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Outcome of children with posterior urethral valves: Prognostic factors**RA Kukreja, RM Desai, RB Sabnis, SH Patel, MR Desai**

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India**Abstract**

Posterior urethral valves present with a wide spectrum of renal and bladder pathology. These changes may persist despite successful treatment of the primary obstruction, leading to a gradual progress towards renal insufficiency. This study reviews retrospectively a series of 70 children with posterior urethral valves who presented at our institute over the last 10 years, with an aim to identify the prognostic factors and help in defining the end result and implicating the correct treatment protocol. These included age at presentation and intervention (less than or more than 2 years), recurrent urosepsis, presence of vesico-ureteric reflux, renal parenchymal damage as seen on ultrasound, vesical dysfunction and the nadir serum creatinine level. 29% of children had renal insufficiency at the end of 3-years «SQ» follow-up. Factors important in the progression towards renal insufficiency were evaluated. Factors found to be statistically significant with a p value <0.05 were age at intervention more than 2 years, recurrent urosepsis, bilateral high grade vesico-ureteric reflex, bilateral parenchymal damage as seen on ultrasonography and nadir serum creatinine of more than 0.8 mg%.

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Available from: <http://www.indianjurol.com/text.asp?2001/17/2/141/21044>**Full Text****Introduction**

Posterior urethral valves present with a wide spectrum of renal and bladder pathology, including damage to the renal parenchyma as well as to the smooth muscle function of the ureter and bladder. These changes may persist despite successful treatment of the primary obstructing posterior urethral valves leading to renal insufficiency, which is the primary cause of morbidity and mortality in these children. Incidence of renal failure in literature is reported at 25-35%. [1],[2],[3],[4] Much work has been done to identify the factors that predict the final outcome in these cases so as to prognosticate the end result and implicate the correct treatment protocol. [2],[4] This study reviews retrospectively a series of 70 children with posterior urethral valves who presented at our institute over the last 10 years with an aim to identify these prognostic factors.

Material and Methods

70 children with posterior urethral valves presented during the period of 1988-1997. The average duration of follow-up was 3 years. A routine haemogram, routine urine analysis and culture examination, serum creatinine and electrolytes, ultrasound examination and micturating cystourethrogram (MCUG) constituted the baseline investigations. All the patients were put on a per-urethral catheter drainage at admission, which was continued till the serum creatinine level stabilized, with 2 consecutive levels showing no further drop. This was followed by primary valve fulguration and continuous chemoprophylaxis. At follow-up, weight and height estimation of the child, urine routine and culture analysis, serum creatinine estimation and ultrasound examination were done to assess the progress of the child. MCUG was done at either 3 or 6 monthly follow-up. Indication for a urodynamic evaluation included persistent upper tract dilatation or rising serum creatinine inspite of an adequate bladder drainage and persistent voiding dysfunction after an adequate valve fulguration.

Factors that could play a role in the final outcome were studied. These included age at presentation and intervention (less than or more than 2 years), recurrent urosepsis (3 or more), presence of vesico-ureteric reflux, renal parenchymal damage as seen on ultrasound, vesical dysfunction and the nadir serum creatinine level. These were put through a statistical analysis test (chi square test). Patients were divided into those with normal renal function and those with renal insufficiency. The criterion of renal insufficiency was an elevated serum creatinine level as per the age of the child.

Results

Per-urethral catheter drainage was instituted in all the 70 patients with an average duration of 2.6 days. 35 patients had vesicoureteric reflux on the initial MCUG. 5 of which were low grade (I-III) and the remaining high grade (IV-V). Serum creatinine stabilized at >0.8mg% in 22 patients, while 48 patients had a nadir creatinine of 5 yrs) and were put on clean intermittent self-catheterization.

