



“ CLINICAL STUDY OF LOWER URINARY TRACT ANOMALIES IN PEDIATRIC AGE GROUP ” – Cross Sectional Study

Urology

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KEYWORDS

Lower urinary tract anomalies , CAKUT

INTRODUCTION

Among all birth defects, only one percent of human fetuses have congenital anomalies of the kidney and urinary tract (CAKUT), which is a family of birth defects including kidney anomalies such as renal hypodysplasia and hydronephrosis, and lower urinary tract (LUT) anomalies such as vesicoureteral reflux (VUR), urinary tract obstruction, bladder and urethral abnormalities. CAKUT is a complex genetically heterogeneous developmental disorder with variable phenotype, it can also be caused by mutations in a single gene that controls early kidney and lower urinary tract development. CAKUT is a leading cause of urinary tract infection (UTI), chronic kidney disease and renal failure in children and may also manifests as primary renal disease in adults as more children with urinary tract birth defects survive to adulthood.

The urinary system is a multi-component organ system, whose primary function is to produce, transport, store, and eliminate urine in order to maintain body homeostasis by controlling the water and ionic balance of the blood. Anatomically, these functions are served by an upper unit, the kidney, which filters and modifies the blood to produce urine, and a lower unit consisting of the ureter, the bladder, and the urethra, which transports, stores and eliminates the urine to the outside.

AIMS AND OBJECTIVES

1. To study the clinical spectrum of lower urinary tract anomalies in pediatric age group.
2. To study the various management strategies for children with lower urinary tract anomalies.
3. To study the complications associated with lower urinary tract anomalies in pediatric age group.

MATERIAL AND METHOD:

This study was conducted in RCSM Govt. Medical College and CPR Hospital (Tertiary Care Centre), KOLHAPUR, MAHARASHTRA. Study period was 18 months from July 2018 to December 2019. We have considered all cases indoor admissions in the Surgery ward and also in OPD.

OBSERVATIONS AND RESULTS

In present study, we included total 50 patients.

Most of the cases in our study were males (62%) followed by females (38%).

Most of the children were in age group 4 to 8 years (44%) followed by, 0 to 4 years (34%). 22% of cases were in age group 8 to 12 years. 60% of mothers were in age group 18 to 25 years, followed by 26 to 35 years (36%). Only 4% of cases were in age group 36 to 45 year. Vesico-urethral reflux was present in 40% cases, posterior urethral valve was present in 34% cases, ureterocele in 12%, urachal anomalies megaloureter in 8% cases. While bladder extrophy in 6% cases. UTI was the most common complication (60.7%), CKD in 28.5% and other complications were seen in 10.8% cases. Surgical management was done in most of the cases (68%) followed by medical management (32%) Fever was commonest sign and symptom (52%). Burning sensation on urination (36%) and pain in abdomen (28%) were the most common signs and symptoms. Followed by vomiting (24%), difficulty in urination/crying during micturition (20%), Failure To Thrive (20%), pain in pubic area (16%), blood in urine (4%) Most

common medication used orally was Amoxiclav (21 cases), Cefixime (12 cases), Ampicillin (8 cases), TMP-SMX (6 cases) and Nitrofurantoin (3 cases). Cefotaxime was the most common parenteral antimicrobial agent used in 17 cases, cefipime in 12 cases while ceftriaxone in 11 cases. Most common Parenteral antimicrobial agent use were Ampicillin Dose/day 4 in 5 Patients, Gentamycin Dose/day 3 in 2 Patients, Cefotaxime Dose/day 3 in 17 Patients, Ceftriaxone Dose/day 2 in 11 Patients and Cefipime Dose/day 2 in 12 Patients respectively. Ultrasound (abdomen + pelvis) was done in all 50 cases followed by voiding cystourethrogram in 47 cases (94%), DMSA scan in 5 cases (10%).

DISCUSSION

The present study was done at our tertiary care centre to assess the clinical spectrum and management strategies of lower urinary tract anomalies in pediatric age group.

