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The Importance of Second Look Cystoscopy after Posterior Urethral Valve Ablation in Children: Single Center Experience

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Abstract

Objectives: This study was designed to assess the importance of second look cystoscopy after primary ablation of posterior urethral valve in children.

Patients and Methods: A prospective study was conducted at Kasr Al Ainy Pediatric Hospital (Aboulreesh), Urology Department, Cairo University on 50 male children, diagnosed to have posterior urethral valve between September 2016 and June 2017. Diagnosis of posterior urethral valve was made by voiding symptoms, ultrasonography and confirmed by voiding cystourethrogram. All children were treated by endoscopic ablation of posterior urethral valve using cold knife and were followed clinically for voiding symptoms and with ultrasonography and laboratory tests. All patients underwent 2nd look cystoscopy one month after primary valve ablation to see residual valves as a routine procedure irrespective of the improvement in symptoms, ultrasonography or laboratory results.

Results: Mean age at presentation was 8.3 ± 12.6 months. The presenting symptoms were acute urine retention in (44%); obstructive symptoms in (42%), recurrent febrile UTI in (10%) and two patients (4%) underwent primary valve ablation based on antenatal diagnosis. 92% showed hydronephrosis at presentation. Serum creatinine was elevated in 72% at presentation. Residual valves on 2nd look cystoscopy were found in 60%. No evidence of significant statistical relationship between symptoms and investigation results before and after valve ablation and the presence of residual valve during 2nd look cystoscopy after 1ry valve ablation except for the age at presentation (p=0.021) and the presence of post-voiding residual urine in post-ablation ultrasound (p=0.035).

Conclusion: The 2nd look cystoscopy one month after 1ry valve ablation is important for early detection of any residual obstructive valve irrespective of improvement in the clinical symptoms, ultrasonography, or laboratory results.

Keywords: PUV; Endoscopic valve ablation; Residual valve; 2nd Look cystoscopy

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Introduction

Posterior Urethral Valves (PUV) is life-threatening congenital anomalies causing lower urinary tract obstruction in male neonates [1]. They are found in 1 in 1,250 in a population undergoing fetal US screening [2]. Clinical presentation depends on the degree of outlet obstruction which is determined by the severity and configuration of the valves [3]. If not early managed it can be the cause of renal failure in 25% to 30% of cases before adolescence, in addition to other considerable morbidities as UTI, vesicoureteric reflux, voiding dysfunction and even death [4]. Diagnosis of the condition may be suspected antenatal with ultrasound scanning in the presence of fetal proximal urethral dilatation, hydronephrosis (usually bilateral) and oligohydramnios. However, the diagnosis should be confirmed postnatally with micturate cystourethrogram which shows the classical posterior urethral dilatation and bladder trabeculation [5]. Management of PUVs remains a real challenge, requiring long-term management through childhood in order to avoid progressive structural and functional deterioration of both upper and lower urinary tracts. The main and gold standard therapy is endoscopic ablation of the valve as early as it can be [6]. Residual valve remnants after ablation can result in progressive dysfunction of the urinary bladder and the upper tract [7-9]. We tried in this study to evaluate the importance of doing second look cystoscopy one month after

primary cystoscopy and valve ablation for detection of residual valve remnants and to assess pre and post ablation prognostic factors.

Patients and Methods

This prospective study was conducted at our institute on 50 male children with posterior urethral valve after ethical committee approval between the period of September 2016 and September 2017. For proper diagnosis, all patients were clinically evaluated by proper history taking from the parents or the caretakers along with detailed general, abdominal and genital examination, laboratory investigation including serum creatinine, blood electrolytes, urine analysis, culture and sensitivity in addition to radiological evaluation with pelvi-abdominal ultrasonography and ascending and maturate cystourethrogram. Initial management was targeted to decompress the urinary system. Primary valve ablation was done for medically stable patients. As for medically unfit patients, catheter drainage was done in addition to intravenous fluids and antibiotics and correction of metabolic disturbances. After medical stabilization, patients underwent valve ablation. A dose of intravenous antibiotic was given at induction of anesthesia. In the lithotomy position diagnostic cystoscopy using 11Fr neonatal Cystoscope and zero lenses were performed. The posterior urethra was carefully inspected and the valve configuration was noted. The configuration of the bladder neck and appearances of the bladder and ureteric orifices were also properly inspected. Valve resection was performed at the 5, 7 and 12 o'clock positions using cold knife and a urethral catheter was placed at the end of the procedure to allow good bladder drainage. After 48 h to 72 h the catheter was removed allowing the patient to void spontaneously. Severely ill and very low weight children, PUV children with primary valve ablation done outside our hospital, children with history of previous cystoscopy operations and PUV children with history of vesicostomy were excluded from our study. All patients were routinely followed clinically for symptomatic improvement. After one month, follow up laboratory investigations were done to assess improvement of serum creatinine and blood electrolytes and follow up pelvi-abdominal ultrasonography was done to detect resolution of upper tract dilatation and to assess the post-voiding residual urine volume after valve ablation. All patients had a follow-up (second look) cystoscopy after 1 month of the primary procedure to ensure completeness of valve ablation. The data were statistically described in terms of Standard Deviation (SD), mean, median, range or frequencies (number of cases) and percentage when appropriate. All statistical calculations were done using computer programs SPSS (Statistical Package for Social Sciences Inc., Chicago IL., USA) version 15 for Microsoft Windows and the graphs were done using Microsoft Excel 2007. Comparisons between variables of two groups were done by Mann-Whitney Rank Sum test for non-parametric data. Comparing categorical variables were done by Chi-square test or Fischer exact test for small sample size. All p-values were two-sided and considered significant when p-values were less than 0.05.