Discussion

Posterior urethral valves cause a broad array of renal parenchymal and vesical dysfunction. Because urethral valves are present during the earliest phase of fetal development, primitive tissues mature in an abnormal environment of high intraluminal pressure resulting in permanent maldevelopment (hydronephrotic, cystic or dysgenetic kidneys) and long-lasting functional abnormalities, with gradual progress towards renal insufficiency. [5],[6],[7],[8] Incidence of renal failure in literature is reported at 25-35%. [1],[2],[3],[4] Factors possible in defining the final outcome were evaluated in this series.

1. Age at intervention

Our study showed that deterioration of renal function occurred in 16% of children with intervention before age of 2 years, as compared to 77% after 2 years. This finding correlates well with those of Tejani and Mayor and associates. [2] The process of nephrogenesis, which continues to mature till the attainment of maximum glomerular filtration till the age of 2 years, allows some degree of compensation after an early intervention. [9]

In a country like ours, lack of awareness of normal urinary stream and poor patient compliance plays a major role in defining the final outcome. Early referral by primary health centres will facilitate early diagnosis and intervention, which in turn improves renal function.

2. Recurrent urosepsis

In the current series, the incidence of renal insufficiency in patients with urosepsis was 76%. Recurrent urosepsis (fever with urine culture showing infection) primarily due to the poor patient compliance (as regards to follow-up and chemoprophylaxis) leads to progressing pyelonephritis and nephron damage and plays an important role in the ultimate outcome of these children. [4]

3. Vesico-ureteric reflux

Vesico-ureteric reflux is present at initial diagnosis in 30.70% of boys with valves. [10],[11] Bilateral high-grade vesicoureteric reflux is associated with high incidence of renal insufficiency due to associated primary renal dysplasia and recurrent ascending pyelonephritis. [11] In our series, 12 children had bilateral high grade vesico-ureteric reflux, 10 (83%) of which had chronic renal failure.

The role of unilateral reflux as a pop-off valve mechanism [6] by buffering the high intravesical pressure, with its protection to the opposite kidney, is true only if the contralateral kidney does not show primary dysplastic changes. [2] The incidence of renal insufficiency in cases with unilateral reflux in this series was 33% (6/18). Of these 6 cases, one had a solitary kidney, while the other 5 had significant parenchymal damage in the opposite renal unit as seen on ultrasound.

4. Renal parenchymal damage as seen on ultrasound

Besides assessing the upper tract dilatation, ultrasound examination also serves to assess the state of renal parenchyma. Features of renal parenchymal damage on ultrasound include increased cortical echogenicity, loss of corticomedullary differentiation and atrophic and irregular cortex.

Presence of these factors on ultrasonography hint towards renal insufficiency. [12] Of the 10 cases with unilateral renal parenchymal damage as seen on ultrasonography, 4 progressed to renal insufficiency, while 6 had normal renal parameters. Evidence of bilateral parenchymal damage was seen in 16 cases, all of which progressed to renal insufficiency. Hence presence of bilateral renal parenchymal damage on ultrasonography indicates 100% progression towards renal insufficiency.

5. Bladder dysfunction

Bladder dysfunction may be associated with posterior urethral valves in 13 to 38% of patients and may or may not be reversible after relief of obstruction. Urodynamic abnormalities are present in 20 to 88% of boys with posterior urethral valves. [13],[14],[15] A urodynamic evaluation should be done in all children, who after an adequate valve fulguration show presence of urge incontinence, high post-void residue or a progressive increase in upper tract dilatation or renal insufficiency. Peters & Bauer had described 3 major categories of bladder dysfunction:

Acontractile bladder
Detrusor instability
Low compliant, small capacity with high filling bladder pressure. [14]

These prevent adequate upper tract drainage with subsequent increasing dilatation and damage to the upper tracts. Anticholinergic therapy improves bladder compliance, decreases detrusor instability, improves continence and facilitates upper tract drainage in the majority of boys as seen in 7 boys in our series.

Clean intermittent catheterization should be done for hypocontractile bladders as in 2 of our children with renal insufficiency. Both presented at age of above 5 years, indicating the lengthy duration of obstruction leading to decompensation of bladder musculature.

