www.jmscr.igmpublication.org
Impact Factor 5.244
Index Copernicus Value: 5.88
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossref DOI: http://dx.doi.org/10.18535/jmscr/v4i6.70

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

Follow Up With Clinical Characteristics and Somatic Growth in Posterior Urethral Valve

Authors
Dr Lalit Kumar[1], Dr Rahul Tiwari[2], Dr Amit Sandhu[3], Dr Sakshi Agarwal[4], Dr Bajrang Tak[5], Dr Ashok Kumar[6], Dr Mahesh Joshi[7]
[1,2,3]MCH Urology Resident, S P Medical College, Bikaner
[4]Senior Resident, Department of Obstetrics and Gynaecology, S P Medical College, Bikaner
[5]Assistant Professor, Department of General Surgery, S M S Medical College, Jaipur
[6,7]Junior Resident, Department of General Surgery, S P Medical College, Bikaner
Name of department and institution where the work was conducted- Department of Pediatric Surgery and Department of Urology, Institute of Medical Sciences, Banaras Hindu University, Varanasi, India
Corresponding Author
Lalit Kumar
MCH Resident, Department of Urology, S P Medical College, Bikaner, Rajasthan (INDIA)
Address- Room Number 40, New PG Hostel, Near S P Medical College, Bikaner, Rajasthan (INDIA), Pin code-334001
Email: *lovelydocims@gmail.com, Phone number- 7073567088*

Abstract
Purpose- *Follow up of PUV patients is very crucial. We analyzed the long term follow up in posterior urethral valves with clinical characteristics and somatic growth.*
Materials and methods- *Study has been carried out both retrospectively. Fifty cases of PUV of age ≥3 years were included in the study. 32 patients required urinary diversion procedure along with primary valve fulguration while 18 patients were managed only by primary valve fulguration. Fifty identical age matched children were selected as controls. In both case and control group somatic growth was recorded in 3 followups at 6 months interval.*
Results- *The mean weight and height at the time of initial presentation of study group was 9.40±7.81kg & 72.55±12.77cm and for control group 15.83±4.15kg & 86.35±13.05cm. In the 3rd follow up the mean weight and height of study group was 20.72±11.07kg &112.00±23.1cm and for control group 25.45±10.21kg & 114.25±24.22cm. The mean weight and height at the 3rd follow up in primary valve fulguration group was 22.78±14.858kg & 44.94±11.644 inch while in diversion with fulguration was 19.56±8.310kg & 44.72±7.787 inch.*
Conclusions- *Somatic growth remains significantly lower in PUV patients. Proper nutritional support is essential to achieve near normal somatic growth.*
Manuscript Keywords- *Posterior urethral valves; Urinary Diversion; Urinary tract infection*

Introduction

Posterior urethral valve (PUV) is the most common congenital obstruction of the lower urinary tract with an incidence of upto 1 in 4000 [1-3]. The PUV incidence is declining in some populations as a result of prenatal diagnosis and subsequent termination of affected fetuses. In one report, elective termination of fetuses diagnosed with PUV was done in 46% of cases [4].

In the past PUV presented with a variety of clinical features and at various ages [5]. They ranged from newborns presenting with severe renal and pulmonary manifestations to older children with minor voiding dysfunction. In general, the symptoms are age dependent with the more severely affected boys presenting earlier in life. The diagnosis is usually suggested prenatally and postnatal investigation provides confirmation. Ultrasound is the first postnatal investigation while micturating cystourethrography provides the definitive diagnosis Intravenous urogram and radionuclide renal scan are also helpful in its management [6].

Initial management of all patients with PUV requires the immediate establishment of urinary catheter drainage from the bladder. After successful initial bladder drainage and when the patient's medical condition has stabilized, the next step is to permanently destroy the valves. Follow up of patients is very crucial to recognize the risk factors and complications to improve the quality of life. It can be done with the help of somatic growth, renal function test, imaging investigations and urodynamic studies [7].

