Posterior urethral mini-valves causing urinary tract infection: A report of 3 cases

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ABSTRACT
Posterior urethral valves have myriad presentations based on the severity of obstruction with the milder end of spectrum often termed as mini-valves. The simultaneous occurrence of ureteropelvic junction obstruction and urethral valves has not been described before and is most likely coincidental. Herein, we discuss the management of three boys who had febrile urinary tract infection following pyeloplasty and on evaluation were found to have valves. This article highlights the need for considering these mini-valves as a possibility in boys presenting with symptoms following pyeloplasty so as to avoid delay in diagnosis and unnecessary morbidity in these children.

INTRODUCTION
Since the initial description of urethral valves 50 years ago, there have been many papers on the subject, generally describing children with extreme urinary tract damage, hydronephrosis, uremia, and a high morbidity rate. Unquestionably, this is true in certain cases; however, as Hendren stated, “the picture as usually described is but one end of a spectrum and there are many less severe and dramatic cases which escape recognition.”[1]
Although various authors have described this milder spectrum of posterior urethral valve (PUV) or the so-called “mini-valves,” it continues to be a source of controversy.[1-5] Herein, we describe three cases of ureteropelvic junction obstruction (UPJO) who, on evaluation for urinary tract infection (UTI) following pyeloplasty, were diagnosed to have PUVs or the so-called “mini-valves.” These mini-valves may be a rare but unrecognized cause of UTI in children following pyeloplasty.

CASE REPORTS

Case 1
A 5-year-old boy presented with a history of left flank pain for the past 1 year. He had undergone evaluation outside and was diagnosed to have left UPJO, for which he was advised surgery. Physical examination was unremarkable. His urine examination showed pyuria, and his serum creatinine was 0.3 mg/dl. An ultrasound showed left gross hydronephrosis with no ureteric dilatation, and a diethylenetriaminepentaacetic acid (DTPA) scan showed obstruction at the level of ureteropelvic junction (UPJ). He underwent an uneventful laparoscopic dismembered pyeloplasty, and a narrow segment of 5 mm at the level of UPJ was excised. Following pyeloplasty, the patient started having spikes of fever which were persistent despite a change of antibiotics. Assuming the possibility of a stent blockage, stent exchange was done and a retrograde pyelogram done at that time showed no anastomotic leak and unobstructed flow of contrast through the anastomosis. During urethroscopy, it was noticed that there was a valvular structure in the posterior urethra, similar to a PUVs [Figure 1]. On further...
questioning the parents, a history of straining and occasional enuresis was obtained. A micturition cystogram (MCUG) was done which showed evidence of narrowing close to bulbomembranous junction [Figure 2a]. A cystourethroscopy and valve ablation along with stent removal was performed. Postoperatively, the catheter was removed after 48 h, and the patient voided well and there were no further episodes of fever. Six months post-operatively, a DTPA renogram showed good improvement of function with unobstructed flow.

Case 2
A 9-year-old boy presented with a history of multiple episodes of febrile UTI following ureterocalicostomy done 3 months prior in another center for a grossly hydroureter nephrotic left kidney due to UPJO. He gave a history of voiding symptoms, and his urine examination showed pyuria and bacteriuria. An ultrasound revealed moderate left residual hydronephrosis with no ureteric dilatation and DTPA showing delayed drainage. An MCUG was done which showed features suggestive of PUV [Figure 2b]. A cystourethroscopy revealed valves, which were ablated at 5 and 7 o’clock using a pediatric resectoscope and a hook electrode. Postablation, the patient voided well and had no further episodes of UTI. At 3 months of follow-up, he was voiding well and had demonstrable improvement in drainage on DTPA study.

Case 3
A 9-month-old boy presented with a history of febrile UTI, turbid urine, and poor urinary stream since birth. He had undergone a left open pyeloplasty at 4 months of age for UPJO; however, following pyeloplasty, he continued to be symptomatic. On examination, he had a palpable kidney and his urine examination showed pyuria and bacteriuria. An ultrasound showed gross left hydronephrosis with no ureteric dilatation. A DTPA scan showed a poorly functioning kidney with obstruction at level of UPJ. An MCUG showed features suggestive of PUV [Figure 2c]. A cystourethroscopy confirmed the suspicion of valves which were ablated. Postablation, he voided well and had no UTI; however, due to persistent obstruction at UPJ, he underwent a redo open pyeloplasty after one month. At 6 months of follow-up, the boy is doing well with marked reduction in hydronephrosis and demonstrable improvement in drainage on radionucleotide study.

DISCUSSION
There is a broad spectrum of any type of congenital malformation, one end of which is close to normal with no disability, and the other end of which is severe, and grossly abnormal. In the case of PUV, the existence and significance of the mild group of PUVs has been a source of controversy. Campbell and Harrison recognized that valves frequently are missed, and Hendren demonstrated that valves present in a broad clinical spectrum, which may cause minor, moderate, or severe urinary tract malfunction, and the radical classification into obstructive and nonobstructive has undermined the knowledge of their true incidence. Kurth et al. and Crooks have also supported the validity of the mini valves. The cornerstone of the diagnosis of mini PUV lies in a very strict correlation of the radiological and endoscopic findings. The excellent reported results obtained by the endoscopic treatment of mini valves clearly confirm the validity of their diagnosis. In Pieretti’s series, 34 of 36 patients with mini valves were cured or improved of their disturbing symptoms. Mini valves are not a progressive and life-threatening disease; however, on the other hand, it is true that a rather simple operation can cure or improve most affected patients. Unfortunately, the literature on these mini-valves is limited, and in clinical practice, they are mostly encountered in

Figure 1: Cystoscopic view of valves seen in the posterior urethra

Figure 2: Micturition cystogram pictures showing minimal narrowing at the bulbomembranous junction (black arrow) suggestive of valves. (a) Case 1, (b) Case 2, and (c) Case 3
isolation, and they rarely form a part of a collection of congenital lesions. To our knowledge, the simultaneous occurrence of UPJO and PUVs in our series cannot be explained on an embryological basis as the source of UPJO and PUV development is different and should be construed as unrelated events. Hence, routinely, investigating the coexistence of PUV and UPJO cannot be recommended based on this series.

However, this series highlights the need for careful evaluation of patients who present with voiding symptoms or febrile UTI following a pyeloplasty. We believe that one of the reasons the valves may have been missed in routine practice may be the fact that these patients are referred to hospitals following sonographic detection of hydronephrosis with no ureteric dilatation, suggestive of UPJO, with focus shifting to management of this condition at the expense of a detailed history and examination. Another reason may be the fact that these mini-valves as evidenced in our series do not have the typical obstructive features of more severe cases of PUV such as severe posterior urethral dilatation and reflux with dilated ureters. We hypothesize that these milder variants typically would have presented later in life with enuresis and voiding symptoms, but the insertion of stent following pyeloplasty had actually led to bypass of the competent ureterovesical junction, leading to transmission of the high voiding pressures to the kidneys which resulted in pyelonephritis, thereby unmasking the valves.

CONCLUSION

Urethral valves may be more common than generally appreciated. In addition to the severe forms usually reported in the literature, there are many milder cases with less severe disease. Although the occurrence of UPJO and PUV may be coincidental, based on our experience in these three cases, we believe that this possibility should be kept in mind when dealing with children who develop recurrent febrile UTI or have persistent pyuria following pyeloplasty. Further, our experience highlights the fact that proper history-taking, specifically for voiding symptoms before planning for pyeloplasty and urethroscopy at the time of pyeloplasty in suspicious cases, may avoid later postoperative problems.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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