

Laparoscopic Omentoplasty to Support Anastomotic Urethroplasty in Complex and Redo Pelvic Fracture Urethral Defects



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OBJECTIVE	To test the hypothesis that a new surgical technique using elaborated perineal anastomotic urethroplasty combined with laparoscopic omentoplasty for patients with complex and prior failed pelvic fracture urethral defect repair was feasible, safe, and effective.
METHODS	We performed a prospective, observational, stage 2a study to observe treatment outcomes of combined perineal and laparoscopic approach for urethroplasty in patients with pelvic fracture urethral defect at a single center in Pune, India, between January 2012 and February 2013. Complex and redo patients with pelvic fracture urethral defect occurring after pelvic fracture urethral injury were included in the study. Anterior urethral strictures were excluded. The primary study outcome was the success rate of the surgical technique, and the secondary outcome was to evaluate feasibility and safety of the procedure. The clinical outcome was considered a failure when any postoperative instrumentation was needed.
RESULTS	Fifteen male patients with a median age of 19 years were included in the study. Seven patients were adolescents (12-18 years) and 8 patients (53.3%) were adults (19-49 years). The mean number of prior urethroplasties was 1.8 (range, 1-3). All patients underwent elaborated bulbomembranous anastomosis using a perineal approach with inferior pubectomy combined with laparoscopic mobilization of the omentum into the perineum to envelope the anastomosis and to fill the perineal dead space. Of 15 patients, 14 (93.3%) were successful and 1 (6.6%) failed. One adolescent boy 14 years old developed a recurrent stricture 2 months after the procedure and was managed using internal urethrotomy. Median follow-up was 18 months (range, 13-24 months).
CONCLUSION	Combining a laparoscopic omentoplasty to a membranobulbar anastomosis for complex and redo pelvic fracture urethral injury is successful, feasible, safe, and with minimal additional morbidity to the patient. The technique has the advantage of a perineal incision and the ability to use the omentum to support the anastomosis. UROLOGY 85: 1200–1205, 2015. © 2015 Elsevier Inc.

The reconstruction of the posterior urethra in patients with pelvic fracture evolved in 2 different periods. In 1962, Pierce first described the posterior urethroplasty by using an abdominal approach with total pubectomy.¹ Later, Waterhouse et al described a combined perineoabdominal approach for mobilization of the anterior urethra and a transpubic bulboprostatic

anastomosis.² An important innovation of the transpubic approach to the posterior urethra occurred in 1976, when Turner-Warwick suggested the use of omentum in supporting the bulboprostatic anastomosis.³ In the years thereafter, the technique by Turner-Warwick was considered the gold standard to repair complex pelvic fracture urethral defect (PFUD).⁴⁻⁷

The next step of great importance in posterior urethroplasty occurred in 1986, when Webster and Goldwasser described a new technique with excision of the inferior pubic bone through a simple perineal incision.⁸ This technique also included some additional steps (separation of the corporeal bodies, inferior pubectomy, and rerouting of the urethra around the corpora cavernosa). The objective was to reduce the gap between the bulbar and the prostatic urethra and to arrange a tension-free anastomosis.⁹

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Figure 1. Preoperative combined retrograde and voiding cystourethrography. This was taken after a previous failed anastomotic urethroplasty from an outside institution. Note the false passage at the bladder neck.

Compared to the transpubic approach, this technique has the advantage of a single perineal incision, but the main limitation was the inability to use the omentum to support the anastomosis. The advancements of Webster and Goldwasser have significantly improved the morbidity of PFUD, and success rates have limited the need for transpubic approach. Since the 1990s, the perineal approach has become the standard for the treatment of PFUD.¹⁰ The shift to a perineal approach has made the omentoplasty a forgotten child in the proper repair of PFUD.

A comprehensive review of omentum, as an adjunct to surgical repair, reach beyond the scope of this article, but its use in anastomotic urethroplasty is a well-established practice. Omentum is a highly preferred interposition material with abundant physiological properties to fill dead space after surgical intervention. Complex PFUD is associated with rectourethral fistula or abundant scar. Redo PFUD is associated with abundant scar. A dead space is created in complex and redo repairs after excision of scar and inferior pubectomy. During transpubic approach, the dead space is filled with omentum. The integral omentoplasty is omitted in perineal-only urethroplasty owing to the lack of abdominal access by a perineal incision.

In pelvic fracture, the posterior urethra is plucked away from the bulbar urethra posteriorly and upward.¹¹ The puboprostatic ligaments are torn. The bleeding from the dorsal vein complex forms hematoma in the retropubic space. The hematoma forms fibrosis. The obliteration of the dorsal vein complex after pelvic fracture allows a safe passage for mobilization of the omentum into the perineum by laparoscopic assistance.

The aim of this study was to test the hypothesis that a new surgical technique using elaborated perineal anastomotic urethroplasty combined with laparoscopic

omentoplasty for patients with prior failed PFUD repair was feasible, safe, and effective.

METHODS

Patient Characteristics and Data Collection

We conducted a prospective, observational, stage 2a study as defined by the Idea Development, Exploration, Assessment and Long-term study guidelines for assessing innovation in surgery, to observe treatment outcomes of combined perineal-laparoscopic urethroplasty in patients with complex PFUD.¹² All patients were treated in a single referral center in Pune, India, between January 2012 and February 2013. Before the start of the study, the observational study protocol was submitted to the competent authority. In addition, approval from the local ethical committee was obtained. Before study participation, patients provided their informed consent for data collection. The cut-off date for the analysis was March 30, 2014.

Patients with PFUD with at least 1 failed prior anastomotic urethroplasty were included in the study. Anterior urethral strictures were excluded. Our current indications for omentoplasty are those requiring inferior pubectomy in complex redo PFUD, and for whom a substantial scar excision was required, resulting in large dead space. Rectourethral fistulas are also included as an indication but were not included in our cohort.

Preoperative evaluation included clinical history, physical examination, urine culture, combined retrograde, and voiding cystourethrography (VCUG; Fig. 1).

The primary study outcome was the success rate of the surgical technique, and the secondary outcome was to evaluate feasibility and safety of the procedure. Feasibility was defined as the number of overall procedures completed through our technique of the total number of procedures for which the procedure was intended. Safety was estimated by the perioperative complication rate according to the Clavien-Dindo classification.¹³

The objective outcome was considered a failure when any postoperative instrumentation was needed, including dilation. Uroflowmetry and urine culture were repeated every 4 months in the first year and annually thereafter. When symptoms of decreased stream were present and uroflowmetry was <12 mL/s, urethrography and urethroscopy were repeated.

Surgical Technique and Postoperative Course

The patient is placed in a modification of lithotomy position using Allen stirrups, with the left leg slightly extended to facilitate laparoscopic abdominal access (Fig. 2). Urethroscopy is performed to evaluate the anterior urethra. The suprapubic catheter is removed, and antegrade cystourethroscopy is performed to view the bladder neck and evaluate for stones. A midline perineal incision is made. Circumferential mobilization of the bulbar urethra is performed up to the penoscrotal junction. The proximal bulbar urethra is transected at the site of obliteration. The corpora are separated in the midline, and the deep dorsal vein of the penis is mobilized to one side. The periosteum over the inferior part of the pubic bone is incised in the midline and then elevated laterally on both sides to facilitate the pubectomy. Care is taken to preserve the dorsal penile arteries, which lie lateral to the deep dorsal vein. Using a hammer and bone gouge, the inferior pubectomy is performed. The posterior urethra is incised over an antegrade bougie. In case of difficulty, antegrade rigid or flexible endoscope was passed to facilitate incision on the posterior urethra. The scar at the

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