In the present study we have evaluated the long term follow up in patients of posterior urethral valve coming to our department with special reference to somatic growth to evaluate the outcome of treatment. We also evaluated clinical characteristics in PUV.

Subjects and methods

The present study has been carried out retrospectively and was approved by the ethical committee of our Institute. Fifty cases of PUV of age 3 years or above, attending our outpatient department between the period of July 2010 to June 2012 were included in the study. A detailed history and relevant investigations were done. We evaluated long term outcome in patients of PUV by somatic growth. Height and weight of case and control groups were calculated by same observer. Fifty cases were divided into 2 groups based on the initial surgical procedure done. 32 patients required urinary diversion procedure (vesicostomy) along with primary valve fulguration while 18 patients were managed only by primary valve fulguration. Both these procedures were compared regarding somatic growth. In most of the cases the initial presentation data were collected retrospectively when patients of PUV $\geq$3 years of age came in the pediatric surgery OPD using discharge sheet issued at time of discharge after the operation. At that time first follow up data were recorded including clinical features, somatic growth and relevant investigations. Patients were followed up at the interval of 6 months for 2nd and 3rd follow up data prospectively. No patient was lost in follow up. Fifty identical age matched children were selected at the time of first follow up, whose parents knew their children's previous height and weight. These controls were followed at the interval of 6 months to record height and weight in each visit. The statistical analysis was done using statistical software SPSS for windows (Version 16). Chi-square test was used for non-parametric variables. Student's t test was used for comparing two groups and one-way ANOVA test was used for multiple group comparison. P-value <0.05 was stated as statistically significant.

Results

PUV is a relatively common (6.375 PUV cases/ 1000 OPD cases) pediatric surgical problem. In the present series the mean age at initial presentation was approximately 2.35±2.36years with a range of 1 day to 9 years. Mean age at the time of 3rd follow up was 7.47±4.65years. The youngest patient was 4 years and the oldest was 22 years

old. Follow up duration was from 1.5-22years. In follow up micturating cystourethrogram was done which showed complete valve fulguration in all patients.

At the time of initial presentation dribbling of urin e (78%) was the most common symptom follwed by fever(46%), other symptoms (44%), dysuria (34%) or poor stream (14%). After management of the PUV in the 1st follow up fever (36%) was the most common symptom followed by dribbling (24%) and dysuria (16%).Similarly in the 2nd follow up dribbling (14%) was most common symptom followed by fever (10%) and other symptoms (8%). In the 3rd follow up also dribbling (14%) remained as most common symptom followed by other symptoms (8%), retention (2%) and poor stream (2%)[Table1].

Table 1: Incidence of various clinical features

Symptoms	Initial presentation		1st follow up		2nd follow up		3rd follow up	
	Number of patients	%	Number of patients	%	Number of patients	%	Number of patients	%
Poor stream	7	14	2	4.0	1	2.0	1	2.0
Dribbling	39	78	12	24.0	7	14.0	7	14.0
Dysuria	17	34	8	16.0	-	-	-	-
Retention	4	8	2	4.0	1	2.0	1	2.0
Fever	23	46	18	36.0	5	10.0	-	-
Others†	22	44	6	12.0	4	8.0	3	8.0

†(pain abdomen, lump abdomen, respiratory distress, vomiting, loss of appetite, pyuria)

E. coli was most common bacteria cultured in 64% cases followed by klebsiella in 8% cases. In 16% cases urine culture was sterile. E coli was most commonly sensitive to amikacin (78.12%) followed by gentamicin (59.37%) while Klebsiella to Norfloxacin (50%) followed by ceftazidime, nitrofurantoin and gentamicin each in 25% cases.

The mean value of serum creatinine in primary valve fulguration group was 1.486±.7646mg/dl at the time of initial presentation and 0.8511±0.22721mg/dl at the time of third follow up while for diversion with fulguration group it was 1.737±.9734 mg/dl and 1.0913±.41396 mg/dl respectively.

In the present study mean weight and height at the time of initial presentation of study group was 9.40±7.81 (3 to 47) kg &29.02±5.10(22 to 42) inch and for control group 15.83±4.15 (3.3 to 52.5) kg &34.54±5.22(23.2 to 43.6) inch[Table2].

