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Original Research Article.

Management of Posterior Urethral Valve in Male Child Population

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ABSTRACT

Introduction: The Posterior urethral valves remain the single most common urologic cause for renal failure and need for renal transplantation in children. These anomalies are unique to male children.PUVs are a common cause of lower urinary tract obstruction in male infants and the most common congenital cause of bilateral renal obstruction. Their incidence is estimated at 1/ 5,000 to 8,000 male births but they may in fact be more common due to fetal demise.

Objective: To study the outcome following fulguration of Posterior urethral valve in male child population.

Methods: From August 2004 and April 2007, in the present study, in a series of continuous 21 male child patients having posterior urethral valve were admitted in Department of Urology. All patients were well evaluated, followed-up and data analysis was done.

Results: Our 21 patients ranging from 15 days to 12 years were treated by PUV fulguration age group from 1 month to 1 year.9 patients presented with voiding difficulty 5 patients with fever with voiding difficulty, 2 patients only with. One patient was incidentally detected and 4 patients in septicemia. Vesicostomy was done in 5 patients in periphery, supravesicle diversion needed in one. Following fulguration of PUV, serum creatinine become normal in 8, and 2 developed CRF there was improvement in hydronephrosis in 10 units, in grade of reflux in 8 units. In two units needed nephrectomy. Following PUV fulguration there was marked improvement in maximum flow rate and PVRV. UDS was interpreted as normal study in 2 of the 9 patients studied, unstable detrusor with small capacity bladder in 1 patient, unstable detrusor with normal capacity bladder 4 patients remaining 2 had hypocontractile bladder with normal capacity bladder. One patient had false passage during introduction of paediatric cystoscope, urethral catheter was kept for one week and then removed. One patient developed stricture at site of proximal bulbar region managed successfully endoscopically.

Conclusions: Most of the patients of the PUV present during infancy with most common presentation are voiding difficulty having type-I PUV. Vesicostomy or supravesicle diversion should be considered in septicemic patients. Following PUV fulguration 80% of the patient achieve normal RFT and improvement in hydronephrosis, PVR and VU-reflexes around in 54.55%, in 85.71% and occurs in 35.71% respectively. Regular follow-up is must for all PUV patients. Persistent altered RFT and or VUR and or HN requires complete investigation including renal scan and urodynamic study.

Keywords: Posterior Urethral Valve (PUV), Valve Fulguration, Vesicostomy.

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INTRODUCTION

Posterior urethral valves remain the single most common urologic cause for renal failure and need for renal transplantation in children. These anomalies are unique to male children. PUVs are a common cause of lower urinary tract obstruction in male infants and the most common congenital cause of bilateral renal obstruction. Their incidence is estimated at 1/ 5,000 to 8,000 male births but they may in fact be more common due to fetal demise.[1-3] The history behind the diagnosis and classification of PUVs as well as the theories behind their embryology is rich with controversy. Dr. H. Hampton Young is generally given credit for the first clear description and classification of posterior urethral valves.[4] He recognized three distinct varieties of congenital proximal urethral obstructions and classified these as types I, II, and III urethral valves.

Type I urethral valve is an obstructing membrane that arises from the posterior and inferior edge of the verumontanum and radiates distally toward the membranous urethra, inserting anteriorly near the proximal margin of the membranous urethra. Although type I valves are usually represented in line sketches as two coapting folds, they actually are a single membranous structure with the opening in the membrane positioned posteriorly near the verumontanum. Retrograde passage of a urethral catheter is

usually possible without resistance because the catheter slides along the outer surface of the valve and is directed posteriorly to the small opening.

Type I posterior urethral valves are thought to develop when the mesonephric ducts enter the cloaca more anteriorly than normal. During infolding and separation of the cloaca, their migration is impeded and they may fuse in the midline anteriorly. Children with classic type I valves do not have plicae colliculi.

Type II urethral valves were initially described as folds radiating in a cranial direction from the verumontanum to the posterolateral aspect of the bladder neck. These folds are not obstructive but rather represent hypertrophy of the thin superficial muscle that runs from the ureteral orifice to the opening of the ejaculatory duct on the verumontanum (muscle derived from the tissue of the mesonephric ducts as the ureter and the vas deferens separate).

When there is resistance to urine flow through the urethra, these muscle bands hypertrophy. This is found when true mechanical obstruction is present, but it may also be seen in cases of functional obstruction (neuropathic bladder, detrusor-sphincter dyssynergy).

