

Cutaneous vesicostomy in infants and children with posterior urethral valve: experience from a tertiary teaching hospital in eastern india

Dipankar Bera, Tapan Kumar Mandal, Vishal Kashyap, Bishwarup Guha,
Gaurav Tulsyan, Shashanka Dhanuka

Department of Urology, NRS Medical College & Hospital, Kolkata, India

Abstract

Objective: To review the role of cutaneous vesicostomy in the management of posterior urethral valve (PUV), in infants and children.

Methods: A retrospective review of 25 patients with PUV who had vesicostomy as the initial management. Demographics and clinical information were reviewed.

Results: Age at presentation was 29 days to 13 years (mean 2.8 years). The mode of presentation was poor urinary stream in 15 patients (60%), urinary retention in 4 (16%), renal failure in 5 (20%) and 1 patient (4%) presented with fever (due to urinary tract infection). The most common clinical feature was palpable bladder. Abdominal ultrasonogram showed hydronephrosis in all patients. Voiding cystourethrogram (VCUG) was done showing dilated posterior urethra and associated vesico-ureteral reflux (VUR) in all patients. Complications following vesicostomy were stomal stenosis in 1 patient (4%), bladder mucosal prolapsed 1 (4%) and diaper rash around stoma in 12 patients (48%).

Following vesicostomy 10 patients had undergone valve fulguration and vesicostomy closure at a median age of 4 years (age range 2-8 years). They are doing well with normal renal ultrasonographic findings and normal serum urea, creatinine and electrolytes. 15 patients are still awaiting valve fulguration but had normal creatinine, electrolytes and normal upper tract on follow up.

Conclusion: Cutaneous vesicostomy is a useful temporising mode of urinary diversion in infants and children with PUV when facilities for endoscopic valve ablation are not readily available, patient presenting with uncontrolled sepsis and renal failure and for children presenting late.

Date of Submission: 20-03-2021

Date of Acceptance: 04-04-2021

I. Introduction

Posterior urethral valves (PUVs) are the most common cause of bladder outlet obstruction in male infants. The incidence is 1:5000 to 1:8000 live births [1]. Delay in the treatment might lead to end stage renal failure [2]. Gold standard treatment for PUV is valve ablation by endoscopic procedure. In developing countries endoscopic treatment is limited in neonates and infants due to lack of appropriate sized instruments and also limitation of antenatal checkup. Vesicostomy is still needed for a child presenting with uncontrolled sepsis and impaired renal function. Delayed presentation is also a major factor for urinary diversion. In these circumstances vesicostomy is used initially and later followed by definitive valve ablation.

The objective of this study is to review the role of vesicostomy, as a modality of urinary diversion in infants and children with PUV, in a resource limited setting.

II. Materials and methods

The study was conducted at Nil Ratan Sircar Medical College & Hospital, Kolkata. We retrospectively reviewed the medical records of patients treated for posterior urethral valve from January 2010 to February 2020 and enrolled 25 children with PUV in the study who had vesicostomy. They were assessed for demographics, mode of presentation, clinical findings, investigations, treatment, complications, outcome and follow up.

III. Results

A total of 25 children were managed with vesicostomy during the period. Their ages at presentation ranged from 29 days to 13 years. The mean age at presentation in our study was 2.8 years.

Table 1: Age distribution at presentation

Age group	Frequency	Percentage(%)
<1 month	1	4
2-12 month	7	28
13-60 month	13	52
>60 month	4	16

15 patients(60%) presented with poor stream, 4(16%) had urinary retention at presentation, 5(20%) had renal failure and 1 patient(4%) presented with urosepsis (Table 2).

Table 2: Presenting symptoms

Clinical feature	Frequency	Percentage
Poor stream	15	60
Urinary retention	4	16
Renal failure	5	20
Urosepsis	1	4

Urethral catheterization was done in all patients using a Foley catheter or an infant feeding tube. The most common clinical feature was palpable bladder. Abdominal ultrasonogram showed hydronephrosis in all patients. Voiding cystourethrogram(VCUG) was done showing dilated posterior urethra and associated vesico-ureteral reflux(VUR) in all patients.VUR was bilateral in 9 patients(36%) and unilateral in 16 patients(64%). Among patients with U/L reflux 10 patients (62.5%)had right sided reflux and 6 patients(37.5%) had left sided reflux.

