IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 19, Issue 1 Ser.10 (January. 2020), PP 19-23
www.iosrjournals.org

Evaluation of Prognostic Factors In Posterior Urethral Valve

[1]Dr.R.P. Dharmendra, [2]Dr.V. Muthulingam, Dr.M.A.Vaithiyalingam, Dr.PraveenKrishna.G
[1](Department of Pediatric Surgery,Coimbatore Medical College,Tamilnadu, India)
[2](Department of Pediatric Surgery,Coimbatore Medical College,Tamilnadu, India)
Corresponding Author: Dr.VMuthulingam

Abstract:
Background*: Posterior urethral valve represents the most common cause of congenital obstructive uropathy leading to childhood renal failure[1]. The prognosis for children with urethral valves is improving and current management is gradually rewriting the historical data Early (prenatal) recognition, control of infection, appropriate and selective surgery recognition of harmful urodynamic abnormalities, modern nephrology management and eventual dialysis and transplantation all combine to increase survival now to an extent unheard of in the past[2].*
Materials and Methods*: In this retrospective study, we registered 52 cases of posterior urethral valves out of which 7 cases are antenatally diagnosed, 24 cases were in the new born period, 13 cases were between 1 to 12 months of age group, 8 cases were between 1 to 4 years of age group.we analyze the various described prognostic factors, in our antenatally diagnosed patients.To determine the prognostic factors that predict the outcome of posterior urethral valve patients postnatally and to identify the significant of each individual factor in the long-term outcome.*
Results*: The most common initial procedure after stabilization of patients with posterior urethral valves was primary cystoscopic valve ablation which was carried out in 82% of patients (43 cases). serum creatinine value at the initial evaluation, at the age of 1 year and the final follow up in an individual prognostic factor that determines the outcome of the PUV in our group.Increased echogenicity of kidneys comparing with adjacent liver or spleen and absence of cortico-medullary differentiation is a bad prognostic indicator in our observation.*
Conclusion:*Early age group (<1 month) at initial presentation is a single most significant prognostic indicator in our observation. Serum creatinine level at the time of diagnosis, 12 months after valve ablation and at the time of last follow-up is the main factor that indicates the outcome of the disease.*
Key Word*:Ureterostomy, Prognosis in PUV, Bladder outlet obstruction*

Date of Submission: 06-01-2020 Date of Acceptance: 21-01-2020

I. Introduction

Posterior urethral valve represents the most common cause of congenital obstructive uropathy leading to childhood renal failure. The incidence of posterior urethral valve is approximately 1:5000 to 1:8000 infant males. Challenges faced by children with posterior urethral valve are multiple. Obstruction by valve is the process which involves the entire urinary system. Appropriate clinical suspicion remains the key to diagnosis which is confirmed by standard imaging techniques. The risk of renal compromise and ultimate renal failure is a potential problem for each patient. The outcome may be altered by appropriate intervention, but in most cases the renal development in-utero determines the need for eventual dialysis or transplantation.

The prognosis for children with urethral valves is improving and current management is gradually rewriting the historical data. In most modern large series neonatal deaths make upto only 2% to 3% of the series.

Early (prenatal) recognition, control of infection, appropriate and selective surgery recognition of harmful urodynamic abnormalities, modern nephrologic management and eventual dialysis and transplantation all combine to increase survival now to an extent unheard of in the past[3].

In the past, the treatment of posterior urethral valve was based primarily on the mechanism of obstruction and its relief. The current treatment of this condition is based upon our evolving knowledge of the consequences of bladed outlet obstruction. So, the quality of life in these patients, are very much improving in the recent days.

II. Material and Methods

This Retrospective observational study was carried out on patients of Department of Pediatric Surgery at Coimbatore Medical College and Hospital, Coimbatore, Tamilnadu, from January 2014 to December 2018.

Study Design: Retrospective observational study

Study Location: Coimbatore Medical College and Hospital, Coimbatore – 18

Study Duration: January 2014 to December 2018.

Sample size: 52 patients.

