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The Outcome of Posterior Urethral Valves among Children in Tertiary Care Hospital–A Prospective Study

Dr. Ipsita Biswas[1*], Chakraborty A K[2]

[1]Associate Professor, Department of Urology, Bangladesh Shishu Hospital and Institute, Dhaka, Bangladesh
[2]Associate Professor, Department of Pediatric Surgery, Shaheed Suhrawardy Medical College, Dhaka, Bangladesh

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***Corresponding author:** Dr. Ipsita Biswas
Associate Professor, Department of Urology, Bangladesh Shishu Hospital and Institute, Dhaka, Bangladesh

Abstract **Original Research Article**

Introduction: Posterior Urethral Valve (PUV) is the most common cause of lower urinary tract obstruction in male children. This obstruction in posterior urethra could lead to severe dilatation of upper urinary tract and functional impairment of one or both kidney. The presentations are not always same for all patients. Early diagnosis and appropriate treatment may reduce the progressive damage and helps in recovery. ***Aim of the Study:*** The aim of this study was to find out the presentation and to assess the short term functional outcome after fulgaration of the patients with PUV. ***Methods:*** This prospective study was conducted at Pediatric urology department, Bangladesh Shishu Hospital and Institute, Dhaka. We included fifty patients with Posterior urethral valve, who were treated at the pediatric urology department from Jan, 2019 to Nov, 2021. ***Result:*** Total 50 patients enrolled in the study. In our study we found 50% of our patients were aged between 1 month to 1 year, followed by 36% were more than 1 years old and 14% were less than 1 month old. 76% patients were presented with dribbling of urine. 40%,26%,10% and 6% patients had UTI, poor stream,, retention of urine and palpable bladder respectively. 45 patients had bilateral hydronephrosis (HDN) at presentation and only 5 had unilateral hydronephrosis in USG. At follow up MCU, 14% patients had unilateral VUR and 10% patients had bilateral VUR. Mean postoperative serum creatinine was 0.585 mg/dl. We found residual Valve in 11(22%) patients during follow up who required repeat Valve ablation. ***Conclusion:*** In our study, we found that Cystoscopic valve ablation and follow up is the treatment of choice for PUV patients which may arrest the progressive damage of renal function and facilitate the improvement. Further multicenter study and long term follow up is necessary for understanding the ultimate outcome.

Keywords: PUV, Cystoscopic valve fulgartion, Functional outcome.

INTRODUCTION

Posterior Urethral Valve (PUV) is the most common cause of lower urinary tract obstruction in male children with an incidence of 1 in 8000 male births [1]. This obstruction in posterior urethra could lead to severe dilatation of upper urinary tract and functional impairment of one or both kidney and damage to the smooth muscle function of the bladder [2]. Early diagnosis and appropriate treatment may reduce the progressive damage and helps in recovery [3].

The disease has a wide variety of presentation ranging from life threatening renal failure in newborn to minor voiding dysfunctions in older children [3]. Treatment of PUV is transurethral resection of valve with electrocautery (fulgaration). The changes present in kidney and bladder in these patients may persist even after successful valve ablation which are the important factors for the morbidity, mortality and renal insufficiency [4].

About 25%-30% cases of PUV develop renal failure before adolescence [5]. The purpose of this study is to find out the presentation and to assess the short term functional outcome of the patients with PUV at our centre.

MATERIALS AND METHODS

This prospective study was conducted at Pediatric urology department, Bangladesh Shishu Hospital and Institute, Dhaka. We included the patients with suspected Posterior urethral valve, who attended the pediatric urology department from Jan 2019 to Nov 2021.

Preoperative evaluation included history, clinical examination, Renal Function assessment with serum creatinine, Serum electrolytes and urine culture and sensitivity. Initial renal ultrasonography was done routinely.

Suspected cases of PUV after admission, catheter drainage of the bladder was achieved by passing a transurethral catheter or feeding tube (size 5-7 fr, according to age).

Voiding cystourethrogram was performed when patients became clinically stable.

After stabilization, patients were taken for cystoscopy and primary valve ablation.