In the present study, most of the cases were males (62%) followed by females (38%). Most of the children were in age group 4 to 8 years (44%) followed by, 0 to 4 years (34%). 22% of cases were in age group 8 to 12 years. 60% of mothers were in age group 18 to 25 years, followed by 26 to 35 years (36%). Only 4% of cases were in age group 36 to 45 years. This is similar to the studies of Sivaraj P et al¹ and Narreddy RR et al².

Sivaraj P et al¹ prospective study assessing risk factors associated with febrile UTI in children aged 1 month to 14 years found of the 79 cases of febrile UTI, 60 were boys with a male: female ratio of 3:1. Most children were older than 5 years at the time of presentation.

Narreddy RR et al² study assessing common clinical presentation of urinary tract infections in children found 18 children (30%) were boys and 42 (70%) children were girls. In <2 years age group total no of cases were 13. Boys formed 69.2% of cases & girls formed 30.7%. In the 2-5 years age group total no of cases were 19. Boys formed 21% of total cases in this age group and girls formed 78.9%. In the 5-12 years age group total no of cases were 28. Girls and formed 82.1% of total cases and boys formed 17.8%.

Vesico-urethral reflux was present in 40% cases, posterior urethral valve was present in 34% cases, ureterocele in 12%, urachal anomalies megaloureter in 8% cases. While bladder extrophy in 6% cases. This is comparable to the studies of Sivaraj P et al¹ and Narreddy RR et al².

Sivaraj P et al¹ prospective study found only 5 (6.5%) structural anomalies (primary VUR in 3 cases, horse shoe kidney in one case and posterior urethral valves in 1 case). Only 12 children were less than one year of age and of that three (25%) had structural anomalies.

Narreddy RR et al² study assessing common clinical presentation of urinary tract infections in children observed Vesicoureteric reflux (VUR) in 20% of cases. Gr II & Gr III VUR was more common. VUR was cause of recurrent UTI in 66.6% of cases presenting with recurrent UTI.

It was observed in the present study that UTI was the most common complication (60.7%), CKD in 28.5% and other complications were seen in 10.8% cases.

Earlier approaches assumed Vesicoureteral reflux could lead to significant long-term renal damage, therefore should be identified early. There is now increasing awareness that much of the renal disease based on reflux is congenital, with an appreciation of mild hydronephrosis and VUR as likely normal physiological states that resolve spontaneously³. Lower grade reflux is less likely to cause clinically significant scarring, and mild scarring without other risk factors is less likely to cause long-term renal dysfunction, aggressive identification of all VUR is unwarranted. Active management strategies should still be considered for higher grade VUR¹.

It was observed in present study that Initially , ultrasound of the abdomen and pelvic was done in all 50 cases to identify anatomical irregularities and evidence of obstruction in kidneys and/ urinary tract. And according to findings, further diagnostic measures such as , voiding cystourethrogram (VCUG) to identify lower urinary tract anomalies and vesicoureteric reflux was done in 47 cases (94 %), and dimercaptosuccinic acid (DMSA) scan was done for early diagnose acute renal parenchymal involvement in presence of UTI and done later to assess permanent scarring in 5 cases . This is concordant to the studies of Michaela M. Prasad et al⁵.

It was observed in present study that surgical management was done in most of the cases (68%) followed by medical management (32%) Fever was commonest sign and symptom (52%). Burning sensation on urination (36%) and pain in abdomen(28%) were the most common signs and symptoms. Followed by vomiting(24%),Failure To Thrive(20%),difficulty during urination/crying during urination(20%),pain in pubic area(16%), blood in urine (4%). This is concordant to the studies of Sivaraj P et al¹, Narreddy RR et al², Leung AKC et al⁶.