Table 2: Comparison of somatic growth of study and control group at the time of initial presentation

Parameters	Study group (n=50)	Control group (n=50)	p-value
Age (year)	2.35±2.36 (0.1 to 9.0)	2.44±2.21 (0.1 to 9.1)	0.659
Height (inch)	29.02±5.10 (22 to 42)	34.54±5.22 (23.2 to 43.6)	0.041
Weight (kg)	9.40±7.81 (3 to 47)	15.83±4.15 (3.3 to 52.5)	0.038

While in the 3rd follow up of the present series the mean weight and height of study group was 20.72±11.07 (11 to 50) kg &112.00±23.1 (82.5 to 165) cm and for control group 25.45±10.21 (12 to 58.22) kg & 114.25±24.22 (83.55 to 167.21) cm [Table3].

Table 3: Comparison of somatic growth of study and control group at the time of 3rd follow up

Parameters	Study group (n=50)	Control (n=50)	p-value
Age (year)	7.47±4.65 (4 to 22)	7.58±4.72 (4 to 22.12)	0.790
Height (cm)	112.00±23.1 (82.5 to 165)	114.25±24.22 (83.55 to 167.21)	0.794
Weight (kg)	20.72±11.07 (11 to 50)	25.45±10.21 (12 to 58.22)	0.039

The mean weight and height at the initial presentation in primary valve fulguration group was 8.75±2.504kg &29.89±4.714inch while in diversion with fulguration was 8.85±7.585 &27.78±5.505 inch, for both p value is >0.05[Table4]

Table 4: Comparison of somatic growth between primary valve fulguration and diversion with fulguration at initial presentation

Parameters	**Primary valve fulguration**			**Diversion with fulguration**			
	Mean	**Min.**	**Max.**	**Mean**	**Min.**	**Max.**	**p-value**
Age(year)	2.294±1.4086	.5	6.0	2.123±2.1830	.1	9.0	.767
Height(inch)	29.89±4.714	23	40	27.78±5.505	15	42	.178
Weight(kg)	8.75±2.504	5	15	8.85±7.585	3	47	.957

The mean weight and height at the 3rd follow up in primary valve fulguration group was 22.78±14.858kg & 44.94±11.644 inch while in diversion with fulguration was 19.56±8.310kg & 44.72±7.787 inch, for both p value is >0.05 [Table5].

Table 5: Comparison of somatic growth between primary valve fulguration and diversion with fulguration at 3rd follow up

Parameters	**Fulguration**			**Diversion with fulguration**			**p-value**
	Mean	**Min.**	**Max.**	**Mean**	**Min.**	**Max.**	
Age 3rd FU(year)	7.361±4.7459	4.0	16.5	7.516±4.6964	3.5	22.0	.912
Height3rd FU(inch)	44.94±11.644	33	65	44.72±7.787	35	66	.935
Weight3rd FU(kg)	22.78±14.858	12	50	19.56±8.310	11	46	.330

Discussion

PUV is a common childhood surgical problem. In the present study PUV incidence was 6.375 PUV cases/1000 OPD cases. Gangopadhyay (2003) reported a similar incidence of 3.5 per 1000 pediatric surgical OPD cases[8]. In western countries incidence was ranging from 1/4000 to 1/7500 births, 1/3000 and 1/8000 male births and 1/5000-1/8000 male live births by Miguel et al (2000), Mazen et al (2005) and Caione et al (2011) respectively [9-11]. In our study it was 6.375/1000 pediatric surgical OPD cases. Common symptoms at presentation were dribbling of urine (78%), fever (46%) and pyuria (44%). A comparison of symptoms at presentation in various studies is given in Table 6 [1,10-14].