Type III urethral valves are believed to represent incomplete dissolution of the urogenital membrane. The obstructing membranes are situated distal to the verumontanum at the level of the membranous urethra. Classically described as a discrete, ring like membrane with a central aperture, these lesions can assume the most bizarre configurations, depending on the elasticity of the membrane and the location of the perforation in it). Long, willowy folds may prolapse well down into the urethra during voiding and suggest more of a bulbar urethral obstruction—the classic windsock valve. Although it is generally accepted that type II valves do not exist. Overall, type I urethral valves make up more than 95% of the lesions in large series. Type III valves make up the remainder. Type III valves have a worse prognosis than children with type I valves.

Type IV urethral valve seen most often in the prune-belly syndrome. These obstructions occur when a flabby, poorly supported prostate folds on itself and causes relative outlet obstruction.

AIMS AND OBJECTIVES

To study the outcome of Posterior urethral valve treated with fulguration in children.

MATERIALS AND METHODS

Study was conducted on 21 patients having posterior urethral valve admitted in the Department of Urology, Civil hospital, Ahmedabad over the four years duration. All patients included in the study, PUV was confirmed after doing MCU. The pre-op work-up was standard, as for any patient with PUV and included Ultrasonography, Uroflowmetry, RFTs, CBC, Urine routine & microscopy, Urine Culture and sensitivity. In selected cases Urodynamic study and Renal scan was done. Once patient was stable, electrolyte and renal function came down to normal value and urine culture became sterile, MCU was done. If renal function test didn't come down to normal value after giving anticholinergic, patient require temporary diversion in form of vesicostomy, ureterostomy or percutaneous nephrostomy.

After proper preoperative work-up for confirmation of the diagnosis and fitness for surgery, patient was taken for operation. Routinely 4-5 hours of nil by mouth is enough for pediatric patients. General anesthesia was given to all the patients. For children more than 3 years, standard lithotomy position is the ideal position. For children less than 3 years, assistant is going to hold both legs in such a way that fulguration can be done comfortably using glycine as an irrigant fluid and Hopkins's II pediatric cystoscope of 30 degree & 1.9 mm in size or pediatric ureteroscope with electrode bugbee at 12 o'clock. Care is taken to prevent injury to external urethral sphincter and urethra. Routinely per urethral catheter is kept and removed on the next morning. Patient is discharged after removing the catheter. Prophylactic antibiotics and anticholinergic are given to the patient to prevent infection and bladder spasm. A follow- up voiding cystourethrogram is usually done 2 months after the valve ablation to be sure that the obstruction was satisfactorily relieved. Ultrasonography uroflowmetry and renal function test should be done 3 monthly to know the improvement or deterioration. RGU should be done if patient having voiding difficulty and uroflowmetry suggestive of urethral stricture. Renal scan was indicated in patients suspecting renal dysplasia, secondary vesicoureteral junction obstruction or presence of VUR and break- through infection. Urodynamic study was indicated in patients developing or worsening hydroureteronephrosis, progressive renal deterioration, persistent urinary incontinence and suspected bladder valve syndrome.

Table 1: Unilateral reflux (Grade)

Low (I-III)	**1**
High (IV-V)	7
Total Units	8/16
T0tal No. of Patients	21

Table 2: Bilateral reflux (Grade)

Low (I-III)	**0**
High (IV-V)	6
Total Units	6
Total No. of Patients Having Reflux	11/21

Table 3: Serum creatinine value

Age	S.Creatinine	Pre-Op
<2 Years	>0.4 mg%	7
2-7 Years	>0.7 mg%	3

Table 4: UDS indications in patients

Altered RFT and Persistant HN	**1**
IVP:-Non-Excreting Kidney	2
Persistant VUR	2
Persistant High PVR	2
Persistant HN	2

Table 5: Renal scan indications in patients

Persistent HN	**3**
Non-Excreting Kidney in IVP	2
Persistent HN With Altered RFT	1
Recurrent Infection	1
Persistent HN With Megaureter On IVP	1

Table 6: Clinical presentation

Presentation	No. of Patient
Voiding Difficulty	9
Voiding Difficulty With UTI	5
UTI	2
Asymptomatic(USG)	1
Septicaemia	4

Table 7: Improvement in hydronephrosis

Pre-Op		Post-Op	Total Units
GR-I	➔	Normal	15
GR-II	➔	Normal	1
GR-II	➔	GR-I	2
GR-III	➔	Normal	2
GR-III	➔	GR-I	8
No Change In HN			5
Resolution Of HN			18/33(54.55%)
Improvement In HN			10/33(30.30%)

