Rectourethral Fistulas Secondary to Prostate Cancer Treatment: Management and Outcomes from a Multi-Institutional Combined Experience

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Purpose: Rectourethral fistula is a known complication of prostate cancer treatment. Reports in the literature on rectourethral fistula repair technique and outcomes are limited to single institution series. We examined the variations in technique and outcomes of rectourethral fistula repair in a multi-institutional setting.

Materials and Methods: We retrospectively identified patients who underwent rectourethral fistula repair after prostate cancer treatment at 1 of 4 large volume reconstructive urology centers, including University of California-San Francisco, University College London Hospitals, Lahey Clinic and Devine-Jordan Center for Reconstructive Surgery, in a 15-year period. We examined the types of prostate cancer treatment, technical aspects of rectourethral fistula repair and outcomes.

Results: After prostate cancer treatment 201 patients underwent rectourethral fistula repair. The fistula developed in 97 men (48.2%) after radical prostatectomy alone and in 104 (51.8%) who received a form of energy ablation. In the ablation group 84% of patients underwent bowel diversion before rectourethral fistula repair compared to 65% in the prostatectomy group. An interposition flap or graft was placed in 91% and 92% of the 2 groups, respectively. Concomitant bladder neck contracture or urethral stricture developed in 26% of patients in the ablation group and in 14% in the prostatectomy group. Postoperatively the rates of urinary incontinence and complications were higher in the energy ablation group at 35% and 25% vs 16% and 11%, respectively. The ultimate success rate of fistula repair in the energy ablation and radical prostatectomy groups was 87% and 99% with 92% overall success.

Conclusion: Rectourethral fistulas due to prostate cancer therapy can be reconstructed successfully in a high percent of patients. This avoids permanent urinary diversion in these complex cases.

Key Words: urethra, fistula, prostatic neoplasms, prostatectomy, high-intensity focused ultrasound ablation

Abbreviations and Acronyms

HIFU = high intensity focused ultrasound

RP = radical prostatectomy

RUF = rectourethral fistula

Accepted for publication August 8, 2016.

No direct or indirect commercial incentive associated with publishing this article.

The corresponding author certifies that, when applicable, a statement(s) has been included in the manuscript documenting institutional review board, ethics committee or ethical review board study approval; principles of Helsinki Declaration were followed in lieu of formal ethics committee approval; institutional animal care and use committee approval; all human subjects provided written informed consent with guarantees of confidentiality; IRB approved protocol number; animal approved project number.

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RECTOURETHRAL fistula is an uncommon but potentially devastating consequence of prostate cancer treatment, which may result in urinary incontinence, chronic pain and infections.[1] Small surgical fistulas diagnosed early after RP may heal spontaneously with urinary and

0022-5347/17/1971-0001/0
THE JOURNAL OF UROLOGY®

http://dx.doi.org/10.1016/j.juro.2016.08.080
Vol. 197, 1-4, January 2017
Printed in U.S.A.

bowel diversion, although larger or more complex fistulas are often persistent and necessitate surgical repair.[2] Complicating characteristics of fistula include size, concomitant urethral stricture and tissue damage from applied external energy sources such as radiation, cryoablation and HIFU. Some reports describe complex RUFs that were primarily managed by permanent bowel diversion and/or urinary diversion.[3,4]

Several techniques of surgical repair of RUF have been described, including transrectal, perineal, abdominal and combined approaches.[5–8] The use of interposition flaps and grafts such as dartos, gracilis, buccal mucosa and omentum has also been described.[9–11] Success rates of RUF repair vary with published reports limited to single surgeon or institution experience.[6,10,12]

We discuss the management and combined outcomes of RUF after prostate cancer treatment at 4 reconstructive urology centers where there is experience with managing these cases.

MATERIALS AND METHODS

Patients with RUF after prostate cancer treatment were identified at 4 urological reconstructive centers, including University of California-San Francisco, University College London Hospitals, Lahey Clinic and Devine-Jordan Center for Reconstructive Surgery, between 1998 and 2014. Institutional review board approval was obtained at each institution.

