

A study of Obstructive Uropathy among Children.

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ABSTRACT

Background: Where in the infection occur repeatedly leaving residual inflammatory changes. It is more common in the presence of structural or functional anomalies of the urinary tract, which interfere with drainage of urine. Common organisms are E. coli in early infancy, while the later resistant organism like proteus and klebsiella predominate. **Objective:** To study, obstructive uropathy among children. **Methods:** A hospital-based study was carried out among children of 6 months to 5 years of age who satisfied inclusion and exclusion criteria. Complete detailed history, examination and investigations like urine for culture and sensitivity, and radiological investigations were carried out. **Results:** Out of total no. of 60 cases sent for urine culture, 44 cases were culture positive. E. coli is isolated in 32 cases (53.3%). Klebsiella in 7 cases (11.6%) and pseudomonas in only 3 cases (5%) and proteus in 2 cases (3.3%). Out of total no of cases, 60 cases, 15 cases were presented with predisposing factors like vesical stones in 8 cases (13.3) noted on plain X-ray of abdomen, where as hydronephrotic changes were seen in 7 cases (11.6%). **Conclusion:** Organism isolated in present study E. coli (53.3%) was commonest organism isolated, then followed, by Klebsiella, Pseudomonas and Proteus.

Keywords: Obstructive uropathy, children, E. coli.

INTRODUCTION

Wherein there is no underlying structural or neurological lesions. It occurs commonly in females. The first few episodes of infection respond well to the treatment. The most common causative organism is E. coli.^[1]

Where in the infection occur repeatedly leaving residual inflammatory changes. It is more common in the presence of structural or functional anomalies of the urinary tract, which interfere with drainage of urine. Common organisms are E. coli in early infancy, while the later resistant organism like proteus and klebsiella predominate. These are difficult to treat, unless the underlying abnormality is corrected. Such children are at higher risk of progressing to chronic renal failure or hypertension.^[2]

Parija, Padhi and Sen (1981)^[2] in their studies have noted gram stain of centrifuged (81%)^[2] reviewed an incidence of asymptomatic bacteriuria of 2.2% in neonates, 1.7% in school girls and 1.2% in school boys.

Varma, Krishna and Bhargava^[3] et al (1984) have shown the incidence of asymptomatic urinary tract infection is about 0.6% with maximal prevalence in the preschool children and girls significantly higher prevalence (1.1%) than boys (0.2%) due to poor toilet habits which had the significant relationship.

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Joseph and Sreekumaran^[4] et al (1989) have observed asymptomatic bacteriuria in school children in small percentages (i.e., 0.12%) and does

show significant difference between the two sexes, while poor toilet habits and perineal hygiene has no significant relationship.

MATERIALS AND METHODS

Type of study: Hospital based prospective observational study.

Study subjects: 99 children of 6 months to 5 years of age.

Study place: Kamineni Hospital, LB Nagar, Hyderabad

Ethical considerations: Children were included in the study after taking an informed consent and approval of the institutional ethical committee.

A complete history, thorough clinical examination was carried out.

Children with age more than 6 months and less than 5 years, and children with symptoms suggestive of obstructive uropathy were included in the study. Children with age less than 6 months and more than 5 years, children with congenital heart disease, children with cerebral palsy, and children with a proven immunodeficiency disorder were excluded from the study.

Urine for culture and sensitivity:

The freshly voided urine is taken with sterile, bacteriological loop on the nutrient agar and MacConkey agar plates and then incubation at 37°C for overnight/24 hours and growth is noted. Then the subculture was made on the peptone water and incubated for 4 hours at 37°C. Later a long culture is made on nutrient agar plates and organisms are isolated.

The commercially available antibiotic discs are placed over the plates and then incubated at 37°C for a period of 24 hours, to note the zone of inhibition, in order to obtain the sensitivity pattern.