Inclusion criteria:

1. Male children with bladder outlet obstruction due to posterior urethral valve were included

Exclusion criteria:

1. Bladder Outlet obstruction other than PUV were excluded

Procedure methodology

In our retrospective study, we registered 52 cases of posterior urethral valves out of which 7 cases are antenatally diagnosed, 24 cases were in the new born period, 13 cases were between 1 to 12 months of age group, 8 cases were between 1 to 4 years of age group.

The initial diagnosis or suspicion of posterior urethral valve based on prenatal ultrasonography, UTI, or others (dehydration, electrolyte changes, palpable bladder, etc.,)

The patient's initial evaluation included renal function, urine culture, urine analysis upper and lower urinary tract ultrasonography and MCUG.

Among the 52 patients, 43 patients were treated by primary cystoscopyvalve ablation and the remaining cases underwent urinary diversion either vesicostomy (6 cases) or cutaneous ureterostomy.

All the above patients were evaluated regularly throughout their follow-up accessing the renal function. Urine culture and urine analysis; upper and lower urinary tract ultrasonography, MCUG and DMSA scan. The results were analyzed.

Our follow up protocols are

- Accessing the regular stream of urine post operatively,
- Monthly urine for culture and sensitivity
- MCUG after 6 months,
- Ultrasound KUB to assess the upper and lower urinary tract
- DMSA scan in needed patients.
- The results were analyzed

III. Result

Table 1: Age distribution

Age Group	No. of patients	Percentage
Newborn	13	25
1 – 12 months	31	59.62
1 – 4 years	8	15.38
Total	52	100

Table 2: Presentation

Presentation	**No. of patients**	**Percentage**
Antenatally diagnosed	7	13.46
Voiding symptoms	20	38.46
UTI	21	40.38
SEPSIS	4	7.70
Total	**52**	**100**

Table 3: Antenatally diagnosed cases

Expired	2
Lost to follow up	2
Primary fulguration	3

Table 4: Initial evaluation

Elevated renal parameters	20
Recurrent UTI	17
Increased echogenicity of kidney or altered CMD	12
Urosepsis	3

Table 5: Associated Anomalies

Ureterocele	1
Bilateral UDT	2
Urachal Cyst	1
Seizure disorder	1
Epididymo-orchitis	2

Table 6: Treatment

Treatment	**No. of patients**	**Percentage**
Primary valve ablation	43	82.70
Vesicostomy	6	11.54
Cutaneousureterostomy	3	5.76
Total	52	100

Table 7: Follow up

Follow up	**No. of patients**	**Percentage**
Fully continent on regular follow-up	12	23.08
Refulguration	6	11.53
Chronic renal failure	10	19.23
Recurrent UTI	10	19.23
Secondary Surgical procedures	9	17.31
Expired	5	9.62
Total	**52**	**100**

Table 8: Presence of Pop Off mechanism

Mechanisms	**No. of patients**	**Percentage**
VURD	7	53.85
Patent urachus	1	7.69
Bladder Diverticulum	5	38.46
Total	13	100

IV. Discussion

Our study included 52 patients of posterior urethral valves. Out of the 52 patients, 13 patients were in the newborn period (25%) and 25 patients were infants (59%). The duration of follow ranged from 1 year to 5 years. On comparing our study with same Cohort of study group by All India Institute of Medical Sciences, Delhi (M.Bajpaietal)[2], the most common age group at initial age group at initial presentation is in infants. Among the 38 patients with PUV, elevated serum creatinine value i.e., more than 0.8 mg/dl was present in 10 infants (34%) whereas in newborn 6 of 13 babies had elevated serum creatinine level. In the 1 to 4 years of age group, elevated value is present in 4 out of 8 cases.

The most common initial procedure after stabilization of patients with posterior urethral valves was primary cystoscopic valve ablation which was carried out in 82% of patients. (43 cases).

The remaining patients underwent diversion procedures either vesicostomy (6 patients) or cutaneous ureterostomy (3 patients). Although we have performeda greater number of diversion procedures before 2004, with the availability of newborn cystoscope we presently perform primary valve ablation in all cases except in few patients. In few centers like AIIMS, are started doing primary laser vaporization of valves even in the neonatal period but we are not having that facility at present. The percentage of patients who underwent primary valve ablation was highest in the newborn period. (80%). Out of the 52 patients, we did primary valve ablation in 43 cases.