Table 8: Study comparison for unilateral reflux (grade)

	J. Mathew Hasan, et al[19]	Present Series
Low (I-III)	1	1
High (IV-V)	17	7
Total Units	18/35	8/16
T0tal No. Of Patients	73	21

Table 9: Study comparison for bilateral reflux (grade)

	J. Mathew Hasan, et al[19]	Present Series
Low (I-III)	9	0
High (IV-V)	25	6
Total Units	34	6
Total No. of Patients Having Reflux	35/73	11/21
Complete Resolution Of VUR	16/35(45.71%)	5/14(35.71%)

Table 10: Urodynamic study findings

Normal	2
Unstable Detrusor With Small Capacity Bladder	1
Unstable Detrusor With Normal Capacity Bladder	4
Hypocontractile Bladder With Normal Capacity Bladder	2

OBSERVATIONS

Majority of patients (9) were in age group of 1 month to 1 year. Only one patient was included in the age group less than 1month of age. Age range was 15 days to 12 years. 9 patients presented with voiding difficulty such as straining on micturition, crying during micturition, lower abdominal swelling during micturition, intermittency or poor stream. 5 patients presented with fever and rigor along with voiding difficulty. 2 patients presented only with fever and rigor. One patient was incidentally detected to have distended bladder on routine ultrasound. 4 patients presented with morbid condition in septicemia. Vesicostomy was done in 5 patients in periphery and were referred to us for further management. In one patient having septicemia who hadn't improved after vesicostomy, supravesicle diversion in form of bilateral percutaneous nephrostomy was required. All patients improved after diversion and later on posted for PUV fulguration. Out of 42 units there was hydronephrosis in 33 units. Of the 21 patients 15 had a maximum flow rate (MFR) of <7 ml/s, 5 had MFR of 7-15 ml/s and only one had MFR >15. 14 patients had associated Vesico- Ureteric reflux. 8 had unilateral and 3 had bilateral. In which 6 units had reflux on right side and 8 units had reflux on left side. Of the total 14 units of reflux 12 were Grade V reflux, one each of Grade IV and Grade III reflux. Most of the patients of the PUV present during infancy with most common presentation is voiding difficulty having type-I PUV.

Vesicostomy or supravesicle diversion should be consider in septicemic patients. Following PUV fulguration 80% of the patient achieve normal RFT and improvement in hydronephrosis, PVR and VU-reflexes around in 54.55%, in 85.71% and occurs in 35.71% respectively. Regular follow-up is must for all PUV patients. Persistent altered RFT and or VUR and or HN requires complete investigation including renal scan and urodynamic study. There was altered serum creatinine according to age in 10 patients. Urodynamic study was performed in 9 patients with following indications. Renal scan wad done in 8 patients with following indications.

9 patients presented with voiding difficulty such as straining on micturition, crying during micturition, lower abdominal swelling during micturition, intermittency or poor stream. 5 patients presented with fever and rigor along with voiding difficulty. 2 patients presented only with fever and rigor. One patient was incidentally detected to have distended bladder on routine ultrasound. 4 patients presented with morbid condition in septicemia.

Vesicostomy was done in 5 patients in periphery and were referred to us for further management. In one patient having septicemia who hadn't improved after vesicostomy, supravesicle diversion in form of bilateral percutaneous nephrostomy was done.[5-8] All patients have improved after diversion and later on posted for PUV fulguration. There was altered serum creatinine according to age in 10 patients. Following fulguration of PUV, serum creatinine came down to normal in 8 of the patients and the remaining 2 developed CRF.[9] All patients were subjected for PUV fulguration using either a pediatric cystoscope or ureterorenoscope and bugbee. All the patients had Type 1 PUV.

