

# POSTERIOR URETHRAL VALVES (PUV): EXPERIENCE OF FOLLOW UP OVER 7 YEARS

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## Abstract:

**Objectives:** Posterior urethral valve is one of the major common congenital obstructive urethral lesions in male children. Endoscopic fulguration with observation is the treatment of choice for posterior urethral valves (PUV). This prospective study was carried out to assess the outcome of endoscopic fulguration of posterior urethral valves based upon the clinical, radiological and laboratory findings.

**Methods :** The study started in Bangabandhu Sheikh Mujib Medical University Hospital in October 2004 on 50 male children with posterior urethral valves who were treated with endoscopic fulguration and came for routine follow up. Diagnosis was established by voiding cystourethrogram (VCUG) and confirmed by urethrocystoscopic findings.. The patients came for follow up after valve ablation at three months interval up to 1 year, and at six months interval for seven years.

**Results:** Mean age of the patients was 2 years ranging from 1 to 12 years old. At diagnosis mean serum creatinine level  $\pm$  SD was  $90.4 \pm 44.8 \mu\text{mol/litre}$  and it decreased to  $58.3 \pm 11.4 \mu\text{mol/litre}$  at the end of 7 years follow up. Hydronephrotic changes decreased from 84% to 2%. Proteinuria decreased from 38% to 4%. Urinary tract infections decreased from 58% to 8% at the end of last follow up.

**Conclusion:** In this study patients improved dramatically following fulguration of posterior urethral valves. But these patients need regular follow up because some of these patients may develop ESRD in the long run.

**Key words:** Posterior urethral valves, Fulguration, Follow up.

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## Introduction:

Posterior urethral valve is the most common cause of bladder outlet obstruction in male children.<sup>1-3</sup> These valves are mucosal folds which may cause varying degree of obstruction when the patients attempt to void. It is associated with poor urinary stream, incomplete bladder emptying, distended bladder, dilated posterior urethra.<sup>4</sup> The incidence of PUV is estimated to be between 1 in 3000 to 1 in 8000 male infants.<sup>5</sup> Lower urinary tract obstruction secondary to PUV affects the entire urinary tract and it leads into chronic renal failure and end stage renal disease in children.<sup>6</sup> The

management of posterior urethral valves has improved significantly in the last decades as a result of earlier diagnosis by ultrasound, improved total patient care, development in surgical techniques.<sup>7</sup> The mortality rate associated with PUV has declined from 50% in the past few decades to less than 5%.<sup>8</sup> Several treatment options are available in the surgical treatment of children with posterior urethral valves :Primary valve ablation and observation, temporary vesicostomy and delayed valve ablation, high urinary diversion via high loop ureterostomy or cutaneous pyelostomy. Due to the development of modern paediatric endoscopes now a days valve ablation can be easily performed by endoscopes. Vesicostomy is reserved for patients in whom valve ablation is technically not possible. However, patients with severe upper tract dilatation , vesicoureteral

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reflux and /or renal insufficiency may require treatment with cutaneous vesicostomy or upper tract diversion to salvage renal function. Early diagnosis and appropriate therapy may arrest progressive damage and facilitate recovery. The patients need long term follow up. This prospective study was carried out on fifty male children with posterior urethral valves who were treated with urethroscoposcopic fulguration and came for routine follow up.

#### Materials and Methods:

The study started in Bangabandhu Sheikh Mujib Medical University Hospital in October 2004. Diagnosis of PUV was established by voiding cystourethrogram (VCUG) which showed elongated and dilated posterior urethra. Urethroscoposcopic findings confirm the diagnosis by visual identification and supravescical compression shows that the valves cause obstruction. Initially all patients were managed with urethral catheterization for drainage of urinary bladder. Endoscopic fulguration was performed by Bugbee's electrode or a pediatric resectoscope with hook in retrograde fashion. Cutaneous vesicostomy was performed where valve ablation was not possible and in these cases valve ablation was deferred for 1 to 2 years of age. The vesicostomy was closed at the same time with valve ablation. Catheter was withdrawn after 3-4 days and the normal flow of urine was checked. Patient was discharged with advice to attend OPD for routine follow up at three months interval for one year and then for at six months interval maximum up to 7 years from October 2004 to February 2012 with urine routine and microscopic examination, urine culture and sensitivity test, serum creatinine level, USG OF KUB including PVR. After collection of data meticulous checking and rechecking were done. Measures of deviation (mean, standard deviation) and test of significance (Chi square, repeated measure analysis of variance-ANOVA) was

performed to detect statistical significance.

#### Results

Fifty male children with posterior urethral valves were treated with endoscopic fulguration. Mean age of the patients was 2 years ranging from 1 to 12 years old. More than half of the patients were 2 years (52%) followed by 3 years (22%), 1 year (16%) and 10% were 4 years and above.

Presentation: Poor urinary stream was the most common presenting feature (70%) followed by palpable bladder (64%), UTI (58%), dribbling of urine (50%), straining (36%), frequency of micturition (18%), failure to thrive (10%), vomiting, flank mass (4%). Ninety six percent patients became normal at the end of seven years follow up.