Urine for colony count:

The freshly voided urine is taken in the 4 test tubes with various normal saline dilution such as 1/10, 1/100, 1/1000, 1/10,000, then with the help of sterile bend wire 0.1 ml is added on solid culture media (i.e., nutrient agar and MacConkey) and spread over the entire surface of the medium. Then the media is incubated at 37°C for overnight to get the growth of micro-organism.

Next day the colony count is carried out in the diluted plate where in the count of the colony is clear. Then count obtain is multiplied with that particular dilution and colony count is obtained.

Radiological investigation of urinary system or renal system

Plain X-ray of Abdomen:

The plain X-ray of abdomen was taken in the morning after last night fasting and castor oil or a laxative for children Above 2 years age at the bedtime was given on the previous night.

Ultrasound abdomen:

In male child with urinary tract infection USG abdomen is done to rule out any genitor urinary abnormalities, whereas in females recurrent urinary tract infection (> 2 attacks) were screened for anomalies.

Intravenous pyelography (IVP):

The IVP is done for assessment of tubular secretory activity. The patient was kept nil by mouth overnight, was given castor oil or laxative at bed time and next day morning he/she was given soap water enema. During the procedure, first plain X-ray of abdomen was taken. Then radio-opaque dye conray 280 was injected after test dose – up to maximum of 0.3 ml/kg and X-ray were taken at 1,5,15 and 30 minutes.

Micturating cystourethrogram (MCU):

The micturating cystourethrogram is most important in the diagnosis of posterior urethral valves (PUV) and in the evaluation of lower and mid-urinary tract. To give better anatomic details X-ray was taken in an oblique position.

The catheterization of the bladder under strict aseptic condition was done with gentleness because the appearance of the structure might distort by spasm and edema. Than bladder was slowly filled with contrast material, the capacity range was 75 ml in newborn to 300 ml in older children. The smallest infants will start to urinate whenever the filling of the bladder reaches to the point of maximum discomfort. In case of older children filling was stopped and the catheter was removed when the child began to complain of discomfort. Films were taken with the child in 45° lateral position during voiding in order to outline the urethra and to demonstrate vesico-ureteral reflux, which occurs when the bladder is filled, or only

during the urination. Lastly, final film in the AP projection including both the bladder and renal area was taken at the end of urination to demonstrate whether or not the bladder has emptied completely and whether or not there is evidence of refluxed contrast material in the renal pelvis.

RESULTS

Table 1: Organism isolated from the urine culture.

Organism isolated	Number of cases	Percentage
E. Coil	32	53.3
Klebsiella	7	11.6
Pseudomonas	3	5
Proteus	2	3.3

Out of total no. of 60 cases sent for urine culture, 44 cases were culture positive. E. coli is isolated in 32 cases (53.3%). Klebsiella in 7 cases (11.6%) and pseudomonas in only 3 cases (5%) and proteus in 2 cases (3.3%).

Table 2: Predisposing factors for obstructive uropathy.

Predisposing factors	Number of cases	Percentage
Vesical stones	8	13.3
Hydronephrosis	7	11.6
Hydroureter	3	5
Post-urethral valve obstruction	2	3.3
Calculus in pelvic ureter	1	1.6
Wilm's tumour	1	1.6
Neuroblastoma	1	1.6
No Predisposing factor	45	75

Out of total no of cases, 60 cases, 15 cases were presented with predisposing factors like vesical stones in 8 cases (13.3) noted on plain X-ray of abdomen, where as hydronephrotic changes were seen in 7 cases (11.6%), Hydronephrotic changes were urethral valve obstruction noted in 2 cases (3.3%), calculus in pelvic ureter Wilm's tumour and neuroblastoma was noted in 1 case each (1.6%) and in the remaining 45 cases (75%) shows no predisposing factors.