Adequacy of ablation was checked by applying suprapubic pressure on the bladder filled with saline to observe the caliber and force of urinary stream. After valve ablation, the urethral catheter was left in situ for 3 days to allow edema to subside. The patients were observed for voiding after the removal of the urethral catheter and at the follow-up visit at the outpatient clinic. Patients were discharged with antibiotic prophylaxis.

The follow up period was at least 1year. During follow up visit Physical examination, Urine routine and culture sensitivity, serum creatinine and USG of KUB were done to assess the progress of the disease in every 3 months in 1st year and 6 monthly thereafter. MCU was done 6 months after operation .USG of KUB assesses the size of the kidney, corticomedullary differentiation, the dilatation of the ureter and post voidal residual urine. The outcome was measured by good urinary stream after valve ablation, and proper bladder emptying. Voiding dysfunction and recurrent UTI and other complications are also assessed. Renal outcome was defined as favorable when serum creatinine was normal (<1.2 mg/dl) and impaired when serum creatinine was ≥1.2 mg/dl (106 µmol/L).

All data were recorded in preformed data collection sheet and qualitative data was expressed as frequency distribution and percentage. The statistical analysis was performed by using SPSS (Statistical Package for Social science). In this study 95% confidence limit was taken and Probability value <0.05% was considered as level of significance.

RESULTS

First 50 children with PUV were treated during the study period were enrolled for analysis. The median age of the patients was 180 days, ranges from 6 days to 7 years .There were 7 (14%) neonates, 25 (50%) infants and 18 (36%) patients were more than 1year of age.

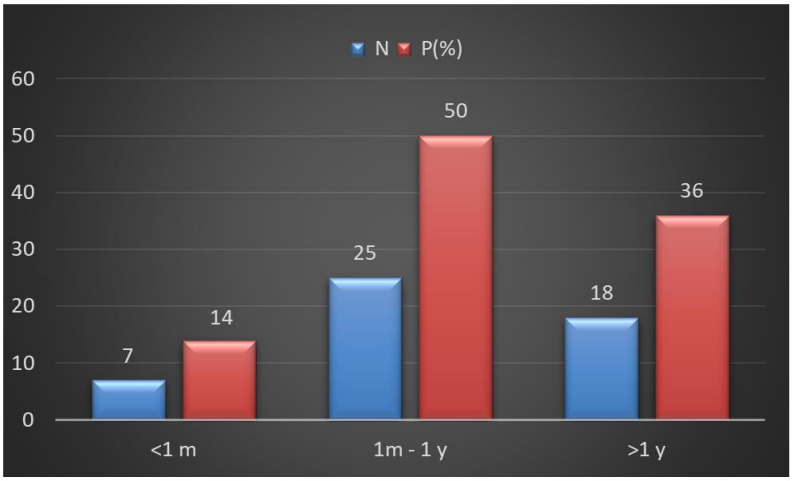

Figure 1: Age distribution among our study subjects

50% of our patients were aged between 1 month to 1 year, followed by 36% were more than 1 years old and 14% were less than 1 month old (figure 1).

Table 1: Distribution of our study subjects based on clinical features

Clinical Feature	N	(%)
Dribling	38	76
Poor stream	13	26
Palpable bladder	3	6
Retension of urine	5	10
UTI	20	40

Table 1 summarized the presentation of the patients. 76% were presented with dribbling of urine and 40% had UTI.

Table 2: Distribution of our study subjects based on Pre & post-operative outcome

Variables	Pre-operative		Post-operative		P-value
	N	(%)	N	(%)	
USG					
Bilateral HDN	45	90	29	58	0.012
Unilateral HDN	5	10	12	24	
No HDN	0	0	9	18	
MCU					
Bilateral VUR	13	26	5	10	0.021
Unilateral VUR	8	16	7	14	
No VUR	29	58	9	18	
S. creatinine					
<1.2mg/dl	45	90	48	96	0.124
>1.2mg/dl	5	10	2	4	
Mean (mg/dl)	0.696		0.585		

Almost all patients (45) had bilateral hydronephrosis (HDN) at presentation and only 5 patients had unilateral hydronephrosis. During follow-up USG, 29 patients had bilateral HDN, 12 patients had unilateral HDN and 9 patients had no HDN. MCU was done in all patients which confirmed the diagnosis. At presentation VUR was present in 21 patients, among them unilateral VUR was in 8 patients. Bilateral VUR was found in 13 patients. Follow up period ranges from 1yr to 2yrs6months (mean1yr 9months). At follow up MCU, VUR was present in 12 patients .Among them 14% patients had unilateral VUR and 10% patients had bilateral VUR. Preoperative mean serum creatinine was 0.696mg/dl. Post operative mean serum creatinine was 0.585 mg/dl .