If the patient is not fit for the primary valve ablation either due to urosepsis or poor general condition, we went for diversion procedures. 9 cases underwent diversion procedures either vesicostomy or bilateral uretrostomy[6]. Among the 9 patients, 3 were below 1 year of age group, and rests of the patients were above 1 year of age group. Considering the scenario primary valve ablation is ideal if the diagnosis of PUV at the earlier age group. On the initial evaluation, 20 out of 52 patients, have elevated from serum creatinine (>1.2 mg/dl) Out of the 20 patients, 10 had normal creatinine level i.e., <0.8 mg/dl at the age of 12 months and maintain within <1 mg/dl in the follow-up period. 2 patients had expired due to urosepsis and chronic renal failure. 8 patients had renal insufficiency in the regular follow up. Among the 8 patients, 4 of them had vesicoureteric reflux and renal scars in DMSA scan.

Considering this, serum creatinine value at the initial evaluation, at the age of 1 year and the final follow up in an individual prognostic factor that determines the outcome of the PUV in our group.

In this observation most of the patients in neonatal age group had renal failure at presentation, but one half of them had regained normal renal function by the time of follow-up. In patients with 1 to 4 years of age group the incidence of renal failure at present was similar (11 out of 21 patients) but the recovery was not liked early presentation. 7 patients had renal insufficiency in the follow-up period.

So early age at presentation is another good prognostic indicator in our observation.

Out of 9 patients who underwent diversion procedures initially,6 patients had improved and their renal function retired to normal in 2 years follow-up , even though they undergone various secondary surgical procedure like bladder augmentation, Mitrofanoff's procedure etc., So the treatment modality either primary valve ablation or diversion procedure does not affect the outcome of disease process in our study group. During the initial evaluation with ultra-sonogram, 11 patients had sonographically identifiable abnormalities in kidneys and bladder (absence of cortico medullary differentiation, increased echogenecity of kidney and thickened bladder). Out of the 11 patients 7 had chronic renal failure in the follow-up period, 3 of them expired, 1 patient had lost on follow-up, probably expired.

So increased echogenecity of kidneys comparing with adjacent liver or spleen and absence of cortico medullary differentiation is a bad prognostic indicator in our observation.

The presence of pressure Pop Off mechanisms like VURD, Patent Urachus, urinary ascitis, bladder diverticulum, are considered to be a good prognostic factors for various texts[4]. But in our study, its's not so. We had 12 patients with pressure pop off mechanism (7 VURD, 1 patent urachus and 4 bladder diverticulum) Out of the 12 patients 7 had renal insufficiency on follow up. It was probably due to late presentation. (all these patients were presented above 1 year)

So the presence of pressure pop off does not alter the long term outcome of disease in our observation.

Presence of vesicoureteric reflux (18 patients) also did not affect the long-term outcome.

Only few numbers of PUV patients (7 out of 52) diagnosed antenatally in our group. Among the 7 patients we had lost 4 patients. (either expired or lost onfollow-up). Only 3 patients came for treatment and they underwent primary valve ablation. Out of the 3 patients, 1 patient expired in the follow up period. **So the prognosis of antenatally detected cases of PUV in our centre is dismal[7].** Considering the outcome of primary valve ablation, out of the 43 patients, 6 had residual valves in the follow-up period, who needed residual valve ablation. In the remaining patients urinary stream became normal. All these patients are fully continent in the follow-up. Seven of our patients needed secondary surgical procedures like bladder augmentation, ureteric reimplantation, ureterocele excision etc., All these patients are in regular follow-up and 3 of them had renal insufficiency.

Presence of 1 or more renal scars in DMSA scan, signifies that the kidney would gone for a progressive failure later. 7 of the patients had renal scars initially and all these patients had renal failure on further follow-up[8]. During the follow-up period of 5 years, 5 of our patients had expired due to chronic renal failure and urosepsis. Among the 52 patients 12 patients had chronic renal failure and they are now in regular nephrology follow-up. Recurrent urinary tract infection had present in 10 of our patients post operatively posing a great challenge to treat and its mainly due to presence of high-grade reflux. Considering all these observations only 18 of our patients (34%) had good continence and no renal insufficiency in the 5 years follow-up and had a good quality of life.

