

# Posterior urethral disruption in 12 year old boy with late urethroplasty after multi-organ injury

Michał Wolnicki, Wiesław Urbanowicz, Janusz Sulisławski

Department of Pediatric, Urology Collegium Medicum, Jagiellonian University, Cracow, Poland

## KEY WORDS

prostate urethral disruption ► children ► urethral reconstruction ► strictures

## ABSTRACT

Management of posterior urethral disruption in children with multiorgan injuries can be quite challenging. We report the case of a 12 year old male with urethral disruption. We present our experience of the staged treatment of this patient with delayed anastomotic urethroplasty after traumatic posterior urethral disruption. The patient suffered from a motor vehicle accident and sustained multiple organic injuries. We performed late realignment of the urethra 6 months after the accident. The described method with late reconstruction of urethral disruption offers good long term results to patients.

## INTRODUCTION

Urethral injuries belong to rare urogenital trauma in children as well as in adults. The incidence of urethral injury is more common in males. Posterior urethral disruptions represent 5% of all urethral injuries but are the most challenging [1]. Management of complete posterior urethral disruption is difficult because of the frequently severe extent of associated organ injuries, initial patient instability and pelvic and lower urinary tract anatomy distortions. Multiple approaches to these patients are described: the perineal, transpubic, transsymphyseal or combined approach [1, 2]. Treatment depends on patient status, at the time of admission. Urethral anastomosis may be immediate (less than 2 days post injury), delayed (2-14 days after injury) or late (3 months or more after injury) [3]. Primary realignment of the urethra in cases of severe multiorgan injuries is not possible to perform. We report our experience with a 12 year old boy who underwent late urethral reconstruction after complete disruption of posterior urethra, with perineal approach and urethral anastomosis. He was classified at stage V in the scale of American Association for the Surgery of Trauma [AAST] (Table 1) [4].

## CASE REPORT

Patient: obese 12 year old admitted to our department after multiorgan trauma in motor vehicle accident in August 2006. Patient at admission unconscious, with intubation tube, and with perineal injury, wound of glutei and also rectal and anal disruption. After examination we detected humeral fracture and deep wounds to left shoulder and left femoral. Inability to urinate and problems with catheterization and also blood in the urethra was detected.

Probability of urethral disruption. On the day of admission, the patient was operated on: wound suture, colostomy, fracture reductions. Suprapubic cystostomy intubation was performed. In the first days after admission, the patient was in a critical condition with blood loss. X Ray investigations revealed: VCUG (voiding cystourethrogram) with contrast feeding by cystostomy and moreover cystoscopy which confirmed complete disruption of urethra. Function of anal sphincter was preserved. Colostomy was closed in January 2007. In May 2007, after 6 months, an anastomotic urethral realignment was planned. Before surgery, by additional RUG/VCUG /retrograde urethrogram and voiding cystourethrogram/, were confirmed complete lack of urethral continuity, site and length more than 2 cm between ends of the disrupted urethra (Fig. 1). Access was perineal to bulbar and posterior urethra. First was performed catheterization of the anterior urethra, and after catheterization by dilators through vesica colli to prostatic urethra. After that was performed complete resection of the fibrous segment and second incision of distal and proximal ends of urethra on inserting catheters. 12 radial 5-zero absorbable sutures were placed on normal looking proximal and distal ends of the urethra. The bulbar urethra was mobilized to gain sufficient length and a tension-free anastomosis end to end (Fig. 2). Cystostomy tube, catheter in the urethra and guidewire loop were left after the operation and withdrawn after 2 and 3 weeks (Fig. 3). In August 2007 endoscopy was performed – urethrocystoscopy – which showed stricture in the site of anastomosis. The patient required urethral dilatation by catheter. The catheter and guidewire were left in for 10 and 14 days and after that removed. The patient started catheterization by himself.

Follow up, after 1 month, consisted of VCUG in September 2007, which did not reveal stricture. In control cystoscopy was



Fig. 1. Retrograde urethrogram and voiding cystourethrogram (RUG/VCUG).

noticed slow contradictions of bladder colli after withdrawal of cystoscope. Guidewire and catheter were left for 1 month. Cystostomy tube was left. In October 2007, after VCUG, guidewire and cystostomy tube were removed. Alfa-blockers and antibacterial medicines were taken by patient.