Results

Fifty children were included in our study. The age in all patients was less than 5 years old, ranged at presentation from 0 to 53 months, with mean age 8.3 ± 12.6 months. The majority of cases, 43 patients (86%) were ≤ 1 year, while only 7 patients (14%) were >1 year old. Analysis of the clinical data showed that the most common presenting symptoms in those boys were acute urine retention in 22 patients (44%), obstructive urinary symptoms in 21 patients (42%), recurrent febrile UTI in 5 patients (10%) and two patients (4%) underwent primary valve ablation based on antenatal diagnosis. Fifteen patients (30%) were diagnosed antenatal of whom 8 patients (16%) presented with acute urine retention postnatally, 5 patients (10%) had postnatal obstructive urinary symptoms and two patients (4%) were asymptomatic. Urethral catheters were fixed at presentation to 43 patients (86%), while 7 patients (14%) underwent primary valve ablation without urethral catheter fixation. Serum creatinine was done for all patients at the time of presentation. Thirty six patients (72%) presented with elevated creatinine while 14 patients (28%) had normal creatinine level. Serum creatinine ranged from 0.2 to 8 mg/dl with a median level of 1.0 mg/dl and a mean value of 1.82 mg/dl ± 1.87 mg/dl. By the time of valve ablation, 33 patients were still having elevated creatinine. At presentation, renal US findings were as follows: 46 patients (92%) had renal back pressure changes; 42 patients (84%) had bilateral hydronephrosis and 4 patients (8%) had unilateral hydronephrosis; 3 patients (6%) had nephropathy kidneys patients (4%) unilateral and 1 patient (2%) bilateral [2]. After valve ablation, out of the 43 patients (100%) patients who presented originally with obstructive symptoms or urine retention, 32 patients (74%) improved, while in 11 patients (26%) symptoms were not improved. Follow-up of serum creatinine one month after the primary PUV ablation showed that creatinine post ablation ranged from 0.23 to 1.3 mg/dl with a mean value of 0.614 ± 0.253 mg/dl. Out of the 33 patients (100%) with elevated serum creatinine before valve ablation, serum creatinine level was improved in 16 patients (48%) after valve ablation, while it was not improved in 17 patients (52%). Regarding hydronephrosis, out of the 46 patients (100%) with hydronephrosis before valve ablation, back pressure changes were improved in 29 patients (63%) and were not improved in 17 patients (37%). Using ultrasound, post voiding residual urine was found in 13 patients (26%) with a mean value of 15.16 ± 25.97 cc, while no significant post-voiding residual urine was found in 37 patients (74%). Second look cystoscopy was done for all patients after one month from the primary valve ablation. In 30 patients (60%), residual valve was found and re-ablated and the other 20 patients (40%) were free. Results of 2nd look cystoscopy (presence of residual valve or not) were assessed in correlation to variables at presentation; obstructive symptoms or retention, febrile UTI, US (hydronephrosis; whether present or not, unilateral or bilateral), raised creatinine, and urethral catheter fixation. Correlation between results of second look cystoscopy (presence of residual valve or not) and post-ablation course was also assessed; presence of residual volume, improvement of obstructive symptoms, creatinine improvement, and US improvement after 1ry ablation. Within the 20 patients who had no residual valve during 2nd look cystoscopy, the age at presentation ranged from 1 to 17 months with a mean of 3.2 ± 4.085 months, serum creatinine at presentation ranged from 0.3 to 5.5 mg/dl with a mean of 1.7 ± 1.615 mg/dl, serum creatinine one month after primary valve ablation ranged from 0.2 to 1.3 mg/dl with a mean of 0.665 ± 0.308 mg/dl and the mean post-voiding residual urine volume was 10.2 ± 22.997 cc. As regards the 30 patients who had residual valve during 2nd look cystoscopy, the age at presentation ranged from 1 to 53 months with a mean of 11.8 ± 15.089 months, serum creatinine at presentation ranged from 28 to 8 mg/dl with a mean of 1.91 ± 2.054 mg/dl, serum creatinine one month after primary valve ablation ranged from 0.2 to 1.2 mg/dl with a mean of 0.58 ± 0.209 mg/dl and the mean post voiding residual urine volume was 18.47 ± 27.658 cc. Using Mann-Whitney Test, the data were compared according to the presence or absence of residual valve. Regarding the age of presentation; the mean rank of the group of