Table 9 :Various described prognostic factors in the literature

Variable	Good Predictors	Poor Predictors
In – utero presentation (Weeks)	>24	<24
Amniotic fluid volume	Normal to moderately increased	Moderate to severely decreased
Sonographic appearance of renal parenchyma	Normal to slightly increased echogenicity	Increased echogenicity to frankly cystic
Fetal urinary values Sodium (mEq/L) Chloride (mEq/L) Osmolality (mOsm) Urinary output (ml/Hr) Beta 2 microglobulin	 <100 <90 <210 >2 <6	 >100 >90 >210 <2 >6

Table 10: Prognostic variables – after birth

Variable	Good Predictors	Poor Predictors
Sonographic identification of CMJ differentiation	Present Pyramids in atleast one kidney	Absent Hyperechoic, no pyramids
S.Crreatinine	< 0.8 at one year	> 0.8 at one year
Reflux	No reflux	Bilateral reflux
Continence	At 5 years	Incontinence
Pop off mechanisms Urinary Ascites Bladder diverticulum VURD] Patent urachus	Present Present Present Present	Absent Absent Absent Absent

In our study, only less number of patients are turned up antenatal visits so the antenatal assessment of prognosis is difficult. So most of the patients were assessed post natally with available investigations and clinical examinations.

V. Conclusion

Early age group (<1 month) at initial presentation is a single most significant prognostic indicator in our observation.
Serum creatinine level at the time of diagnosis, 12 months after valve ablation and at the time of last follow-up is the main factor that indicates the outcome of the disease.
The treatment modality either primary valve ablation or diversion procedures such as vesicostomy or cutaneous ureterostomy does not affect the outcome of disease process.
The prognosis of our antenatally detected PUV patients were dismal.
Absence of corticomedullary differentiation and altered cortical echoes in ultrasonography predict the poor prognostic outcome.
Presence of vesicoureteric reflux does not have any impact in the long-term outcome.
Presence of pressure pop off does not have any significance in our observation. Presence of one or more renal scars in DMSA scan is a definitive predictor for future renal impairment.
Only 34% of our patients had good quality of life without renal insufficiency in the 5-yearfollow-up.

Limitation-
Observational study.
Needs further follow-up to assess the long-term outcome in these cases.

References

[1]. Reinberg Y, De Castano I, Gonzalez R (1992) Influence of initial therapy on progression of renal failure and body growth in children with poeterior urethral valve. J Urol 148: 532-533
[2]. M Bajpai, S Dave, DK Gupta. Factors affecting outcome in the management of posterior urethral valve. Pediatric Surg Int(2001)17:11-15.
[3]. Egami K, Smith ED (1982) A study of the sequelae of posterior urethral valves. J Urol 127: 84-87
[4]. Warshaw BL, Hymes LC, Woodard JR (1982) Long term outcvome of patients with obstructive uropathy. Pediatric clinic North America 29: 815-826.
[5]. Nasir AA, Ameh EA, Abdul Rahman LO, Adeniran JO, Abraham MK. Posterior uretharal valve. Worl J Pediatric 2011: 7: 205-16.
[6]. OdetundeOl, Odefunde OA, Ademuyiwa AO, Okafor HU, Ekwochi U, Azubuike JC, et al. Outcome of late presentationof posterior urethral valves in a resource –limited economy: Challenges in management. Int J Nephrology. 2012: 2012: 345298.
[7]. Dinneen MD, Dhiloj HK, Ward HC, Duffy PG, Ransley PG. Antenatal diagnosis of posterior urethral valves. Br J Urol. 1993:72:3649.
[8]. Tejani M, Butt K, Glassberg K, Price A, GurumurthyK (1986). Predictiors of eventual end stage renal disease in children with posterior urethral valves. J Urol 136: 857-860.

Dr.R.P.Dharmendra, et.al. "Evaluation of Prognostic Factors In Posterior Urethral Valve".*IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 19(1), 2020, pp. 19-23.