

Coexistence of Pelviureteric Junction Obstruction and Vesicoureteral Reflux

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Abstract

Introduction: The most common upper urinary tract problem in children is obstruction at the pelviureteric junction. It happens with varying degrees of seriousness. Ultrasonography and DTPA (Diethylene Triamine Penta-acetic Acid) renography are commonly used to detect it. **Objective:** To find out the coexistence of ipsilateral pelviureteric junction obstruction with vesicoureteral reflux. **Materials and Methods:** This prospective study was conducted in the Department of Paediatric Surgery, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh from January 2006 to May 2007 over a period of 1 year 5 months. Thirty-five patients with unilateral hydronephrosis due to PUJ obstruction were included in this study (age: 1 month-15 years). Results were analyzed using Statistical Package for Social Science (SPSS). **Results:** Incidence of Vesicoureteral reflux (VUR) among pelviureteric junction (PUJ) obstruction patients was 8.6%. Of them Grade-I VUR was 33.3% and grade-II VUR was 66.7%. Mean age of the patients was 4.71 ± 1.97 years and with VUR was 9.33 ± 4.93 years. Male to female ratio was 4:1. Only 5.7% mothers had regular antenatal checkup and 28.5% had irregular. Majority of the patients 28 (80%) were presented with painless loin mass, 6 (17.1%) with fever, 8 (22.9%) with loin pain and 8 (22.9%) with failure to thrive. Three patients (8.6%) showed abnormal R/M/E and all of the abnormal R/M/E samples showed positive culture. **Conclusions:** Incidence of Vesicoureteral reflux (VUR) among pelviureteric junction (PUJ) obstruction patients was 8.6%.

Keywords: Vesicoureteral reflux (VUR), Pelviureteric junction (PUJ).

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Introduction:

Obstruction at the pelviureteric junction is the commonest problem of the upper urinary tract in children. It occurs with all degrees of severity^{1,2}. It is usually detected by ultrasonography and DTPA (Diethylene Triamine Penta-acetic Acid) renography³. In most cases, a congenital intrinsic lesion is responsible for the pelviureteric junction obstruction⁴.

The overall incidence of pelviureteric junction (PUJ) obstruction approximates 1 in 1500. The ratio of male to female is 2:1 in the neonatal period, with left-sided lesions occurring in 60 percent⁵.

Vesicoureteral reflux (VUR) is the common abnormal condition of the child's lower urinary tract. VUR is a dynamic event, the retrograde flow of urine from the bladder to the upper urinary tract⁶. This anomaly is considered primary when there is no demonstrable urinary out flow obstruction⁷. Primary reflux results from mal development or delayed maturity of VUJ. PUJ may be distorted by changes in the bladder wall secondary to other pathology, called secondary reflux. In both situations the pathophysiological consequences of VUR are the same in exposing the kidneys to pressure changes and urine, normally confined to the bladder⁸.

In 2001, Yeung and colleagues⁹ have shown that low-grade reflux coexists with pelviureteric junction obstruction. When pelviureteric junction obstruction coexists with vesico ureteral reflux both operation may be necessary¹.

Voiding cystourethrography (VCUG) is the standard diagnostic investigation for VUR⁸. Nuclear cystogram can also be used as diagnostic tool. But conventional VCUG has some advantages over

nuclear cystogram– it can also diagnose other VUR problems and posterior urethral valves; it yields other details of bladder anatomy and function that the nuclear cystogram does not; it stages the severity of reflux more accurately and it detects reflux in a duplex system¹⁰.

A voiding cystourethrogram should always be obtained in case of PUJ obstruction to look for the presence or absence of vesicoureteral reflux. Severe reflux and subsequent ureteral ectasia may kink the PUJ and cause delayed drainage of the pelvis. Milder degrees of reflux may also be seen concomitant with PUJ obstruction¹¹.

Materials and Methods:

This prospective study was carried out in the Department of Paediatric Surgery, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh from January 2006 to May 2007 over a period of 1 year 5 months. Thirty-five patients with unilateral hydronephrosis due to PUJ obstruction were included in this study (age: 1 month-15 years). Patients suffering from parenchymal renal disease, bilateral hydronephrosis and patients with solitary kidney were excluded from this study. All the selected patients underwent voidingcystourethrography on the Radiology and Imaging Department of Bangabandhu Sheikh Mujib Medical University. Results were analyzed using Statistical Package for Social Science (SPSS).

Results:

Nineteen patients were <5 years (54.2%) and 45.7% were ≥ 5 years old. All of the VUR patients were ≥ 5 years old. Males were predominant than females. Male to female ratio was 4:1 (Table-I).

Table-I: Incidence of VUR in PUJ obstruction patients (N=35).

VUR	Frequency (n)	Percentage (%)
Present	3	8.6
Absent	32	91.4
Grade of VUR		
Grade-I	1	33.3
Grade-II	2	66.7

Incidence of Vesicoureteral reflux (VUR) among pelviureteric junction (PUJ) obstruction patients was 8.6%. Of them Grade-I VUR was 33.3% and grade-II VUR was 66.7%.

Table II: Demographic profile of the patient (N=35).

