Experience with 32 Pelvic Fracture Urethral Defects Associated with Urethrorectal Fistulas: Transperineal Urethroplasty with Gracilis Muscle Interposition

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Purpose: Pelvic fracture urethral defects associated with urethrorectal fistulas are rare and difficult to repair. The aim of this study was to evaluate the efficacy of transperineal urethroplasty with gracilis muscle interposition for the repair of pelvic fracture urethral defects associated with urethrorectal fistulas.

Materials and Methods: We identified 32 patients who underwent transperineal urethroplasty with gracilis muscle interposition to repair pelvic fracture urethral defects associated with urethrorectal fistulas. Patient demographics as well as preoperative, operative and postoperative data were obtained.

Results: Mean followup was 33 months (range 6 to 64). The overall success rate was 91% (29 of 32 cases). One-stage repair was successful in 17 of 18 patients (94%) using perineal anastomosis with separation of the corporeal body and in 12 of 14 (86%) using perineal anastomosis with inferior pubectomy and separation of the corporeal body. All 22 patients (100%) without a previous history of repair were successfully treated. However, only 7 of 10 patients (70%) with a previous history of failed urethroplasty and urethrorectal fistula repair were cured. Recurrent urethral strictures developed in 2 cases. One patient was treated successfully with optical internal urethrotomy and the other was treated successfully with tubed perineoscrotal flap urethroplasty. Recurrent urethrorectal fistulas associated with urethral strictures developed in an additional patient.

Conclusions: Transperineal urethroplasty with gracilis muscle interposition is a safe and effective surgical procedure for most pelvic fracture urethral defects associated with urethrorectal fistulas. Several other factors may affect its postoperative efficiency.

Key Words: urethra; fistula; rectum; fractures, bone; pelvis

Abbreviations and Acronyms

ED = erectile dysfunction

FI = fecal incontinence

PFUD = pelvic fracture urethral defect

SCTCUG = spiral computerized tomographic cystourethrography

UI = urinary incontinence

URF = urethrorectal fistula

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Posterior urethral disruption occurs in approximately 10% of patients with pelvic fractures.[1] Approximately 2% of PFUDs are associated with URFs, which are usually caused by severe pelvic injuries.[2,3] The management of PFUDs remains one of the most challenging problems in urology and the associated URFs make urethral reconstruction more difficult.[3,4] To our knowledge there has been no standardized approach to date to the treatment of complex PFUDs associated with URFs.

Successful repair of PFUDs associated with URFs requires good exposure to clearly identify and excise the fistulous tract and pathological urethral segment, and close all fistulous openings.[3,4] Because most PFUDs associated with URFs are large and fibrotic, a well vascularized

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tissue flap must be interposed between the repaired rectum and the urethra to ensure successful closure, fill the dead space, support urethral anastomosis, promote healing and, thus, prevent recurrence.[3,4] Furthermore, the suture lines should be separated by the interposed vascularized tissue flap with a tension-free end-to-end mucosa-to-mucosa urethral anastomosis.[3,4]

Until now surgeons have successfully used various surgical approaches to repair complex PFUDs, including transabdominal, transpubic, transperineal and sometimes mixed approaches.[3–5] Various vascularized tissue flaps used for interposition when repairing URFs have also been described, such as omentum, bulbospongiosus muscle and subcutaneous dartos flaps, gracilis muscle and rectus muscle flaps.[3,5]

The transperineal approach provides good urethral and rectal exposure for complex URF repairs as well as for concurrent urethral or bladder neck stricture repairs.[5] The gracilis muscle is used in more than 95% of transperineal approaches to buttress the repair.[5] After gaining significant experience with transperineal urethroplasty for PFUDs[6] and adynamic graciloplasty for male acquired UI,[7] we began to perform transperineal urethroplasty with gracilis muscle interposition to treat complex PFUDs associated with URFs. The aim of this study was to review our experience with transperineal urethroplasty with gracilis muscle interposition for the surgical treatment of PFUDs associated with URFs.