Multiple response, Chi-square test ( $P < 0.05$ ) S=significant

Serum creatinine level: Renal function was assessed by measuring serum creatinine concentration. Thirty four patients had raised serum creatinine level at the time of presentation. At diagnosis mean serum creatinine level  $\pm$  SD was  $90.4 \pm 44.8$   $\mu\text{mol/litre}$  and it decreased to  $58.3 \pm 11.4$   $\mu\text{mol/litre}$  at the end of over 7 years follow up. At the end of two years we found two patients had developed chronic kidney diseases. One patient had mean serum creatinine level 5.2mg/dl and another one had mean serum creatinine level 3.1 mg/dl during this long term follow up period.

Ultrasonographic hydronephrotic changes: It was evident that before fulguration 20% had grade I, 24% grade II, 28% grade III, and 12% grade IV hydronephrosis respectively. Following fulguration it decreased significantly ( $p < .05$ ) Hydronephrotic changes decreased from 84% to 2% at the end of seven years follow up (Table II). Two patients who had developed CKD still had hydroureteronephrosis in ultrasonographic finding.

**Table I**  
*Percentage distribution of patients by follow up of urinary symptoms.*

Complaints	Before fulguration	3months	6 months	1 year	3 years	5 years	7 years	P value
Poor stream	70.0	0	0	0	0	4.0	0.0	
Dribbling	50.0	22.0	14.0	8.0	2.0	4.0	2.0	0.0001 <sup>s</sup>
straining	36.0	0.0	0	0	0	4.0	2.0	
Frequency	18.0	18.0	8.0	6.0	2.0	4.0	2.0	.025 <sup>s</sup>
Normal	00.0	60.0	78.0	86.0	96.0	96.0	96.0	

**Table-II**  
Percentage distribution of patients by follow up of ultrasonographic findings.

Ultrasonographic hydronephrotic grading	Before fulguration	6 months	12months	At 3 years follow up	At 7 years follow up
NIL	16.0	52.0	62.0	96.0	96.0
GRADE I	20.0	22.0	22.0	2.0	0
GRADE II	24.0	14.0	12.0	2.0	2.0
GRADE III	28.0	8.0	4.0	0.0	2.0
GRAD EIV	12.0	4.0	0.0	0.0	0

Proteinuria: Qualitative urine analysis of protein was done in all cases. Before fulguration 38% of patients had albuminuria. Of these 26.0% had mild (+), 10.0% had moderate (++) and 2.0% had severe proteinuria (+++). Proteinuria decreased from 38% to 4% at the seven years follow up period.

Urinary tract infections: Before fulguration UTI was present in 58% cases. Urine culture showed growth of different organisms ( $>10^5$  colonies /ml) and *Escherichia coli* was the most common organism followed by *Pseudomonas*, *Staphylococcus*, *Streptococcus*, and *Proteus*. Urinary tract infections decreased from 58% to 8 % at the end of final follow up.

#### Discussion:

In this study the age distribution of the patient shows that incidence is high in early childhood and late presentation is rare. This age distribution is similar to other studies in home and abroad. This study is a prospective follow up study over seven years from October 2004 to February 2012 . The follow up period was 1 to 7 years. Mean follow up period was 4.29 years. Only 25 patients could be followed up for seven years. Twenty eight patients attended for follow up for five years. Thirty one and fifteen patients could be followed up for three and two years respectively. Four patients did not come for follow up after one year. Follow up of urinary symptoms shows that following fulguration 60% patients became normal and at the end of 7 years follow up it increased to 96%(Table-I). At diagnosis mean serum creatinine level  $\pm$  SD was  $90.4 \pm 44.8$   $\mu\text{mol/litre}$  and it decreased to  $58.3 \pm 11.4$   $\mu\text{mol/litre}$  at the end of over 7 years follow up. This correlates with the study done by Denes et al<sup>9</sup>. Two patients developed chronic kidney disease. These patients had bilateral hydronephrosis and bilateral vesicoureteral reflux. This is similar with the study done by Merguerian et al<sup>10</sup>. Ultrasonographic changes during the follow up

period of this study correlate with the study done by Farhat et al<sup>11</sup>. Proteinuria decreased from 38% to 4% at the seven years follow up period. This improvement is similar with the study done by Warshaw et al<sup>12</sup>. Urinary tract infections decreased from 58% to 8 % during follow up period. Cystoscopic fulguration was done in 5 patients for second time. Sometimes valve ablation may require third time. In one case unilateral nephroureterectomy was done for nonfunctioning refluxing kidney and in another case only unilateral nephrectomy was done for nonfunctioning kidney. Anterreflux surgery was done in one patient.

#### Conclusion:

Endoscopic fulguration of PUV improves the anatomical and functional status of the urinary tract. But these patients need regular follow up. Regular follow up is necessary to detect and to treat factors that are detrimental to renal function like reflux, overactive bladder, infections etc. Further follow up studies of longer duration are needed to determine the ultimate outcome of these patients because some of these patients develop ESRD in the long run. So the patients with posterior urethral valves mandate long term urological and nephrological follow up.<sup>13,14</sup>

**Conflict of Interest:** None declared

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