Out of 42 units there was hydronephrosis in 33 units prior to fulguration. Following posterior urethral valve fulguration there was improvement in hydronephrosis in 10 units. In 5 units there was no improvement and two units of them had to be removed (Nephrectomy) because of decreased renal function

on renal scan. There was complete resolution of hydronephrosis in 18 units. Of the 21 patients 15 had a maximum flow rate (MFR) of <7 ml/s, 5 had MFR of 7-15 ml/s and only one had MFR >15. Following PUV fulguration there was marked improvement in MFR of all patients except 3 who didn't improve to a significant extent. 14 patients had post void residual of >50 ml which drastically reduced in 12 patients following fulguration. 11 patients had associated VUR. 8 had unilateral and 3 had bilateral. In which 6 units had reflux on right side and 8 units had reflux on left side. Of the total 14 units of reflux 12 were Grade V reflux, one each of Grade IV and Grade III reflux. There was improvement in grade of reflux in 8 units. 6 units there was no improvement. In two of these 5 units there was nonfunctioning of kidney on renal scan requiring nephrectomy. UDS was interpreted as normal study in 2 of the 9 patients studied. There was unstable detrusor with small capacity bladder in 1 patient. 4 patients had unstable detrusor with normal capacity bladder. Remaining 2 had hypocontractile bladder with normal capacity bladder. In 2 patients had normal renal scan. Obstructive pattern was noted in 2 patients and 2 patients had a function of <13%. There was scar formation in other 2 scans.