patients who had no residual valve during 2nd look cystoscopy (mean rank =19.95) is statistically lower than the mean rank of the group of patients who had residual valve during 2nd look cystoscopy (mean rank =29.2). There was evidence of a significant statistical relationship between the age of patients at presentation and the presence of residual valve during 2nd look cystoscopy after 1ry valve ablation (p=0.021). On the other hand, there was no evidence of statistically significant relationship between the presence of residual valve during 2nd look cystoscopy after 1ry valve ablation and obstructive symptoms or retention at presentation (p=0.687), febrile UTI (p=0.075), raised creatinine at presentation (p=0.095), hydronephrosis at presentation (p=1.000), or urethral catheter fixation (p=0.687). As for the post-operative course, a significant statistical relationship was also evident between the presence of post-voiding residual urine in post-ablation ultrasound (Chi-square =4.435, DF=1, p=0.035) and the presence of residual valve during 2nd look cystoscopy after 1ry PUV ablation. There was no significant statistical relationship between the presence of residual valve during 2nd look cystoscopy after 1ry valve ablation and obstructive symptoms improvement post ablation (p=0.156), serum creatinine improvement post ablation (p=0.845) or hydronephrosis improvement post ablation (p=0.526).

Discussion

The incidence of PUV remnants after ablation is not low. Therefore, follow up after ablation and confirmation of the absence of any valve remnant should not be undervalued [10,11]. Efforts are still ongoing trying to find the ideal method of follow-up and to investigate the pre and post-operative clinical, laboratory, and radiological prognostic factors in relation to the incidence of residual valve remnants. Regarding follow-up, studies were held to assess the use of VCUG to measure the posterior to anterior urethral ratio after valve ablation however, there was no clear cut-off value. In addition, VCUG has high false negative and positive predictive values and so, if used alone it will be an inexact test [12]. Owing to the severe structural and functional hazards that can be caused by residual valve after ablations, many experts go for follow-up cystoscopy for proper assessment of valve remnants [10,13]. Nawaz et al. reported on 50 cases of posterior urethral valve. The 2nd look cystoscopy was done for them all. They found that residual valve was present in 78% of cases [14]. Oktar et al. reviewed the records of 127 cases where repeat arthroscopy was done in 21 (20.8%). Residual valve was detected in 10 patients (10/21; 47.6%) [15]. Similarly, Imaji et al. found that the incidence residual valve was 47% [16]. Lower incidence of PUV remnants in follow-up cystoscopy had been reported by Basu et al. (6.2%), Sudarsanan et al. (13%), Lal et al. (13.4%) and Mirshemirani et al. (15.3%) [17,18]. Series, 2nd look cystoscopy was done after one month for all cases; residual valve was found in 60% of cases. The incidence of residual PUV in our study was as high as found by Nawaz et al. as 2nd look cystoscopy was done for all cases. On the other hand, others had lower incidence values as they performed check cystoscopy only when residual valve was suspected clinically or based on radiological findings. As regards the pre and post operative variables, most of the published studies focused on the relation of these prognostic factors to the long term effect on the kidney functions. In 2014 Shirazi et al. studied several pre operative variables as prognostic factors for the risk of residual valve remnants. They found that the risk of residual remnants was higher with younger age group at the time of valve ablation. In addition, the presence of increased renal echogenicity, as well as the presence and grade of reflux were also significantly higher in patients with valve residuals [11]. In our study, we found that the only variables that had a statistically significant relationship with the risk of having valve remnants were the age at presentation and the presence of significant post-voiding residual urine after valve ablation. On the contrary to Shirazi et al. we found that higher age patients were associated with a higher risk of residual valve remnants in the second look cystoscopy. We have no definite explanation for this finding except for the probability of more valve hypertrophy caused by longstanding high pressure on the valve leaflets with higher age. In any event, up till now, there is no precise method to ensure the absence of residual valve remnants except direct visualization of the urethra after primary ablation the proper timing of the second look cystoscopy is debatable. Most studies performed follow up cystoscopy at 3 to 6 months after ablation. However, it seems more advantageous to do follow-up earlier in the first month owing to the structural and functional hazards that can affect the bladder and the upper tract as a result of partial obstruction caused by valve remnants [7,9].

