Return to urinary continence and sexual function after pelvic fracture-urethral injury – A young woman’s years-long journey

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ABSTRACT

Pelvic fracture urethral injury (PFUI) is a rare condition that can have severe short and long-term consequences. Though it is rare, it is essential to consider this diagnosis with a high index of suspicion in the setting of pelvic trauma. With appropriate management, patients may have a successful return to normal urinary and sexual functions even after devastating injury and urethral obliteration.

1. Introduction

Pelvic fracture urethral injury (PFUI) in females, though relatively rare with an incidence cited in large contemporary studies to be as low as 0.05%,1 is a clinically challenging situation that harbors significant immediate and long-term morbidity for affected patients. We report on a young adult female with successful return to urinary and sexual function after bladder neck reconstruction and anastomotic urethroplasty for complete urethral obliteration following major pelvic trauma.

2. Case presentation

A 24-year-old female bicyclist involved in a traumatic collision with a truck suffered complex pelvic fractures with associated bladder injury and complete avulsion of her bladder neck-proximal urethra complex, for which cystorrhaphy and suprapubic tube (SPT) drainage were required. Primary realignment of the urethral injury was not performed due to competing issues during the initial trauma. After more than a year of convalescence, she was referred for evaluation for reconstruction.

On initial evaluation we observed an approximately three-centimeter defect between the distal urethra and bladder neck (Fig. 1). Urethral reconstruction was offered, however, since the internal urethral sphincter was presumably non-functional, we emphasized the risk of developing urinary incontinence. To mitigate this risk and to avoid subsequent incontinence surgery, we offered an open bladder neck reconstruction with simultaneous vesicourethropexy.

Surgery was performed approximately two years after the initial trauma. The bladder was exposed via an infraumbilical, midline abdominal incision; an anterior cystotomy exposed the bladder neck. A second surgeon simultaneously performed a wide transvaginal urethral mobilization and mobilized the bladder off the pubic bone. After achieving adequate exposure, a 1.5 cm gap between the bladder neck and the urethra was identified. Hegar dilators were directed retrograde via the urethra and antegrade via the bladder and were used as guides to excise scar until healthy urothelium was seen at both ends. Once this was accomplished the proximal urethra was anastomosed transvaginally to the newly patent bladder neck around a 14F Foley catheter with closely spaced interrupted Vicryl sutures. Prior to abdominal closure, a 16F SPT was placed and a vesicourethropexy was performed to augment continence after catheter removal. Periurethral tissue was mobilized laterally and flapped over the reconstituted urethra anteriorly to buttress the repair, and the site was additionally covered with a placental allograft membrane. The patient had an uneventful postoperative course and was discharged home on the fourth postoperative day.

At one-month follow-up, urethroscopy demonstrated a small ventral anastomotic disruption, presumably due to pressure from the urethral catheter. The SPT was exchanged and the urethral catheter removed to facilitate healing of the ventral defect. One month later, urethroscopy revealed a stenotic urethral reconstruction through which the 18F flexible cystoscope could not pass, and a persistent fistula. Despite these findings, the patient had no voiding complaints and thus elected conservative management. Unfortunately, SPT cap trials revealed...
subjectively high PVRs which did not improve over time. In the fourth post-operative month we performed urethral dilation leaving a 14F urethral catheter in place for one week, and then resumed SPT cap trials. Three weeks after dilation, urethroscopy with an 8F scope revealed a matured urethral scar with a 12F lumen, and redemonstrated the small urethrovaginal fistula. The SPT was removed leaving the patient completely catheter-free and voiding without difficulty. The fistula remained asymptomatic.

The patient returned for evaluation 19 months after her index operation. During that time she reported having full urinary continence with only a minimal decrease in the caliber of the urinary stream due to the stricture, and a successful return to penetrative vaginal intercourse. On cystoscopy the anastomosis easily permitted passage of an 8F pediatric cystoscope, and the bladder appeared completely normal. The urethrovaginal fistula persisted, however she remained asymptomatic and elected for continued conservative management. At her final follow-up visit almost three years after the index operation the patient remained fully continent of urine and expressed wishes to avoid any further procedures, completely satisfied with the results of her surgery.

3. Discussion

PFUI in female trauma victims is a rare phenomenon. A recent series from a level 1 trauma center cited only one urethral injury in 2,102 females with pelvic fractures (0.05%) while the incidence in their male cohort was 2%,\(^1\) underscoring the importance of having a high index of suspicion. This presents a diagnostic difficulty as it is maybe overlooked during routine trauma surveys. Evidence demonstrates that imaging studies are inferior to physical exam for detecting these injuries. In a series from a large level 1 trauma center Black et al. noted a missed-diagnosis rate of 40%.\(^2\) This highlights the indispensable nature of a complete vaginal exam, especially when there is difficulty with catheter placement or when there is blood in the introitus. In that series, only 50% of urethral injuries were detected on cystography.

The timing of repair of PFUI in males has been examined extensively. It has historically been treated with urinary diversion by SPT and a delayed primary repair, an approach demonstrated in a small case series to improve continence rates and decrease sexual dysfunction,\(^3\) though this is not universally accepted and more recent series find no difference in these sequelae when an immediate repair is performed.\(^4\) In the female PFUI population, in contrast, evidence indicates that immediate primary repair is ideal.\(^5\) Our patient had a significant delay from her initial injury until a primary repair was attempted. It is unclear if a delay in repair contributed to intraoperative complexity and/or post-operative complications.

4. Conclusion

Traumatic urethral injuries in females are uncommon and may be underdiagnosed since they typically occur in concert with more pressing injuries. It is essential to have a high index of suspicion for these injuries and to actively seek them out when there is blood at the introitus, difficulty with catheter passage, or absence of drainage from the urinary catheter. In our patient, delayed primary repair via a combined trans-abdominal and trans-vaginal approach resulted in a successful return to sustained urinary continence and normal sexual function, despite the development of a small but persistent urethrovaginal fistula.

Section headings

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