RUF was defined as any fistula in the posterior urethra that communicated with the rectum. Patients with a colovesical fistula were excluded from study. Subgroup analysis was performed between patients in whom the fistula developed after prostatectomy and those who received 1 or more energy ablative treatments with brachytherapy, external radiation, cryoablation and HIFU. Patients treated with prostatectomy and 1 or more energy ablative therapy were included in the energy ablative cohort. We defined the success of RUF repair as a fistula repaired without recurrence. Urinary incontinence was defined as patient report of loss of urinary control.

RESULTS

We identified 225 patients with RUF after any prostate cancer treatment at a minimum followup of 6 months. Of these patients 210 (98.3%) underwent surgical fistula repair. Primary permanent urinary diversion was performed in 7 patients (3.3%) and bowel diversion was done in 155 (73.8%).

Surgery was performed with the patient in the lithotomy position and the prone jackknife position in 174 (82.8%) and 36 men (17.1%), respectively. A transperineal approach was used in 166 patients (79%), and a combined abdominal and perineal approach was used in 42 (20%). Sometimes concomitant partial prostatectomy was needed to treat prostatic stenosis. Procedures with the patient prone were done through a perineal incision with the rectum dissected off the urinary side of the fistula and not through a transrectal or York-Mason approach. Muscle flaps such as gracilis, levator, dartos or omentum were used in 193 patients (91.9%).

When stratified by treatment type, 106 patients were in the nonablative radical prostatectomy group and 104 were in the energy ablative group (table 1). [T1] Table 2 lists the types of energy ablative treatment. [T2] Bowel diversion was performed in 83.6% of cases in the energy ablative group and in 65.0% in the prostatectomy alone group ($p < 0.01$). Muscle flaps and omentum were used at similar rates in the 2 groups. When used in this cohort, a buccal mucosal graft was applied to cover the fistula defect and sewn to the edges of the fistula after the rectum was dissected away and closed. In our series a single investigator performed this in patients who underwent energy ablation.[12] Concomitant bladder neck contracture or urethral stricture was more common in the energy ablative cohort (26.0% vs 14.2% of cases, $p = 0.03$).

Postoperatively urinary incontinence was more common in the energy ablation group at 34.6% vs 16.0% of patients ($p < 0.01$). However, there was no difference in subsequent artificial urinary sphincter placement. Postoperatively the complication rate was 25.0% in in the energy ablative group and 11.3% in the surgery group ($p = 0.01$). Complications in the surgery group included infection in 4 men, bladder neck contracture or stricture in 1, deep venous thrombosis in 1, pulmonary embolus in 2, lower extremity paresthesia in 2 and ileus in 2. In the energy ablation cohort complications included urine leak or fistula in 8 men, bladder neck contracture or urethral stricture in 8, pulmonary embolus in 1, thigh hematoma in 1, clot retention in 1, partial wound dehiscence in 1, small bowel obstruction in 1, intractable proctitis in 1 and death in 2.

Initial and eventual success rates of fistula repair were higher in the surgical group at 93.3% and 99.0% vs 80.7% and 86.5%, respectively (each $p < 0.01$). The eventual overall success rate of fistula repair was 92.8% (table 3). [T3]

Table 1. *Patient subgroup characteristics*

	No. RP (%)	No. Radiation/Ablation (%)	p Value
Overall	106 (50.4)	104 (49.6)	—
Bowel diversion	69 (65.0)	87 (83.6)	0.002
Muscle flaps or omentum	98 (92.4)	95 (91.3)	0.77
Buccal mucosal graft	0	46 (44.2)	<0.001
Concomitant stricture	15 (14.2)	27 (26.0)	0.03
Urinary incontinence	17 (16.0)	36 (34.6)	0.002
Artificial urinary sphincter	13 (12.2)	19 (18.2)	0.23
Complications	12 (11.3)	26 (25)	0.01