6. Nadir serum creatinine

The baseline serum creatinine after adequate bladder and upper tract drainage indicates the baseline renal parenchymal functional status. [16] 16 out of the 20 children with renal insufficiency in this series had a baseline serum creatinine of more than 0.8mg%, which was more than twice the normal for their respective age. Hence a nadir serum creatinine of more than 0.8mg% prognosticates subsequent renal insufficiency.

Conclusion

The incidence of renal insufficiency in children with posterior urethral valves in this series was 29% with an average follow-up period of 3 years. Factors important in prognosticating the progression towards renal insufficiency were:

Age at intervention more than 2 years
Recurrent urosepsis
Bilateral high grade reflux
Bilateral parenchymal damage as seen on ultrasonography
Nadir serum creatinine more than 0.8 mg %.

Early evaluation and proper management with prolonged follow-up of these factors is necessary, since endstage renal disease can occur many years later. An early renal transplantation (prepubertal) in these children would help them to achieve a normal growth pattern and reach adulthood.

References

- Churchill BM, Krueger RP, Fleicher MH, Hardy BE. Complications of posterior urethral valve surgery and their prevention. *Urol, Clin North Am* 1983; 10: 519-523.
- Cuckow PM, Dinneen MD, Risdon RA, Ransley PG, Duffy PG. Long-term renal function in the posterior urethral valves, unilateral reflux & renal dysplasia syndrome. *J Urol* 1997; 158: 1004-1007.
- Cysen LJ. Cystic kidneys in children with congenital urethral obstruction. *J Urol* 1971; 106: 939-942.
- Parkhouse HF, Barratt TM, Dillon MJ et al. Long-term outcome of boys with posterior urethral valves. *Br J Urol* 1988; 62: 59-62.
- Kim YH, Horowitz M, Combs AJ et al. Comparative urodynamic findings after primary valve ablation, vesicostomy or proximal diversion. *J Urol* 1996; 156: 673-676.
- Kim YH, Horowitz M, Combs AJ et al. Management of posterior urethral valves on the basis of urodynamic findings. *J Urol* 1997; 158: 1011-1016.
- Peters CA, Bolkier M, Bauer SB et al. The urodynamic consequences of posterior urethral valves. *J Urol* 1990; 144: 122-126.
- Bauer SB, Dieppa RA, Labib KK, Retik AB. The bladder in boys with posterior urethral valves: a urodynamic assessment. *J Urol* 1979; 121: 769-773.
- Rittenberg MH, Hulbert WC, Snyder HM, Duckett JW. Protective factors in posterior urethral valves. *J Urol* 1988; 140: 993-995.
- Beck AD. The effect of intrauterine urinary obstruction upon the development of the fetal kidney. *J Urol* 1971; 106: 784-787.
- Tejani A, Butt K, Glassberg K, Price A, Gurumurthy K. Predictors of eventual end stage renal disease in children with posterior urethral valves. *J Urol* 1986; 136: 857-860.
- Muller MG, Ransley PG, Cuckow PM, Combs AJ, Barratt TM. The results of primary valve ablation in children with posterior urethral valves. *J Urol* 1999; 161: 1000-1004.

- 12 Hulbert WC, Rosenberg HK, Cartwright PC, Duckett JW, Snyder HM. The predictive value of ultrasonography in evaluation of infants with posterior urethral valves. J Urol 1992; 148: 122-124.
- 13 Peters CA, Carr MC, Lais A, Retik AB, Mandell J. The response of the fetal kidney to obstruction. J Urol 1992; 148: 503-509.
- 14 Johnston JH, Kulatilake AE. The sequelae of posterior urethral valves. Br J Urol 1971; 43: 743-748.
- 15 Chevalier RL. Renal physiology and function. In: Kelalis PP, King LIZ, Belman AB (eds.). Clinical Pediatric Urology 3rd (ed.). Saunders, Philadelphia, 1992: 1106-1120.
- 16 Warshaw BL, Hymes LC, Trulock TS, Woodard JR. Prognostic features in infants with obstructive uropathy due to posterior urethral valves. J Urol 1985; 133: 240-243.

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