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Posterior Urethral Valves: Experience from a tertiary teaching hospital in Eastern India

Shashanka Dhanuka[1], Tapan Kumar Mandal[2] , Maharaj Mondal[3], Ankit Kayal[4], Bibhas Chandra Mukhopadhyay[5]

[1](Department of Urology, NRS Medical College & Hospital, Kolkata, India)
[2](Department of Urology, NRS Medical College & Hospital, Kolkata, India)
[3](Department of Urology, NRS Medical College & Hospital, Kolkata, India)
[4](Department of Urology, NRS Medical College & Hospital, Kolkata, India)
[5](Department of Urology, NRS Medical College & Hospital, Kolkata, India)

Abstract :
Context: The most common cause of bladder outlet obstruction in male infants is posterior urethral valves (PUV) which causes functional impairment of kidney and bladder.
Aims: This study was planned to analyze various clinical presentations, complications, surgical management and outcome of PUV.
Methods and Material: 30 patients treated for PUV in the Department of Urology, Nil Ratan Sircar Medical College and Hospital, Kolkata from January-2015 to November-2017, have been retrospectively evaluated.
Results: A total of 30 patients with mean age at diagnosis of 6.7 years were included in this study. The most common presenting symptom was dribbling of urine in 93.33% while 83.3% had a palpable bladder. Abdominal ultrasonogram detected bilateral hydronephrosis in 66.6% patients and thickened bladder wall in 56.66%. VCUG done in all patients revealed a dilated posterior urethra. There was associated vesico-ureteral reflux in 33% patients. Urinary tract infection was detected in 66.6% patients. Mean serum creatinine at presentation was 1.81mg/dl (range 0.6-6.2 mg/dl). All patients underwent endoscopic valve ablation and were followed up. All patients had significantly improved stream and 15 out of 20 culture-positive patients became culture-negative at 1 month follow up. Mean serum creatinine at 3 months follow-up was 1.38mg/dl (range 0.6-3.2mg/dl).
Conclusions: Urinary drainage by feeding tube in early infancy, followed by valve ablation is the best treatment in PUV. VCUG is the gold-standard imaging modality for diagnosis. Factors like late presentation and renal dysplasia have their role in final outcome. Parents need to be counselled regarding early presentation and close follow-up.

Keywords - *posterior urethral valves, presentation, endoscopic ablation, outcome, children, India*

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I. Introduction

Posterior urethral valves (PUV) is a congenital mucosal membrane in the prostatic urethra[1].It is the most common cause of bladder outlet obstruction in the male child and is associated with complications including urinary tract infection (UTI), chronic renal failure (CRF), urinary incontinence and even death, and the incidence is 1 in 5000 to 1 in 8000 live births[2,3]. Embryologically it is believed to arise due to an abnormal insertion of mesonephric duct into the fetal cloaca.

The first description of PUV was in 1515, later recognized by Morgagni in 1769, then confirmed by Langenbeck in 1802. Hugh Hampton Young described the first endoscopic diagnosis of posterior urethral valves in 1919.

PUVs are classified in three types:

Valves representing folds extending inferiorly from the verumontanum to the membranous urethra (Type 1) are most common. Valves arising as leaflets radiating from the verumontanum proximally to the bladder neck (Type 2) are usually non-obstructing and valves described as concentric diaphragms within the prostatic urethra, either above or below the verumontanum (Type3) usually have a small opening in the center and occur in 5-10% of cases.

Clinical presentation includes poor stream and dribbling of urine. Some patients present with complications such as repeated urinary tract infections, impaired renal function, anemia and failure to thrive [4]. Diagnosis may be suspected in an antenatal ultrasound scan by the presence of bilateral hydronephrosis in the

fetus and oligohydramnios. Postnatally, diagnosis is confirmed by the presence of posterior urethral dilatation and bladder trabeculation on voiding cystourethrogram.

Posterior urethral valves (PUVs) have a variable effect on the anatomy and physiology of the bladder and the upper urinary tract. Presence of renal dysplasia and timing of intervention play an important role in the prognosis of PUV patients.

Urinary drainage by feeding tube or catheterisation in early days of infancy, followed by valve ablation is the best treatment in PUV. Surgical management of urethral obstruction is usually carried out by endoscopic ablation of valves[5]. Long-term follow-up of children with PUV is mandatory for assessment of renal and bladder function and detection and management of complications [6].

II. Subjects and Methods:

All patients with a diagnosis of PUV who presented to the Department of Urology, NRS Medical College & Hospital, Kolkata over the last 2 years and 11 months (January 2015- November 2017) were retrospectively studied. Their demographic data, clinical features, radiological and laboratory reports, management and follow up investigations were retrieved from the patients and the hospital records and analyzed.