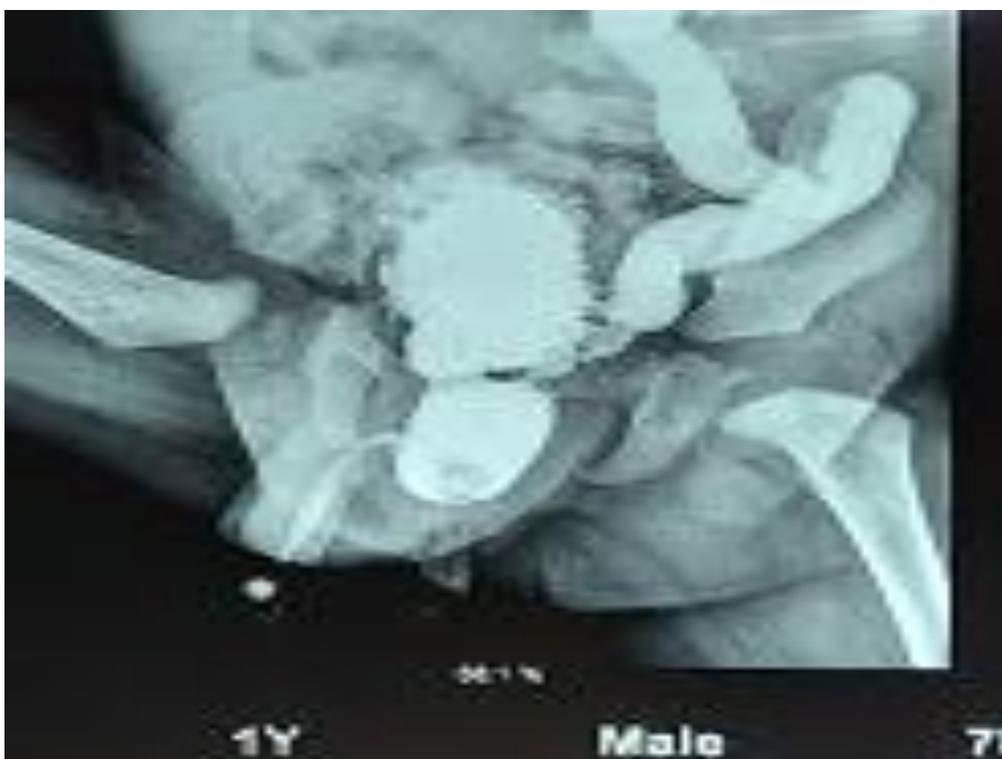


Fig 1.Voiding cystourethrogram showing trabeculated bladder,dilated posterior urethra and unilateral VUR in a PUV patient

Patients were given antibiotics. Cutaneous vesicostomy was done under general anaesthesia in all patients using Blocksom technique.

Stomal stenosis was found in 1 patient(4%) who responded to stomal dilatation. 1 patient(4%) had bladder mucosal prolapse.Diaper rash around stoma was found in 12 patients(48%),managed with zinc oxide cream and dressing.

10 patients had undergone valve fulguration and vesicostomy closure at a mean age of 4.25 years(age range 2-8 years).15 patients still awaiting valve fulguration had normal creatinine ,electrolytes and normal upper tract on follow up.

Follow up after vesicostomy was at 4weeks, 3 months, then 6 monthly for 4 years and yearly afterwards. The bladder volume measured using ultrasonography 4 weeks after vesicostomy closure in the 10 patients was 115-290 ml.

Table 3: Bladder volume after vesicostomy closure

Serial No.	Age (in years) at valve fulguration	Bladder volume after vesicostomy closure (ml)	Expected bladder volume(ml)
1	7	260	270
2	4	180	180
3	4	175	180
4	4.5	180	195
5	2	120	120
6	2	118	120
7	8	290	300
8	2	115	120
9	2	119	120
10	7	259	270

IV. Discussion

Posterior urethral valves are the most common cause of bladder outlet obstruction in male children. The aetiology of this condition is not known, but it is believed to result from abnormal fusion of mesonephric ducts or anomalous insertion of these ducts into the cloaca during embryonic development[3].

PUVs are classified into 3 types[4]. Valves representing obstructing membranes extending distally 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. Type 3 valves appear as membranous diaphragm with a central aperture at the level of verumontanum.

The most common presenting complaint was poor urinary stream which is similar to many other studies in literature[5,6]. Other symptoms are straining, frequency and urinary incontinence.

PUV can be detected in antenatal period by ultrasonography. Foetal interventions like vesicocentesis and vesico-amniotic shunts have been described but their long term benefits are still debated[7,8].

Voiding cystourethrogram is the definitive imaging procedure to diagnose PUV, as was the case in our study where all patients had dilated posterior urethra and associated bladder changes.

Treatment of PUV ranges from temporizing catheterization to endoscopic fulguration to surgical urinary diversion.

Cutaneous vesicostomy is a surgical method which decompresses the bladder and the upper tract. It is easy to construct and does not affect

bladder growth. Valve avulsion can be done retrogradely via the vesicostomy. Vesicostomy has been reported to be as effective as valve ablation as initial therapy[9,10]. Cutaneous vesicostomy is easy to manage[11].

