Case Report

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Management of a Complex Urethrovaginal Fistula Post-pelvic Injury in a Young Female: A Rare Case Report

Urology Section

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ABSTRACT

Urethral injuries associated with pelvic fractures in female patients are a rare condition. The diagnosis and management of traumatic injury to the female urethra are not well-understood, as the literature on the subject is very limited. Hereby, the authors present a case of a 29-year-old female patient who presented with continuous incontinence. The patient had a history of trauma while riding a bicycle 18 years ago, resulting in a pelvic fracture, bladder rupture, and urethral rupture. She was managed with fracture fixation, bladder repair, and Suprapubic Catheter (SPC) insertion. Urethral repair was performed after six months, but the patient remained incontinent. Upon presentation to our hospital, the patient was diagnosed with vaginal stenosis and a large urethrovaginal fistula. She was managed with vaginoplasty followed by urethrovaginal fistula repair using gracilis muscle interposition. This procedure failed, resulting in the recurrence of the Urethrovaginal Fistula (UVF) and ongoing incontinence. The patient was re-operated, and fistula repair was accomplished using a local vaginal flap. This case highlights the complex nature of urethral injury in females, the challenges posed by delayed complications, and the necessity for multiple procedures.

Keywords: Fracture fixation, Gracilis muscle, Urethral rupture, Vaginal stenosis, Vaginoplasty

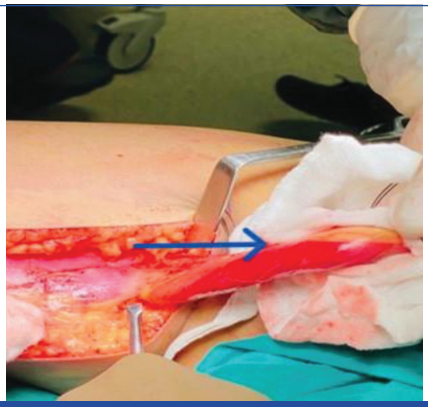
CASE REPORT

A 29-year-old female patient presented with leakage of urine for 18 years, which was post-traumatic, continuous, and aggravated by standing and walking. The patient was using approximately three diapers per day. She had a history of pelvic trauma 18 years ago following a fall from a bicycle, which resulted in a pelvic fracture, bilateral femur fracture, and bladder rupture. She had been managed with bilateral femur fixation and bladder repair at that time. Urethral injury had been missed during the primary examination at the time of the first surgery, and only the failure to place a per-urethral catheter had prompted the insertion of a Suprapubic Catheter (SPC). She reported undergoing urethral reconstruction surgery six months later, after which the SPC had been removed; however, no documentation of this procedure was available.

Patient presented to Urology Department 18 years after the initial trauma and management, continuing to experience incontinence. Clinical examination revealed a Pfannenstiel scar and multiple scars over the bilateral hip joints. The External Urethral Meatus (EUM) was normal, but a vaginal examination could not be performed due to a severely scarred and fibrotic introitus. Ultrasonography of the kidney, ureter, and bladder was normal. Due to financial constraints, an Magnetic Resonance Imaging (MRI) was not performed. A cystoscopy was attempted, but the urethral opening and distal urethra were not adequately visualised. Only a small tract was identified. The endoscope entered the vagina instead of the bladder, and a high-lying bladder neck was visible superiorly. Almost the entire urethra was deficient posteriorly, suggestive of a large urethrovaginal fistula. A SPC was placed. A cystoscopy was performed later through the SPC site. The bladder neck was found to be intact, but the urethra beyond it was completely deficient posteriorly, with the scope directly entering the proximal vagina. A cut-back vaginoplasty with labia minora skin flaps was performed to create adequate space for subsequent urethral reconstruction.

Five months post-vaginoplasty, after local healing, a definitive procedure was planned for the urethrovaginal fistula. In consultation with the plastic surgery department, a right-sided gracilis pedicled flap was used for interposition. With the patient in the jack-knife position, the fistulous defect was identified and the margins were refreshed [Table/Fig-1]. Tunnelling was performed between the urethra and vagina. She was then placed in a supine position with a semi-abducted hip. The gracilis muscle was dissected, and transposition was carried out [Table/Fig-2]. A subcutaneous tunnel was created, and the graft was brought through it to the introitus. The patient was then placed in the jack-knife position again. The gracilis muscle was placed inside the tunnel and fixed [Table/Fig-3]. The fistula was repaired over the muscle.

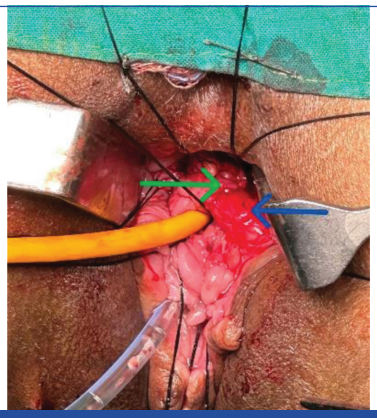
[Table/Fig-1]: Large UVF- clinical examination. Yellow arrow- Vagina, Green arrow- Fistulous opening, Red arrow- Foley catheter in urethra.