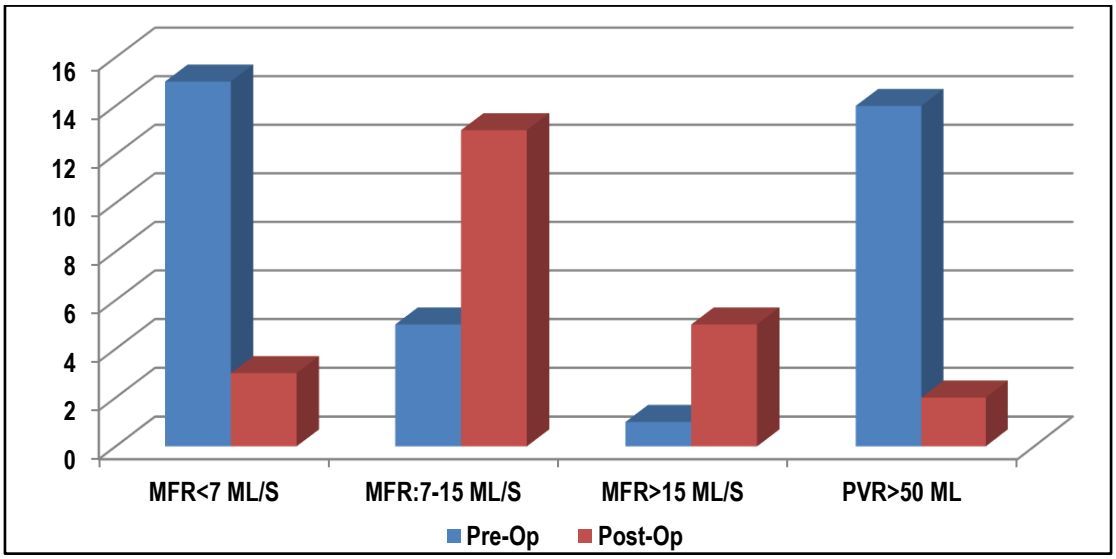

Figure 1: Maximum flow rate of patients

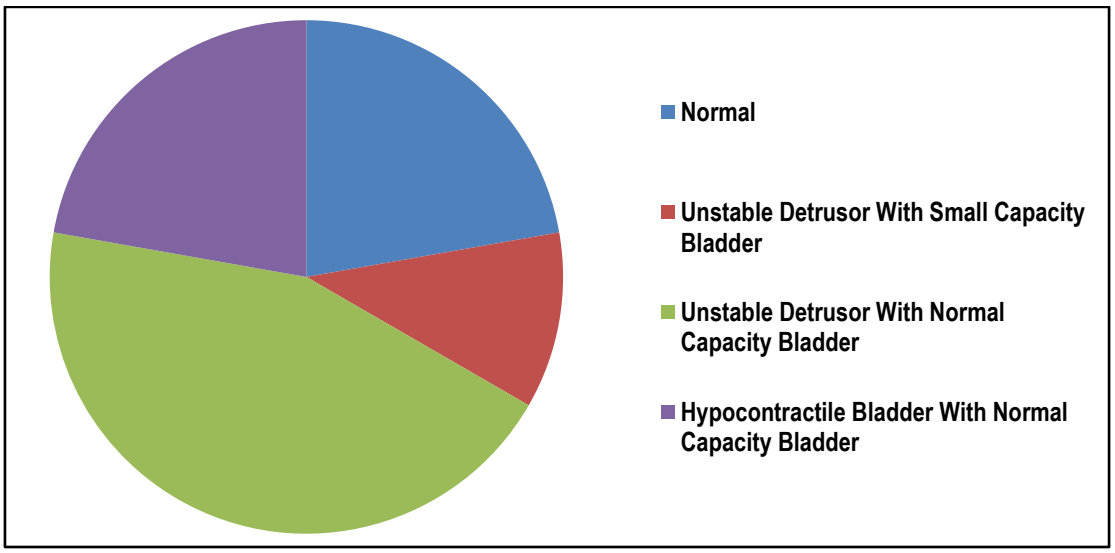

Figure 2: Urodynamic study result

COMPLICATION

One patient had false passage during introduction of pediatric cystoscope with 10 Fr sheath. Perurethral catheter was kept for one week and then removed. One patient developed stricture at site of proximal bulbar region. Fulguration was done at 4, 8 and 12' 0 clock position. Patient underwent visual dilatation and perurethral catheter kept for one week. After removing catheter, patient has voided with good stream and after 3 months of urethral dilatation, RGU was normal.

DISCUSSION

21 patients ranging from 15 days to 12 years were treated by PUV fulguration. Majority 9 (42.85%) patients were in age group from 1 month to 1 year as compared to S. Roy Choudhary et al series (34.44%).

9 patients presented with voiding difficulty. Vesicostomy was done in 5 patients in periphery and were referred to us for further management. In one patient having septicemia who hadn't improved after vesicostomy supravesicle diversion was required in

form of bilateral percutaneous nephrostomy. All patients improved after diversion and later on posted for PUV fulguration.

Following fulguration of PUV, serum creatinine came down to normal in 8 of the patients and the remaining 2 developed CRF. All the patients had Type 1 PUV. All patients underwent PUV fulguration and all of them showed improvement in form of S.Creatinine level.[10-12] Many of them had improvement in VUR and HN. So, by avoiding diversion in most cases bladder function can be preserved and the need for bladder augmentation is decreased.[14-16]

Table 11: Improvement in hydronephrosis

	Donohoe JM et al[13]	Our Series
Total Units With HN	32	33
Complete Resolution	15(46.87%)	18(54.54%)
Improvement In HN	11(34.37%)	10(30.30%)
Persistant HN	6 (18.75%)	5(15.15%)

Following PUV fulguration, there is complete resolution of hydronephrosis in 54.54% as compared to Donohoe et al series which has 46.87%. In rest of the 15 patients, we have started anticholinergic which has worked and we have noted that 30.30% of the patients have improved in hydronephrosis. In 5 patients there is persistent hydronephrosis, MCU and urodynamic study done which were normal, there is no residual PUV. So, persistent HN following PUV fulguration should not be considered residual dilatation until a thorough urodynamic evaluation has been done and any abnormal parameter are addressed. [17-20]

14 patients had post void residual of >50 ml which drastically reduced in 12 patients following fulguration. There was improvement in grade of reflux in 8 units. 6 units showed no improvement. In two of these 5 units there was nonfunctioning of kidney on renal scan requiring nephrectomy. Complete resolution occurred in 35.71% as compared to J. Mathew Hasan et al series (45.71%), while improvement in VUR occurred in 20.45% after starting anticholinergic. Rest of the patients are on prophylactic antibiotics with anticholinergic waited for resolution of VUR. UDS was interpreted as normal study in 2 of the 9 patients studied. There was unstable detrusor with small capacity bladder in 1 patient. 4 patients had unstable detrusor with normal capacity bladder. Remaining 2 had hypocontractile bladder with normal capacity bladder.[23,25] As far as considered about myogenic failure, 9.52% developed myogenic failure as compared to Missen at al series in which 5.9% myogenic failure.[22] One patient is on CISC while another patient is doing double voiding with abdominal strain (crede method). Two patients had normal renal scan. Obstructive pattern was noted in 2 patients and 2 patients had a function of <13%. There was scar formation in other 2 scans. Laparoscopic nephrectomy was performed on two patients who had developed reflexive nephropathy and recurrent UTI and split renal function was less than 13%. Two patients required ureteric reimplantation because of associated obstructive megaureter. [26,27]

CONCLUSION

Most of the patients of the PUV present during infancy with most common presentation is voiding difficulty having type-I PUV. Vesicostomy or supravesicle diversion should be consider in septicemic patients. Following PUV fulguration 80% of the patient achieve normal RFT and improvement in hydronephrosis, PVR and VU-reflexes around in 54.55%, in 85.71% and occurs in 35.71% respectively. Regular follow-up is must for all PUV patients. Persistent altered RFT and or VUR and or HN requires complete investigation including renal scan and urodynamic study.