## RESULTS

Control VCUG did not reveal vesico-ureteral reflux or urethral stricture. The follow-up consisted of a few uro-flow examinations. The mean flow rate was 8.1 ml/s without any problems with urination. The bladder volume was 380 ml without residual urine. There were no complaints from the patient.

## DISCUSSION

Urethral disruption is heralded by the triad of blood at the meatus, inability to urinate, and palpable full bladder. Because these and other classic findings such as a "high-riding" prostate or a "butterfly" perineal hematoma may frequently be absent, urethral disruption is often first detected when a urethral catheter cannot be placed by the emergency department trauma team or when it is misplaced into a pelvic hematoma. Urethral injuries can be contusion, rupture, or partial or full urethral diameter disruption [5]. Pubic diastasis, localized pubic rami fractures, or more complex pelvic fractures are associated with the highest risk of urethral injury [1, 2, 3, 5, 6]. In cases of partial rupture of the urethra, an attempted catheterization by soft catheter for 2 to 4 weeks was made. But the possibility of urethra damage with this maneuver is very high [4, 5].

The risk of complete urethral disruption is more common in children than in adults because of severe displacement of the prostate from the pelvic floor and also because of the possibility of unstable pelvic fractures in children. Urethral realignment for

**Table 1.** AAST classification of urethral injuries.

GRADE	URETHRAL INJURES
I	Contusion, blood at urethral meatus; urethrography normal
II	Stretch injury – elongation of urethra without extravasation on urethrography
III	Partial disruption – extravasation of urethrography contrast at injury site with contrast visualization in the bladder
IV	Complete disruption – extravasation of urethrography contrast at injury site without contrast visualization in the bladder; <2 cm of urethral separation
V	Complete disruption – complete transection with; >2 cm of urethral separation, or extension into the prostate or vagina

complex posterior urethral disruption can be immediate, delayed, or late [3].

There is continuing controversy regarding the best approach to these cases [1, 5, 7, 8, 9]. Immediate intervention after urethral injury may be difficult because of bleeding, hematoma, concurrent injuries, friability of traumatized tissues, and above all because of the severity of other organ trauma. Late repair after 3 months of injury poses a risk for more extensive fibrosis. Therefore many authors advocate primary realignment after urethral disruption [2, 3]. They conclude that early realignment provides better outcomes than delayed open urethroplasty after posterior urethral disruption. Treatment in patients with urethral injury and multiorgan contusions is suprapubic cystostomy tube placement with no attempt at anastomotic primary realignment [3, 9]. Open posterior urethroplasty through a perineal anastomotic approach is the treatment of choice for most urethral disruption injuries because it definitively cures the patient without the need for multiple procedures [2, 3, 8, 9]. In our case early primary anastomosis was impossible because of associated multiorgan injuries and the severe condition of the patient. Late urethral repair was considered 3 months after injury and was performed after 6 months. The primary realignment of the urethra with anastomosis and suprapubic diversion has the highest rate of success for normal urethral continuity without complications in patients with multiorgan injuries [2, 3, 6, 9, 10].

During clinical examination, per rectum examination is very helpful and also allows for detection of high bladder position or anal disruption [5]. In diagnosis, without clinical examination, radiological examinations are very important: VCUG (voiding cystourethrogram), RUG/VCUG (retrograde urethrogram and voiding cystourethrogram), IVP (intravenous pyelography), CT (computer tomography), AP (anterior posterior radiological



**Fig. 2.** Preparation for urethral realignment. (RUG/VCUG).



**Fig. 3.** Perineal approach – view after reanastomosis.

scan), and abdominal and pelvic ultrasonography. Retrograde pyelogram with VCUG was the first examination prior to planning surgery. In suspected multiorgan injury, CT examination with intravenous contrast medium is indicated. Bladder neck injury can be identified by VCUG [2, 6].

Surgery for complex posterior urethral disruption is compounded by problems of access, limited urethral length, and surrounding fibrosis. The golden triad for a successful outcome is the complete excision of the fibrous segment, lateral fixation of healthy mucosa of the urethral ends and creation of a tension-free anastomosis [1-3, 5-7, 9, 10].