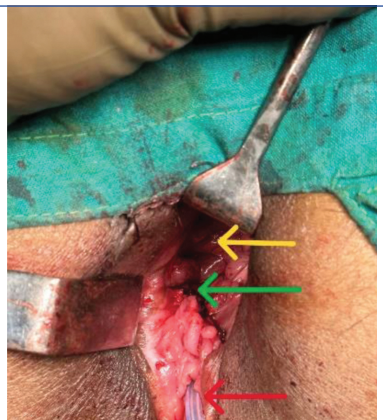
[Table/Fig-2]: Harvesting Gracilis muscle. Blue arrow- Gracilis muscle with pedicle.

[Table/Fig-3]: Gracilis interposition. Blue arrow- Gracilis muscle, Black arrow- Fixation sutures.

During follow-up after catheter removal, the patient remained incontinent. Cystoscopy after six weeks revealed a small urethrovaginal fistula in the mid-urethra. She was scheduled for resurgery. In the jack-knife position, the fistula was delineated, and multiple stay sutures were placed. Dissection of the fistula revealed a partially viable Gracilis Muscle Flap (GMF) [Table/Fig-4]. The defect was closed using a U-shaped local vaginal flap. The previously used gracilis muscle was remobilised vaginally and used as a second layer. The vagina was closed in a T-shaped fashion with interrupted sutures in an attempt to avoid overlapping suture lines [Table/Fig-5].



[Table/Fig-4]: Recurrent fistula. Blue arrow- Partially viable Gracilis flap, Green arrow- Fistulous opening



[Table/Fig-5]: Resurgery with local vaginal flap. Yellow arrow- Vagina, Green arrow- Closed fistula defect with local vaginal flap, Red arrow- Foley catheter in urethra.

At three months postoperatively, the patient is in regular follow-up. Presently, the patient is reasonably continent with the use of a vaginal mould and bladder relaxants, with a healed UVF and an improvement in quality of life. The patient is being scheduled for a definitive procedure for incontinence.

DISCUSSION

Female urethral injury is a very rare occurrence, with even fewer women experiencing non obstetric urethral distraction abnormalities. Severe blunt trauma, commonly resulting from a pelvic fracture, is a frequent cause of traumatic urethral injury. The National Trauma Data Bank for the period 2001-2005 recorded that, although men and women had similar rates of bladder injury associated with pelvic fracture (3.41% in men vs 3.37% in women), men were significantly more likely to sustain urethral injury (1.54% in men vs 0.15% in women) [1]. This difference is thought to be due to the flexibility provided by the vagina and the higher elasticity of the female urethra [2].

Diagnosing female urethral injuries can be challenging. As patients often present with multiple injuries requiring urgent management, urethral injuries can be missed in up to 40% of cases during the initial assessment in the emergency department [3]. A vaginal laceration, disruption of the pelvic circle, numerous pelvic fractures, or injury to the sacral spine are commonly associated with urethral injury. A combination of these injuries in a young female patient with a history of trauma should prompt an examination for urethral injury [4]. As noted by Perry MO and Husmann DA, delayed diagnosis complicates repair and can also lead to serious perineal infections [5].

In their review, Patel DN et al., discovered that the formation of urethral strictures following primary realignment was common. Additionally, it was found that urethrovaginal fistulas were most frequently formed after primary realignment, as opposed to comparable rates following either immediate or delayed repair. Only individuals undergoing delayed repair experienced vaginal stenosis. Dense scarring, strictures, urethral obliteration, vaginal stenosis, and fistulae are often the outcomes of immediate urine diversion with anticipated delayed healing. Consequently, delays in female urethral restoration are challenging [6].

Complex urinary reconstruction is often necessary for patients undergoing delayed repair, and it may also require a combination of vaginal and abdominal approaches. The short length of the female urethra and its significance for preserving continence make delayed restoration considerably more difficult [6].

Management of complex UVF depends on various factors, including the presence or absence of symptoms, aetiology, size and location of the fistula, and other local factors, such as the extent of associated fibrosis. Surgical procedures described for urethrovaginal fistula repair include urethral marsupialisation, vaginal flap closure, labial fat pad repair (Martius procedure), full-thickness skin-graft reconstruction, musculocutaneous flap interposition, and bladder flap techniques [7].

The GMF is a versatile option utilised in a variety of complex reconstructive surgeries [8]. Carbone L et al. reported successful treatment of a recurrent UVF using a GMF [9]. Authors employed the gracilis flap in their primary procedure due to its versatile nature, but unfortunately, due to dense scarring and the long-standing nature of the condition, the flap failed. Peyronnet B et al. have recently reported a successful robotic UVF repair along with concomitant fascial sling insertion in a patient with a recurrent urethrovaginal fistula [10].

According to Patel DN et al., urinary incontinence of some kind was noted in 23 out of 75 patients (31%), with the majority experiencing Stress Urinary Incontinence (SUI) following delayed urethral reconstruction. Most of these patients required surgical intervention for incontinence, either with an artificial urinary sphincter or a fascial sling [6]. Due to dense scarring, poor blood supply, and multiple previous procedures, authors decided to stage the surgery for incontinence.

CONCLUSION(S)

Complicated recurrent UVF with vaginal stenosis secondary to traumatic pelvic and urethral injuries are rare cases, and there is no consensus on the appropriate management. Patients face significant

physical and psychological challenges due to the severe morbidity associated with the need for multiple surgeries. The purpose of presenting this case is to contribute to the limited literature on the subject and to share our insights regarding management in order to assist in developing a standardised approach for such cases.

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