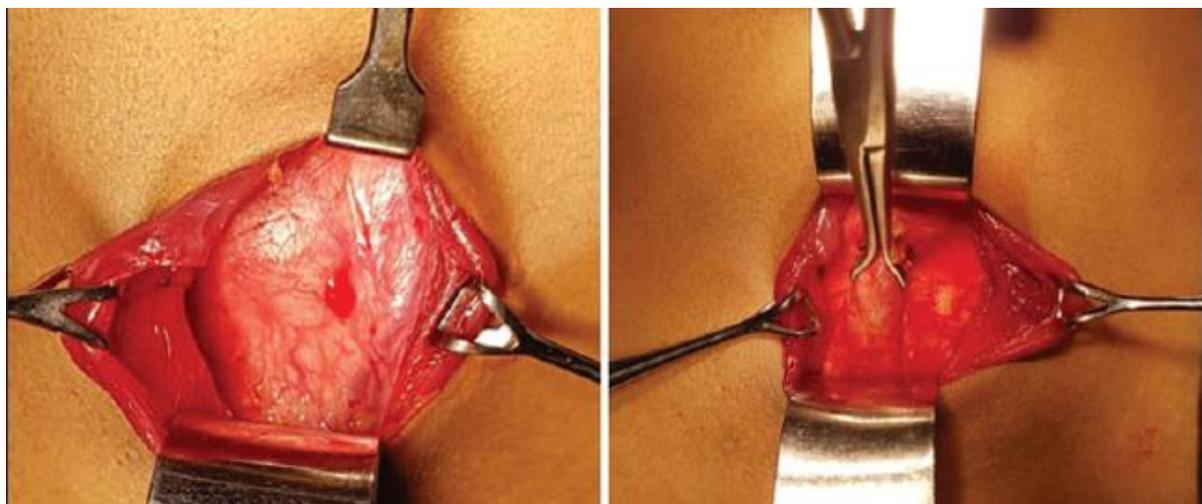




Fig.2. Blocksom technique for cutaneous vesicostomy

10 patients(40%) had a valve fulguration and vesicostomy closure at the same sitting. Evaluation of these patients after vesicostomy closure showed normal bladder volume and good flow (assessed by periodic USG and uroflowmetry).

The urea, creatinine and electrolyte levels of these patients done 6 weeks after the vesicostomy showed normalization. There was a significant difference between the urea and creatinine levels before the vesicostomy and after vesicostomy closure.

In children with metabolic abnormalities temporary bladder drainage established. After resolution of the azotemia, sepsis and/or electrolyte abnormalities valve fulguration performed.

Table 4. Mean serum urea and creatinine

	At presentation(mg/dl)	After vesicostomy(mg/dl)	After vesicostomy closure(mg/dl)
urea	46.45	28.5	27.6
creatinine	2.38	0.94	0.63

In our study post operative hydronephrosis grade improvement was found in 17 patients(68%). VUR improved in 14 patients(56%).

Other modalities of upper tract diversion may appear as better drainage procedures compared to vesicostomy in case of patients with severe symptoms i.e. uremia, anaemia or hypertension. But these procedures may affect bladder capacity and are difficult to perform[12].

V. Conclusion

Vesicostomy plays an important role in the initial management of posterior urethral valve where primary valve ablation cannot be readily done due to lack of appropriate facilities and instruments. There is controversy in the literature as to whether valve ablation, vesicostomy or upper tract diversion provides the best chance of recovering renal function.

References

- [1]. Hodges SJ, Patel B, Mc Lorie G, Atala A. Posterior urethral valves. Scientific World Journal. 2009;9:1119-26.
- [2]. Nasir AA, Ameh EA, Abdur Rahaman LO, Adeniran JO, Abraham MK. Posterior urethral valve. World J Pediatr. 2011;7:205-16.
- [3]. Forsythe WI, McFaden GDF. Congenital posterior urethral valve; a study of 35 cases. Brit J Urol 1959;33:65-70.
- [4]. Young HH, Frontz WA, Baldwin JC. Congenital obstruction of the post urethra. J Urol 1919;3:289-354
- [5]. Ikuerowo SO, Balogun BO, Akintomide TE, Akinola RA, et al. Clinical and Radiological characteristics of Nigerian boys with posterior urethral valves. Pediatr Surg Int. 2008;24:825-9.
- [6]. Warren J, Pike JG, Leonard MP. Posterior urethral valves in Eastern Ontario a 30 years perspective. Can J Urol. 2004;11:2210-5.
- [7]. Kitagawa H, Seki Y, Nagae H, Aoba T, Manabe S, Ooyama K, et al. Valved shunt as a treatment for obstructive uropathy: does pressure make a difference? Pediatr Surg Int 2013;29:381-6.
- [8]. Johnson MP, Bukowski TP, Reitleman C, et al. In utero surgical treatment of fetal obstructive uropathy: a new comprehensive approach to identify appropriate candidates for vesicoamniotic shunt therapy. Am J Obstet Gynecol 1994; 170:1770.
- [9]. Close CE, Mitchell ME. Posterior urethral valve: a change of concept. Arch Esp Urol 1998;51:581-7.
- [10]. Walker RD, Padron M. The management of posterior urethral valve by initial vesicostomy and delayed valve ablation. J Urology 1990;144:1212.
- [11]. Floyd S, Gray M. Managing the cutaneous vesicostomy. J Wound Ostomy Continence Nurs 2009;36:94-9.
- [12]. Tietjen DN, Gloor GM, Husmann DA: Proximal urinary diversion in the management of posterior urethral valves: is it necessary? J Urol 1997;158:1008-1010.