Table 6: Comparison of symptoms at presentation in various studies

Symptoms(%)	**Young et al 1919**	**Atwell 1983**	**Garg et al 1983**	**Pieretti 1993**	**Mazen et al 2004**	**Mirshemirani et al 2013**	**Present study**
Poor Urinary stream with straining	**33.3**	**5.5**	**62.0**	**59.77**			**14**
Dribbling of urine	**8.3**		**38**			**51**	**78**
Retention of urine	**25**		**11**	**14.94**			**8**
Fever with urinary tract infection(UTI)			**20.0**	**55.17**	**28**	**45.9**	**46**
Abdominal distention	**16.6**		**33.0**		**13.0**		**30**
Diurnal & nocturnal enuresis		**16.6**		**33.33**	**9.5**		**16**
Failure to thrive		**27**	**27**	**22.98**	**2.8**		**30**

*Incidence is given as percentage of total children included in the respective study.

Symptoms at presentation in this series agreed maximum with that of Garg et al (1983) and Mirshemirani et al (2013) [13,15]. Dribbling of urine (78%) was the most common presentation in all age groups in this series whereas with advancement of age other common additional symptoms were fever, dysuria, pyuria, pain and palpable mass in abdomen. Otukesh et al (2009) found weak urinary stream as the most common presenting symptom in 43.2% followed by UTI in 28.3% [16]. Uthup et al (2010) also reported poor urinary stream as the most common symptom [17]. Though Hendren (1971) reported that frequently mothers did not know about their son's urinary symptom, in this series mother were found to be reliable in giving an adequate and proper history regarding the urinary stream and other details [4]. This is indeed a pleasant surprise because majority of mothers in our study were either illiterate or had very little formal education unlike in Hardy hendren's series from USA. As most of the mothers in India do not use any napkins for their children, it is easier for them to observed the urinary stream of their children.

In the present study at the time of initial presentation both height and weight value were significantly lower in study group than in control group (in both group $p<0.05$). Narasimhan et al (2002) found distant values of body weight and crown-heel length of both vesicostomy (18 patients) and transurethral fulguration (19 patients) were less than the 5th percentile of the National Centre for Health Statistics (NCHS) and healthy Punjabi infants showing growth retardation in the 1st year of life [18].

In 3rd follow up also mean weight was significantly lower in study group as compare to control group with p value of=0.039, though mean height was also less in study group than in control group but difference was not significant as p=0.074 so we see as the patients grow, their height became equivalent to same age matched controls but weight remained significantly low. Previous study by Nambiranjan et al (2004) had reported the growth patterns for height and weight in the 47 patients followed up beyond 10 years of age. In most of the patients, the curves for height and weight were parallel, but weight gain tended to lag more than height gain [19]. Similarly Gangopadhyay (2003) assessed 516 cases for long term follow up (5-20 years), only 312(60.5%) came for regular follow up. Out of these 312 cases only 48% have attained 80th percentile of height and 70th percentile of weight and the rest are below 50th percentile in term of height and weight as compared to normal age matched control group [8]. This suggest that long term iron and calcium supplementation is essential for achieving near normal height and weight.

In the present study at the 3rd follow up there was not significant difference of mean weight and height between primary valve fulguration group and diversion with fulguration as for both p value was >0.05. So growth velocity is not affected by surgical procedure done. Upto our research no other study in literature found comparing 2 procedures regarding somatic growth velocity. Only one study conducted by Krueger et al (1980) showed a remarkable improvement in growth in a group of neonatal boys who had supravesical diversion compared to those with primary valve ablation, even though the former group had worse initial serum creatinine. They postulate that supravesical diversion allows greater preservation of nephron function. Their data however, does not include statistical analysis, so although they may show trends of improved growth in the supravesical diversion group, the statistical significance of this has not been proven [20].

Conclusion

PUV is one of the most common congenital malformation of the posterior urethra in male having deleterious effects on upper urinary tract in long term follow up. Hence regular long term follow up is mandatory in all the cases. Somatic growth in terms of height and weight is also an important parameter as they remains significantly lower in comparison with normal controls. Proper nutritional support along with supplementation of

iron and calcium is essential to achieve near normal somatic growth.

Abbreviations

PUV- Posterior urethral valve, OPD- Out patient department, UTI- Urinary tract infection.

