensitivity.

Hence cephalosporins can be continued as a first line empiric antibiotic treatment

**Limitations:** Small sample size.

**Financial support and sponsorship:** Nil.

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