REFERENCES

1. Abbott JF, Levine D, Wapner R: Posterior urethral valves: Inaccuracy of prenatal diagnosis. Fetal Diagn Ther 1998;13:179.

2. Adzick NS, Harrison MR, Flake AW, de Lorimier AA: Urinary extravasation in the fetus with obstructive uropathy. J Pediatr Surg 1985;20:608.

3. Bomalaski MD, Arema JG, Coplen DE, et al: Delayed presentation of posterior urethral valves: A not so benign condition. J Urol 1999;162:2130.

4. Campbell-walsh urology textbook, ninth edition.

5. Chertin B, Cozzi D, Puri P: Long-term results of primary avulsion of posterior urethral valves using a Fogarty balloon catheter. J Urol 2002;168:1841.

6. Close CE, Carr MC, Burns MW, Mitchell ME: Lower urinary tract changes after early valve ablation in neonates and infants: Is early diversion warranted? J Urol 1997;157:984.

7. Cromie WJ, Kwang L, Kara H, et al: Implications of prenatal ultrasound screening in the incidence of major genitourinary malformations. J Urol 2001;165:1677.

8. Cuckow PM, Dinneen MD, Risdon RA, et al: Long-term renal function in the posterior urethral valves, unilateral reflux and renal dysplasia syndrome. J Urol 1997;158:1004.

9. DeFoor W, Tackett L, Minevich E, et al: Successful renal transplantation in children with posterior urethral valves. J Urol 2003;170:2402.

10. Denes ED, Barthold JS, Gonzalez R: Early prognostic value of serum creatinine levels in children with posterior urethral valves. J Urol 1997; 157:1441.

11. Dillon E, Ryall A: A 10 year audit of antenatal ultrasound detection of renal disease. Br J Radiol 1998;71:497-500.

12. Dinneen MD, Duffy PG: Posterior urethral valves. Br J Urol 1996;78:275.

13. Donohoe JM, Weinstein RF, Misseri R, Combs AJ, Horowitz M et al: when can persistent hydronephrosis in posterior urethral valve disease be considered residual streching? J Urol; 2004172:706-11.

14. Freedman AL, Johnson MP, Smith CA, et al: Long-term outcome in children after antenatal intervention for obstructive uropathies. Lancet 1999; 354:374.

15. Ghanem MA, Nijman RJ: Long-term follow up of bilateral high (Sober) urinary diversion in patients with posterior urethral valves and its effect on bladder function. J Urol 2005;173:1721.

16. Ghanem MA, Wolffenbuttel KP, De Vylder A, et al: Long-term bladder dysfunction and renal function in boys with posterior urethral valves based on urodynamic findings. J Urol 2004;171:2409.

17. Glassberg KI: The valve bladder syndrome: 20 years later. J Urol 2001; 166:1406.

18. Greenfield SP: Posterior urethral valves: New concepts [editorial]. J Urol 1997;157:996.

19. Hassan JM, Pope JC, Brock JW, et al: Vesicoureteral reflux in patients with posterior urethral valves. J Urol 2003;170:1677.

20. Holmdahl G, Sillen U, Hanson E, et al: Bladder dysfunction in boys with posterior urethral valves before and after puberty. J Urol 1996;155:694.
21. Kim YH, Horwitz M, Combs A: Comparative urodynamic findings after primary valve ablation, vesicostomy, or proximal diversion. J Urol 1996;156:673.
22. Misseri R, Combs AJ, Horowitz M, et al: Myogenic failure in posterior urethral valve disease: Real or imagined? J Urol 2002;168:1844.
23. Mitchell ME, Close CE: Early primary valve ablation for posterior urethral valves. Semin Pediatr Surg 1996;5:66.
24. Patil KK, Wilcox DT, Samuel M, et al: Management of urinary extravasation in 18 boys with posterior urethral valves. J Urol 2003;169:1508.
25. Podesta M, Ruarte A C, Gargiulo C et al: Urodynamic findings in boys with posterior urethral valves after treatment with primary valve ablation or vesicostomy and delayed ablation. J Urol 2000;164:139.
26. Schober JM, Dulabon LM, Woodhouse CR: Outcome of valve ablation in late-presenting posterior urethral valves. Br J Urol 2004;94:616.
27. Smith's textbook of endourology, 1996.

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