Suprapubic cystostomy drainage should be maintained until the associated injuries have healed and the patient can be appropriately positioned for the reconstructive procedure. The posterior urethra can be reached by a perineal approach and the patient is placed in the high lithotomy position and a midline or lambda-shaped incision is made (Fig. 3) [1, 2, 5]. Care must be taken to carefully and precisely resect all fibrotic tissue from the proximal urethral margin. In posterior urethral disruption, the rupture defect between the two severed ends fills with scar tissue, resulting in a complete lack of urethral continuity. This separation is not a stricture; it is a true urethral rupture defect filled with fibrosis. At 3 months and later, scar tissue at the urethral disruption site is stable enough to allow posterior urethroplasty to be undertaken safely [9].

The urethral stricture in patients who underwent early primary realignment was less developed than the stricture that developed in those who underwent delayed management [3]. According to many papers which recommend early primary realignment in children with posterior urethral injury it is a choice, but in children with multiorgan injuries delayed or late surgery is necessary [1, 3, 9]. The most challenging problems after repair of urethral disruption are strictures, impotence, and incontinence [1, 3, 6]. Posterior urethral injuries have been associated with erectile dysfunction and incontinence in children. The incidence of erectile dysfunction is increased when total disruption of urethra occurs, especially with injury of prostatic urethra [3, 6, 10]. But in our case, after delayed urethral anastomosis, we didn't noticed incontinence or voiding problems.

## CONCLUSION

The described method with late reconstruction of urethral disruption is successful in case of long distance urethral disruption.

The most challenging problems are strictures and incontinence. In our case, after long term treatment, we assume that we have avoided both of these problems.

## REFERENCES

1. Pratap A, Agrawal ChS, Pandit RK et al: *Outcome of combined abdominal transpubic perineal urethroplasty for complex posterior urethral disruptions*. J Urol 2006; 176: 2514-2517.
2. Cooperberg MR, McAninch JW, Alsikafi NF, Elliott SP: *Urethral reconstruction for traumatic posterior urethral disruption: Outcomes of a 25-year experience*. J Urol 2007; 178: 2006-2010.
3. Nerli RB, Kura AC, Ravish IR et al: *Posterior urethral injury in male children: long term follow up*. J Ped Urol 2008; 4: 154-159.
4. Urbanowicz W, Wolnicki M, Sulisławski J: *Urazy układu moczowego u dzieci - etiologia, diagnostyka i postępowanie (Genitourinary trauma in children - etiology, diagnosis and management)*. Rocznik Dziec Chir Ur 2006; 10: 71-744.
5. Husmann D: *Genitourinary trauma: Urethral injuries*; in Campbell's Urology, 9<sup>th</sup> ed. W. B. Saunders Company, 2007, Chapt 132, pp. 3939-3943.
6. Koraitim MM: *Post traumatic posterior urethral strictures: preoperative decision making*. Urol 2004; 64 (2): 228-231.
7. Holland AJA, Cohen RC, McKertich KMF, Cass DT: *Urethral trauma in children*. Pediatr Surg Int 2001; 17: 58-61.
8. El-Sheikh MG, Ziada AM, Sadek SZ, Shoukry I: *Pediatric and adolescent transperineal anastomotic urethroplasty*. J Ped Urol 2008; 4: 333-336.
9. Martinez Montoya JA, Tascon Acevedo NM: *Surgical approach to traumatic urethral injury in children. Experience in San Vicente de Paul University Hospital (Medellin Colombia), 1987-2007*. Act Urol Esp 2009; 33: 416-421.
10. Lynch TH, Martinez-Pineiro L, Plas E: *EAU Guidelines on Urological Trauma*. Eur Urol 2005; 47 (1): 1-15.

## Correspondence

Michał Wolnicki  
Department of Pediatric Urology  
Collegium Medicum Jagiellonian University  
265, Wielicka Street  
30-665 Kraków, Poland  
phone : +48 12 658 20 11 int. 1590  
miwolnic@cyf-kr.edu.pl