III. Results:

A total of 30 patients with a diagnosis of PUV were managed during the period. Their ages at presentation ranged from 8 months to 16 years. Only five (16.6%) patients presented before the age of 1 year and the mean age at presentation in our study was 6.7 years. The most common presenting complaint was poor stream or dribbling of urine found in 28 (93.33%) patients. The most common clinical feature was palpable bladder which was noted in 25 (83.3%) patients (Table 1).

Abdominal ultrasonogram was done in all patients and it detected bilateral hydronephrosis in 20 (66.6%) patients (Table 2). There was associated bilateral hydroureter in 15 (50%) patients and thickened bladder wall in 17 (56.66%) patients. Voiding cystourethrogram (VCUG) was done in all the patients and it revealed a dilated posterior urethra in all the patients, with associated vesico-ureteral reflux in 10 (33%) patients. Urine culture was positive for infection in 20 (66.6%) patients, with the most common organism being *Escherichia coli* (Table 2). Serum creatinine at presentation ranged from 0.6 mg/dl to 6.2 mg/dl with a mean of 1.81 mg/dl.

On admission, urethral catheterisation was done in all patients using a Foley's catheter or an infant feeding tube. All 30 patients underwent endoscopic valve ablation with the help of bugbee diathermy electrode. All 30 patients had Type I PUV while 4 (13.33%) had associated Type II PUVs also. Catheter was removed about 48 hours after surgery and improvement in urinary stream was noted in all the patients. There were no significant immediate postoperative complications.

Patients were followed up at 1 month, 3 months and later after surgery. 15 out of the 20 patients who were initially urine culture positive had negative urine culture at 1 month follow up. All patients had significant improvement in stream of urine. Serum creatinine at 3 months follow up ranged from 0.6 mg/dl to 3.2 mg/dl with a mean of 1.38 mg/dl. Abdominal ultrasonogram showed persistent bilateral hydronephrosis in 12 patients upto 1 year after valve ablation. There were no deaths in our study.

Table 1: Clinical Features

SYMPTOMS/ SIGNS	NUMBER OF PATIENTS	PERCENTAGE
Poor flow/ dribbling of urine	28	93.33
Fever	6	20
Palpable bladder	25	83.33
Pallor	8	26.6

Table 2: Complications

CLINICAL FEATURES	NUMBER OF PATIENTS	PERCENTAGE
Urinary tract infection	20	66.6
Raised Creatinine (>1.2mg/dl)	14	46.6
Hydronephrosis	20	66.6

IV. Discussion:

Posterior urethral valves are the most common cause of bladder outlet obstruction in male children and a significant cause of renal insufficiency and associated complications. This study was designed to evaluate the presentation, clinical features, management and outcome of the treatment in PUV patients in our department.

We had a mean age of presentation of 6.7 years, suggesting that in our region patients with this condition present late. Only 5 patients (16.6%) out of 30 presented during the 1st year of life. This might be due to lack of awareness associated with poverty and illiteracy, inadequate use of antenatal ultrasound.

PUV can be detected on antenatal ultrasound showing the presence of hydronephrosis, proximal urethral dilatation and associated oligohydramnios[1,2]. In utero interventions like vesicocentesis and vesicoamniotic shunts have been described but their long term benefits are still debatable[7].

The most common presenting complaint was poor flow or dribbling of urine which is similar to many other studies in literature[3,4,8]. Patients with severe obstructive features or complications present early. There is a need to impart awareness among the parents to seek medical attention at an earlier time to avoid delay in intervention. Urinary tract infection was detected in 20 (66.6%) patients. Most common organism isolated was *Escherichia coli*, found in 15 patients. Abdominal ultrasound detected bilateral hydronephrosis in 20 (66.6%) and bilateral hydroureter in 15 (50%) patients. Serum Creatinine before intervention ranged between 0.6 mg/dl and 6.2 mg/dl with a mean of 1.81 mg/dl. This could be partly due to renal dysplasia that developed in utero and partly due to obstructive uropathy that developed due to delay in intervention.

Voiding cystourethrogram continues to be the definitive and gold standard radiologic study to diagnose posterior urethral valves[9], as was the case in our study where all the patients had dilated posterior urethra and associated bladder changes.

Establishment of urinary drainage by means of catheterization with a Foley's catheter or an infant feeding tube was done in all patients on admission. This helped in relieving the obstruction before surgery.

Endoscopic valve ablation is the gold standard in the management of PUV and was done in all our patients using bugbee diathermy electrode[10]. There was relief in obstruction and improvement in flow in all the patients without any postoperative complications. Complications such as acute urinary retention, urethral bleeding and urethral stricture have been reported in literature but none were noted in our study during the period of follow up.