Conclusion

A significant percentage of patients have residual valves on 2nd look cystoscopy. We recommend 2nd look cystoscopy one month after 1ry valve ablation for early detection of any residual obstructive valve even with the improvement of the other follow up parameters in these patients.

References

1. Heikkilä J, Holmberg C, Kyllönen L, Rintala R, Taskinen S. Long-Term Risk of End Stage Renal Disease in Patients with Posterior Urethral Valves. J Urol. 2011;186(6):2392-6.
2. Thomas DF, Gordon AC. Management of prenatally diagnosed uropathies. Arch Dis Child. 1989;64(1):58-63.
3. Nasir AA, Ameh EA, Abdur-Rahman LO, Adeniran JO, Abraham MK. Posterior urethral valve. World J Pediatr. 2011;7(3):205-16.
4. Hutton KA. Management of posterior urethral valves. Curr Paediatr. 2004;14:568-75.
5. Hodges SJ, Patel B, McLorie G, Atala A. Posterior urethral valves. Scientific World J. 2009;9:1119-26.
6. Sarhan O, El-Ghoneimi A, Hafez A, Dawaba M, Ghali A, Ibrahiem el H. Surgical complications of posterior urethral valve ablation: 20 years experience. J Pediatr Surg. 2010;45(11):2222-6.
7. Burmeister D, AbouShwareb T, DAgostino R Jr, Andersson KE, Christ GJ. Impact of partial urethral obstruction on bladder function: time-dependent changes and functional correlates of altered expression of $Ca2^{+}$ signaling regulators. Am J Physiol Renal Physiol. 2012;302(12):1517-28.
8. Mirone V, Imbimbo C, Longo N, Fusco F. The detrusor muscle: an innocent victim of bladder outlet obstruction. Eur Urol. 2007;51(1):57-66.
9. Levin RM, Chichester P, Hass MA, Gosling JA, Buttyan R. Obstructive bladder dysfunction: morphological, biochemical and molecular changes. Eur Urol Suppl. 2002;1(9):14-20.
10. Horowitz M, Harel M, Combs A, Glassberg K. Surveillance cystoscopy in the management of posterior urethral valves. J Urol. 2009; 181(4):172.
11. Shirazi M, Farsiani M, Natami M, Izadpanah K, Malekahmadi A, Khakbaz A. Which Patients Are at Higher Risk for Residual Valves After Posterior Urethral Valve Ablation? Korean J Urol. 2014;55(1):64-8.
12. Smeulders N, Makin E, Desai D, Duffy PG, Healy C, Cuckow PM, et al. The predictive value of a repeat micturating cystourethrogram for remnant leaflets after primary endoscopic ablation of posterior urethral valves. J Pediatr Urol. 2011;7(2):203-8.
13. Babu R, Kumar R. Early outcome following diathermy versus cold knife

ablation of posterior urethral valves. J Pediatr Urol. 2013;9(1):7-10.

14. Nawaz G, Hussain I, Muhammad S, Jamil MI, Rehman AU, Iqbal N, et al. Justification For Re-Look Cystoscopy After Posterior Urethral Valve Fulguration. J Ayub Med Coll Abbottabad. 2017;29(1):30-32.

15. Oktar T, Salabas E, Acar O, Atar A, Nane I, Ander H, et al. Residual valve and stricture after posterior urethral valve ablation: How to evaluate? J Pediatr Urol. 2013;9(2):184-7.

16. Imaji R, Dewan PA. Congenital posterior urethral obstruction: re-do fulguration. Pediatr Surg Int. 2002;18(5-6):444-6.

17. Basu AK, Banerjee S, Haque J, Chakravarty US, Ghosh A, Mitra D, et al. Posterior urethral valves–report of a single private clinic in Kolkata. J Indian Assoc Pediatr Surg. 2003;8(3):144-7.

18. Sudarsanan B, Nasir AA, Puzhankara R, Kedari PM, Unnithan GR, Damisetti KR. Posterior urethral valves: a single center experience over 7 years. Pediatr Surg Int. 2009;25(3):283-7.