Sensitivity pattern of the isolated organism

E. coli

Out of total no of 60 cases E. coli was isolated in 32 cases (53.3%) of which maximum sensitivity to Nitrofurantoin in 24 cases followed by Gentamycin in 14 cases and then Cephalexin in 10 cases, Ciprofloxacin in 8 cases, Norfloxacin in 6 cases.

Klebsiella

Klebsiella was isolated in 7 cases, i.e., (11.6%), of which 5 cases were sensitive to Nitrofurantoin, while 4 cases for Gentamycin, 2 case for Cephalexin and 1 case of Ciprofloxacin.

Pseudomonas

Pseudomonas was isolated in 3 cases (5%) and were sensitive to Gentamycin and Nitrofurantoin.

Proteus

The two cases (3.3%) of urinary tract infection caused by Proteus organism were sensitive to Gentamycin and Nitrofurantoin.

Radiological investigation

These include KUB, Ultrasound abdomen, resting and voiding cystourethrogram and intravenous pyelography.

Table 3: Incidence and nature of radiological investigations.

No. of cases	Present study
Radiologically investigated	30
Showing radiological abnormality	15
Intravenous pyelography	8
Cystourethrography	2
Ultrasound abnormality	15

Out of total no. of 60 cases radiological investigation was done in 30 cases out of which 15 cases (50%) showed radiological abnormality, intra Venous Pyelography was done in 8 cases (26.6%), Micturating Cystourethrography was done in 2 cases (6.6%) and ultrasound abnormality in 15 cases (50%).

Table 4: Abnormal radiological finding in the present study.

Investigation	No. investigation	No. with positive findings
Intravenous pyelography	8	7
Cystourethrography	2	1

Radiological abnormality were found in 15 cases, number investigated with intravenous pyelography were 8 cases, in cystourethrography were 2 cases, the abnormal radiological finding was found in 7 cases (87.5 %) with intravenous pyelography, in the 1 case (50%) with cystourethrography and ultrasound abnormality was found in 15 cases (100%).

Table 5: Incidence and nature of radiological investigations.

Radiological Findings	No. of cases	Percentage
Poor and/or delayed dye excretion	7	23.3
Both sides	2	6.6
One side	5	16.6
Hydronephrosis	7	23.3
Vesicoureteric reflux	1	3.3
Bilateral	0	
Unilateral	1	3.3
Hydroureter	3	10
Calculus in pelvic ureter	1	3.3

Detailed radiological findings revealed that poor and/or delayed dye excretion was found in seven cases, both sides in two cases, one side in five cases, Hydronephrosis was noted in seven cases, Vesicoureteric reflux was found in one case, Unilateral in one case, Hydroureter has been noted in three cases, Calculus in pelvic ureter in one case.

DISCUSSION

E-coli was the most common micro-organism isolated by urine culture this according to Grag et al^[5] was 53.20%. Belapurkar^[6] et al 54.40%, Shiela Ethraj^[7] 54%. In the present study, it was noticed in 53.3% of cases.

According to Grag et al^[5] Klebsiella was isolated in 18.3%, Shiela Ethraj^[7] 13%, but lest cases in 7% is noted in Belapurkar et al^[6] study. In the present study, it was noticed in 11.6% of cases.

In a study done by Grag et al^[5] Pseudomonas was noticed in 4.3%, Belapurkar^[6] 5.2%, Shiela Ethraj^[7] 4% of cases. In the present study, it was isolated in 5% of cases.

Studies done by Grag et al^[5] has found proteus in 6.4%, while Belapurkar et al^[6] have reported in 17.1% and Sheila Ethraj et al^[7] in 2%. In the present study, it was found to be 3.3% of cases.

Vesical stone was a most common predisposing factor for urinary tract infection while Belapurkar et al^[6] study have reported less cases 3%. In the present study, it is 13.3% of cases. The next most common predisposing factor for urinary tract infection was hydronephrosis, which was in 18% of

cases in Belapurkar et al^[6] study. In the present, it was noted in 11.6% of cases. All other predisposing factors were less than 10%, Belapurkar^[6] study has reported posterior urethral valve obstruction in 5% compared to present study where it was 4%, Hydroureter 8.3%, calculus and pelvic ureter 1.6%, Wilm's tumour 1.6%, Neuroblastoma 1.6%.