Table 3: Distribution of our study respondents based on remarks

Remarks	N	(%)
Residual Valve	11	22

We found residual Valve in 11(22%) patients during follow up who required repeat Valve ablation.

DISCUSSION

PUV is one of the most serious congenital urinary tract anomalies that can lead to a deleterious effect on future renal and bladder function [5, 6]. In recent decades the PUV prognosis has improved considerably and mortality decreased from 50% to less than 5% in the last 30 to 40 years [7]. Despite continuous improvement in the survival of these patients as many as 20% to 60% may have significant renal impairment (RI) at long-term follow-up.

In the current study we found 50% of our patients were between 1 month to 1 year, followed by 36% were more than 1 year old, 22% were below 1 month. Nasir AA *et al.*, [5] found that about a quarter of the patients presented within 1 month of life and another third presented between 1 month to 1 year. Several authors have discussed that late presentation is common among the patients of PUV in developing countries. The cause is not only negligence but also partly due to continuous use of diapers not allowing parents to notice the symptoms of PUV early [5, 8, 9] Analysis of the presentation of the children of PUV we found that the common symptoms was dribbling (76%), and UTI (40%), poor stream, retention of urine and palpable bladder were 26%, 10%, and 6% respectively. Karim MR *et al.*, [3] reported poor stream (64%), Dribbling (52%), and UTI (52%).

In this study, 10% of our patients had renal impairment (serum cretinine more than 1.2 mg/dl) at presentation. But Mirshemirani *et al.*, [6] found that among 98 patients of PUV 46% had renal failure. The incidence of renal failure is 71% at presentation was reported in other studies [10, 11] in Nigeria and in India. The causes of this renal injury in PUV patients are renal dysplasia, persistent high pressure and UTI. For this reason adequate medical stabilization and relief of bladder obstruction are important in the initial management of PUV. In our study renal impairment was found in 2 patients in follow up. So we observed renal functional improvement in 60% (3 out of 5) patient which is comparable with other study [5].

The grade of hydronephrosis was not consistent. Therefore excluded for analysis.

In our study about 42% children had VUR at diagnosis. Among them bilateral and unilateral VUR was in 26% and 16% respectively. Most of the VUR were high grade. In a study by Roth *et al.*, [12] unilateral VUR was present in 30% and bilateral VUR in 50%. Ansari *el al.*, 2010 [13], reported that high grade reflux were strongly associated with high incidence of CKD and End stage renal disease (ESRD). This VUR is usually occurs due to increased intravesical pressure and incompetence of vesico

ureteric junction [5]. High grade reflux is mostly associated with renal dysplasia and ultimately causing poor renal outcome.

Cystoscopic valve ablation has been the gold standard in the management of PUV .But cystoscopic facilities are not readily available in all hospital in developing countries like Bangladesh. In our study improvement of urinary stream was followed up in all patients after valve ablation. We found residual valve in 11 patients whose urinary stream were not improved satisfactorily and required a repeat valve ablation. Octar T et al [14] found residual valve in 9.9% cases.

Long term outcome of PUV is important as 24 to 45% of them developed renal failure in childhood or adolescence [1]. In our study impaired renal function was recorded in 2 patients after follow up of one year. Nasir *et al.,* 2011 [5] found impaired renal function in 13.8% of patients after a median follow up of 5 months.

CONCLUSION

Cystoscopic valve ablation and follow up is the treatment of choice for PUV patients which may arrest the progressive damage of renal function and facilitate the improvement. Further multicenter study and long term follow up is necessary for understanding the disease progressions.

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