Conflict of interest-No

References

1. Atwell JD. Posterior urethral valves in the British Isles: a multicenter B. A. P. S. review. J. Pediatr. Surg 1983; 18(1):70–74.
2. Hutton KA, Thomas DF, Arthur R J, Irving HC, Smith SE. Prenatally detected posterior urethral valves: is gestational age at detection a predictor of outcome? J Urol. 1994;152w(2 Pt 2):127-129.
3. Thomas DFM, Gordon AC. Management of prenatally diagnosed uropathies. Arch. Dis. Child. 1989; 64:58–63.
4. Cromie WJ, Lee K, Houde K, Holmes L. Implications of prenatal ultrasound screening in the incidence of major genitourinary malformations. J Urol. 2001 May;165(5):1677-80.
5. Hendren,W. H. Posterior urethral valves in boys. A broad clinical spectrum. J. Urol. 1971; 106(2):298–307.
6. Dinneen MD, Duffy PG. Posterior urethral valves.Br. J. Urol. 1996; 78(2):275–281.
7. Kim YH, Horowitz M, Combs AJ, Nitti VW, Borer J, Glassberg KI. Management of posterior urethral valves on the basis of urodynamic findings. J Urol 1997;158:1011-1016.
8. Gangopadhyay An. The Experience of Managing Posterior Urethral Valve (PUV) over a Period of 22 Years : A Single Center Study. J Indian AssocPediatrSurg 2003; 8:133-139.
9. Miguel L, Podesta, Ruarte A, Gargiulo C, Medel R, Castero R. Urodynamic Findings In Boys With Postcrior Urethral Valves After Treatment With Primary Valve Ablation or vesicostomy and Delayed Ablation. J Urol 2000; 171: 2409-2412.
10. Ghanem MA, Nijman RJM. Long-term followup of bilateral high (sober) urinary diversion in patients with posterior urethral valves and its effect on bladder function. J Urolo 2005;173:1721–1724.
11. Caione P, Nappo SG. Posterior urethral valves: Long-term outcome. PediatrSurg Int. 2011;27(10):1027–35.
12. Young HH, Frontz WA, Baldwin JC. Congenital obstruction of the posterior urethra. J. Urol. 1919; 3:289-365.
13. Garg SK, Abduurahman MB, Momoh JT, Hargreaves HM, Narayana P, Lawrie JH. Congenital posterior urethral valves:Problems of management in countries with limited facilities.Ann.Trop.Paediatr.1983 Dec;3(4):201-5.
14. Pieretti RV. The mild end of the clinical spectrum of posterior urethral valves. J. Pediatr. Surg. 1993; 28(5):701–704.
15. Mirshemirani A, Khaleghnejad A, Rouzrokh M, Sadeghi A, Mohajerzadeh L, Sharifian M. Posterior Urethral Valves; A single Center Experience.Iran J Pediatr 2013;23(5):531-535. 20.
16. Otukesh H, Sharifiaghdas F, Hoseini R, Fereshtehnejad SM, Rabiee N, Kiaiee MF. Long-term upper and lower urinary tract functionsin children with posterior urethral valves. jpurol.2009.06.143-147
17. Uthup S, Binitha R, Geetha S, Hema R, Kailas L. A follow-up study of children with posterior urethral valve.Indian J Nephrol. 2010;20(2):72–75.
18. Narasimhan KL, Kaur B, Chowdhary SK, Bhalla A, Smaujh R, Rao KLN, Mahajan JK, Prospective Analysis of Renal function and Somatic growth in Neonatal Posterior Urethral valves. Eur J PediatrSurg 2002; 12:267-271.

19. Nambirajan L, Bhatnagar V, Lal R, Agarwal S, Gupta AK, Mitra DK. Somatic and renal growth in boys treated for posterior urethral valves. J Indian AssocPediatrSurg 2004;9: 131-136.
20. Krueger RP, Hardy BE, Churchill BM. Growth in boys with posterior urethral valves.Primary valve resection vs upper tract diversion.UrolClin N Am 1980; 7 (2): 265- 272.