PATIENTS AND METHODS

Patients and Preoperative Preparations

Between June 2005 and March 2014, 32 patients with a mean age of 42.9 years (range 20 to 64) underwent transperineal urethroplasty with gracilis muscle interposition for surgical correction of posttraumatic PFUDs associated with URFs. Informed consent was obtained from all patients before beginning the study, which was approved by the ethics committee at our institution.

In our series PFUDs associated with URFs developed secondary to pelvic fracture urethral and rectal injury in traffic accidents in 21 patients, fall injuries in 8 and extrusion injuries in the remaining 3. All cases were directly managed by suprapubic cystostomy and diverting ileostomy at the time of trauma and were diagnosed with URFs elsewhere. Ten patients had a previous history of unsuccessful transperineal urethroplasty with combined bulbospongiosus muscle and subcutaneous dartos pedicled flap interposition for PFUD and URF repair. Mean time between original trauma or failed repair and definitive repair was 29.0 months (range 8 to 60). The main presenting symptom in all cases was urinary leakage through the anus, which was out of control in 2. Associated symptoms included recurrent urinary tract infections in 4 patients and rectal pain in 2. A total of 20 patients had associated ED and 1 had anal stenosis due to severe rectum rupture in an extrusion.

All patients underwent urinalysis, urine culture and sensitivity testing. The fistula location as well as the site and the extent of associated urethral disruptions was determined by physical examination, voiding cystourethrography and retrograde urethrography, in addition to flexible cystoscope and 3-dimensional SCTCUG according to our previously described methods (fig. 1, *A* to *C*).[2,8] The diagnosis was further confirmed after the bladder was filled with 25 ml methylene blue mixed with normal saline and the blue fluid leaked through the defect in the rectal mucosa.

The preoperative regimen included a 10 mg vitamin K1 intramuscular injection once daily, gentamicin 80,000 U orally twice daily, povidone-iodine saline irrigation of the bladder and urethra twice daily, and soapsuds enema of the rectum once daily for 3 days before surgery. Rectal preparation by soapsuds enema and perineal hygiene using soap and water were performed the night before and repeated the morning of surgery. Antibiotic prophylaxis with intravenous metronidazole and cefoxitin sodium was initiated preoperatively.

Surgical Technique and Data Collection

After the induction of general epidural anesthesia urethroplasty and URF repair were performed according to previously described methods.[3,9] Briefly, the patient was placed in the high lithotomy position and an inverted Y-shaped perineal incision was made. The anterior urethra was exposed and transected at the distal margin of the stricture (fig. 2, *A*). After most scars and fibrotic tissues occupying the distraction defect were excised, fistulas proximal to urethral disruptions were identified and exposed (fig. 2, *B*). The remaining scars or fibrotic tissues surrounding the proximal urethra were excised completely until a healthy pliable mucosa was reached and a 28Fr sound could pass easily through the normal posterior urethra (fig. 2, *C*).

After the margins of the fistulous opening in the rectum were freshened, data on fistula size, the distance of URFs from the anus and the length of urethral distractions were collected. The rectal defect was closed in 2 layers using 3-zero polyglactin running sutures (fig. 2, *C*). Tension-free end-to-end mucosa-to-mucosa urethral anastomosis was performed over an 18Fr silicon catheter using 8 interrupted 5-zero polyglactin sutures (fig. 2, *D* and *E*).

Ancillary procedures for urethroplasty included separation of the cavernous bodies and inferior pubectomy with removal of the bone tissue located at the bottom side of the pubis to accomplish a tension-free urethral reanastomosis.[3,6] The gracilis muscle interposition procedure was then performed by the same surgeon, similar to the previously described methods (fig. 2, *F* to *I*).[9]

The most important aspect of the procedure was to ensure the length of the bulky muscular portion of the well vascularized gracilis muscle and the placement of the muscle between both planes to occlude the fistula tract and separate the suture lines.