Narreddy RR et al¹ study assessing common clinical presentation of urinary tract infections in children found predominant presenting complaint in all age groups (i.e < 2 years, 2-5 years, 5-12 years) was fever and formed 26.6% of all clinical features without any focus of duration more than 3 days. Non specific symptoms included were vomiting's 11.6%, abdominal pain 10%, suprapubic pain 5%, facial puffiness 5%. Most common urinary symptom was increased frequency followed by dysuria.

Leung AKC et al⁶ study assessing the evaluation, diagnosis, and treatment of urinary tract infection in children observed symptoms and signs are non-specific throughout infancy. Unexplained fever is the most common symptom of UTI during the first two years of life. After the second year of life, symptoms and signs of pyelonephritis include fever, chills, rigor, flank pain, and cost vertebral angle tenderness. Lower tract symptoms and signs include suprapubic pain, dysuria, urinary frequency, urgency, cloudy urine, malodorous urine, and suprapubic tenderness.

The most common medication used orally in the present study was Amoxiclav (21 cases), Cefixime(12 cases), Ampicillin (8 cases) and TMP-SMX(6 cases).Cefotaxime was the most common parenteral antimicrobial agent used in 17 cases, Cefpime in 12 cases while Ceftriaxone in 11 cases. This is in concordance to the study of Narreddy RR et al¹.

Narreddy RR et al¹ study assessing common clinical presentation of urinary tract infections in children observed most of the organisms were sensitive to Fluoroquinolone, Cephalosporins mainly Ceftriaxone & Cefotaxime, Amikacin Gentamycin. Recurrent UTI showed isolation of organisms resistant to most of the antibiotics but they were sensitive to Amikacin.

The most common parenteral antimicrobial agent used in our study were Ampicillin Dose/day 4 in 5 Patients, Gentamycin Dose/day 3 in 2 Patients, Cefotaxime Dose/day 3 in 17 Patients, Ceftriaxone Dose/day 2 in 11 Patients and Cefpime Dose/day 2 in 12 Patients respectively. Similar observation was noted in the study of Leung AKC et al⁶.

Leung AKC et al⁶ study assessing the evaluation, diagnosis, and treatment of urinary tract infection in children summarized Parenteral antibiotic therapy is recommended for infants ≤ 2 months and any child who is toxic-looking, hemodynamically unstable, immuno compromised, unable to tolerate oral medication, or not responding to oral medication.

CONCLUSION

Our study concluded that , as any children presenting with fever can have urinary tract infection . All children with urinary tract infection to be assessed thoroughly by clinical examination and relevant radiological investigation to rule out lower urinary tract anomalies .

Neglected lower urinary tract anomalies may cause recurrent urinary tract infection and risk of renal scarring leading to renal failure . Hence earliest , accurate diagnosis and appropriate treatment is necessary in cases of lower urinary tract anomalies .

Table :- observations noted during study

VARIABLE	NUMBER	PERCENTAGE
GENDER		
Male	31	62%
Female	19	38%
PATIENTS AGE		
0 to 4 years	17	34%
4 to 8 years	22	44%
8 to 12 years	11	22%
MATERNAL AGE		
18 to 25 years	30	60%
26 to 35 years	18	36%
36 to 45 years	2	4%
ANOMALY		
Vesico-ureteral reflux (VUR)	20	40%
Urachal anomalies Megaloureter	4	8%
Posterior urethral valve.	17	34%
Ureterocoele	6	12%
Bladder exstrophy	3	6%
COMPLICATIONS		
CKD	8	28.5%
UTI	17	60.7%
Others	3	10.8%
VARIABLE	NUMBER	PERCENTAGE
MANAGEMENT		
Medical	16	32%
Surgical	34	68%
SIGN AND SYMPTOMS		
Blood in urine	2	4%
Burning sensation on urination	18	36%
Pain in abdomen	14	28%
Pain in pubic area	8	16%
Difficulty in urination	10	20%
Vomiting	12	24%
Fever	26	52%
Failure To Thrive	10	20%
INVTIGATIONS		
Ultrasound(A+P)	50	100%
VCUG	47	94%
DMSA	5	10%
TOTAL	50	100

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