Most of the patients were irregular in follow up probably due to the presence of satisfactory urinary stream, absence of complications, long distance from the hospital and financial concerns. Regular follow up is very essential for proper management of PUV and its complications.

V. Conclusion:

The presentation of PUV patients in our region is late. Better availability and utilisation of antenatal ultrasound along with parent education can lead to earlier presentation and earlier detection. Endoscopic valve ablation remains the gold standard of management as in our case it resulted in satisfactory urine flow post operatively. But there is a need to counsel and educate the parents regarding the importance of close follow up as PUV associated renal dysplasia continues to be a challenge that we are yet to overcome.

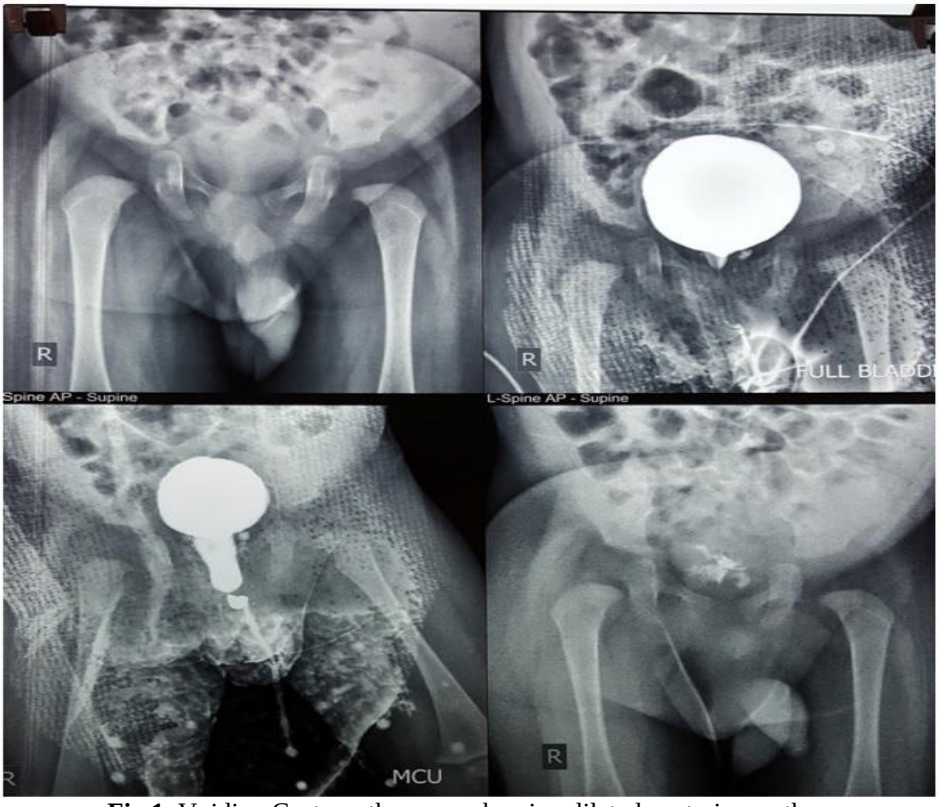

Fig 1. Voiding Cystourethrogram showing dilated posterior urethra

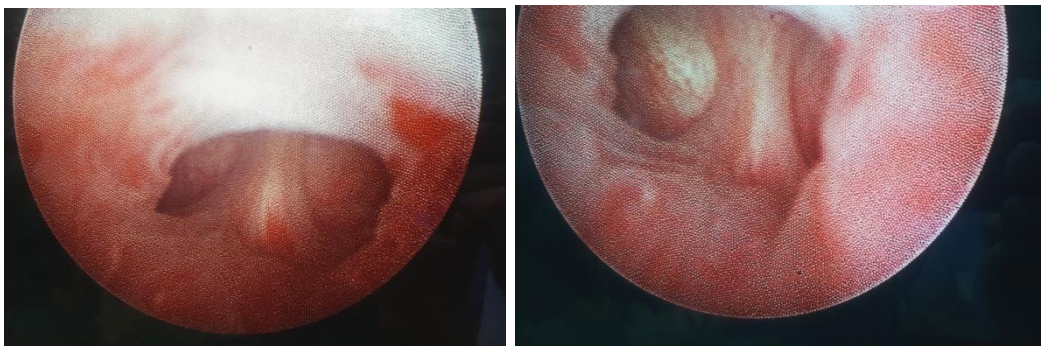

Fig 2. Endoscopic view of Posterior Urethral Valve

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