The treatment was given for 7-10 days, following which the urine culture was done to know the response of the treatment and confirm sterile.

E. Coli:

Nitrofurantoin (5-7 mg/kg/24 hours) was most effective drug in 24 cases (75%) of urinary tract infection caused by E. coli then followed by Gentamycin (3-5 mg/kg/24 hours) in 14 cases (43.%) and Cephalexin 10 cases (31.2%), ciprofloxacin 8 cases (25%), Norfloxacin 6 cases (18.7%).

Klebsiella:

Klebsiella was effective to Nitrofurantoin (5-7 mg/kg/24 hours) in 5 cases (71%), Gentamycin (3-5 mg/kg/24 hours) in 4 cases (57%), and Cephalexin in 2 cases (28.5%) and Ciprofloxacin in 1 case (14.2%).

Pseudomonas:

Pseudomonas which was isolated in 3 cases (5%) and was effective to Gentamycin (3-5 mg/kg/24 hours) in (100%).

Proteus:

The two cases (3.3%) of urinary tract infection caused by proteus organism were effective to Gentamycin (3-5 mg/kg/24 hours) and Nitrofurantoin (5-7 mg/kg/24 hours).

In Belapurkar et al^[6] study, radiological investigation was done in 40 cases out of which 17 cases showed radiological abnormality, intravenous pyelography in 14 cases, cystourethrography in 10 cases. In the present study radiology investigation was done in 30 cases, showed radiological abnormality in 15 cases, IVP in 8 cases, cystourethrography in 2 cases, and ultrasound abnormality in 15 cases.

In Belapurkar^[6] study abnormal radiological findings were found in 14 cases (46.6%) of intravenous pyelography, in 5 cases (25.2%) of cystourethrography. In the present study, abnormal radiological findings were found in 7 cases (87.5%) of intravenous pyelography, in 1 cases (50%) cystourethrography. Radiological investigation revealed that urinary tract infection extending to kidney to very common. So it is better to treat the infection before it extends to kidney.

In Belapurkar et al^[6] study, detailed radiological findings was carried out in 40 patients, outpatients, out of which poor and/or delayed dye excretion was found in 9 cases (22.5%), both sides in six cases (15%) one side in 3 cases (7.5%), hydronephrosis

was noted 7 cases, (17.5%), Vesicoureteric reflux was noted in 5 cases (12.5%), Bilateral in 3 cases (7.5%), Unilateral in 2 cases (5%), hydroureter was noted in 4 cases (10%) and calculus in Pelvic ureter in 1 case (2.5%). In the present study detailed radiological finding was carried out in 30 patients, out of which poor and/or delayed dye excretion were noted in 7 cases (23.3%), both sides in 2 cases (6.6%), one side in 5 cases (16.6%), hydronephrosis were found in 7 cases (23.3%) Vesicoureteric reflux were noted in 1 cases (3.3%), bilateral in 1 case (3.3%), unilateral in 1 case (3.3%) hydroureter were noted in 3 cases (10%) and calculus in pelvic ureter in 1 case (3.3%).

CONCLUSION

Organism isolated in present study E. coli (53.3%) was commonest organism isolated, then followed, by Klebsiella, Pseudomonas and Proteus. The drug sensitivity pattern of the isolated organism in the present study showed Nitrofurantoin 24 cases, the most common drug, and then followed by Gentamycin 14 cases, cephalexin 10 cases, Ciprofloxacin 8 cases Norfloxacin 6 cases. In the present study abnormal radiological findings were found in 7 cases (87.5%) of intravenous pyelography, in 1 cases (50%) cystourethrography.

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