	Total	VUR		p-value
		Present	Absent	
Age				
<5	19 (54.2)	0 (0.0)	19 (59.4)	0.085
≥5	16 (45.7)	3 (100.0)	13 (40.6)	
Mean±SD	4.71 ± 1.97	9.33 ± 4.93	4.28 ± 1.70	<0.001
Min - max	0.08 - 15	6 - 15	0.08 - 9	
Gender				
Male	28 (80.0)	3 (100.0)	25 (78.1)	1.000
Female	7 (20.0)	0 (0.0)	7 (21.9)	

Left sided hydronephrosis was 66.7% and right sided 33.3% among VUR patients (Table-III).

Table -III: Side of hydronephrosis of the patient (N=35).

Side of hydronephrosis	Total	VUR		p-value
		Present	Absent	
Left	25 (71.4)	2 (66.7)	23 (71.9)	1.000
Right	10 (28.6)	1 (33.3)	9 (28.1)	

Ten mothers (28.5%) had history of irregular antenatal, 23 mothers (65.8%) had no antenatal checkup and only two mothers had regular antenatal checkup (5.7%) (Table-IV).

Table -IV: Antenatal checkup of the mother of the patient (N =35).

	Frequency (n)	Percentage (%)
No checkup	23	65.8
Irregular	10	28.5
Regular	2	5.7

Majority of the patients 28 (80%) were presented with painless loin mass, 6 (17.1%) with fever, 8 (22.9%) with loin pain and 8 (22.9%) with failure to thrive (Table-V).

Table -V: Clinical presentation of the patient (N =35).

Clinical presentation	Frequency (n)	Percentage (%)
Painless loin mass	28	80.0
Loin pain	8	22.9
Failure to thrive	8	22.9
Fever	6	17.1

Palpable kidney was the commonest physical finding (80.0%) followed by pallor (17.1%) and only one patient (2.9%) was associated with distal penile hypospadias (Table-VI).

Table-VI: Physical finding of study patients (n=35).

Physical findings	Frequency (n)	Percentage (%)
Palpable kidney	28	80.0
Pallor	6	17.1
Associate anomaly	1	2.9

Three patients (8.6%) showed abnormal R/M/E and all of the abnormal R/M/E samples showed positive culture. Rests of the 32 patients (91.4%) showed normal R/M/E and negative C/S (Table-VII).

Table-VII: Microscopic examination of urine and culture sensitivity (n=35).

	Frequency (n)	Percentage (%)
Urine R/M/E		
Normal	32	91.4
Abnormal	3	8.6
Urine C/S		
Negative	32	91.4
Positive	3	8.6

Discussion:

PUJ obstruction is the commonest cause of hydronephrosis in paediatric. It is usually diagnosed by ultrasonography and renal scan³.

Nineteen study subjects were <5 years (54.2%) and 45.7% were ≥ 5 years old. All of the VUR patients were ≥ 5 years old. This finding is consistent with the findings of others^{12,13}. Males were predominant than females. Male to female ratio was 4:1. In one series male to female ratio was 4.5:1¹².

Majority of the mothers (65.8%) of this study had no antenatal checkup at all, 10 (28.5%) had irregular checkup and only two mothers (5.7%) had regular antenatal checkup.

Majority of the patients of this study (80.0%) presented with a painless loin mass. This finding is not consistent with the findings of western countries where most of the cases were diagnosed by antenatal USG¹⁰. Here patients also had fever (17.1%), loin pain (22.9%) and failure to thrive (22.9%). This observation also matched with that of Rodriguez and his co-workers¹⁴.

In this study, 25 (71.4%) cases were of left sided and 10 (28.6%) cases were of right sided pelviureteric junction obstruction. It may indicate that congenital PUJ obstruction predominantly affects left sided kidney. This finding is consistent with other studies where 2/3rd of cases were left sided^{3,10,14}. In the present study out of 3 patient 2 cases were of left-sided VUR and 1 case were of right sided. It may indicate that VUR with PUJ obstruction predominantly occur left-sided kidney. This finding is consistent with other studies where 2/3rd of cases were left sided¹⁰.

Among them, 3 showed features of UTI (pus cell > 10/HPF in R/M/E of urine) and their culture revealed, growth of E.coli (CFU>1x10⁵). In rest of the 32 cases urinalysis reports were normal. Urine became sterile after using a course of sensitive antibiotic in all the infected case.

Incidence of Vesicoureteral reflux (VUR) among pelviureteric junction (PUJ) obstruction patients was 8.6%. Of them Grade-I VUR was 33.3% and grade-II VUR was 66.7%. This result indicates that PUJ obstruction co-exist with VUR. In one series the co-existence was 14.0%¹⁵ and another series that was 8.5%¹⁶⁻¹⁹.

This study demonstrates that Hydronephrosis due to pelviureteric junction obstruction coexist with VUR so voiding cystourethrography is routinely recommended to detect vesico ureteral reflux in children with uretero pelvic junction obstruction²⁰⁻²².

Conclusion:

From this study, it can be concluded that there is coexistence of pelviureteric junction obstruction with low grade ipsilateral VUR. And a routine voiding cystourethrography can be recommended to detect VUR in children with uretero pelvic junction obstruction.

Conflict of Interest: None.

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