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ORIGINAL ARTICLE

Rectourethral fistula following laparoscopic radical prostatectomy

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Abstract
Purpose To review the outcome of rectourethral fistula sustained during laparoscopic radical prostatectomy.
Methods A retrospective chart review of all cases managed at a tertiary referral center. Data abstracted included demographics, presenting symptoms, additional interventions, healing, and long-term functional outcome.
Results Between 2004 and 2009, 10 patients were treated for rectourethral fistula following laparoscopic radical prostatectomy. Mean age was 60 years. Two patients were converted to open prostatectomy for primary repair of the rectal laceration without fecal diversion. The remaining 8 patients (80%) had unrecognized injury at the time of prostatectomy and presented postoperatively. Mean time from radical prostatectomy to presentation with fistula symptoms was 9.5 days. Seven patients (70%) required 1 or more operations to treat or control the symptoms of the rectourethral fistula (median 2.3, mean 2, range 1–4 operations). Three patients (30%) required colostomy within 1 month of radical prostatectomy due to severity of symptoms. Spontaneous healing of the fistula was noted in 6 patients (60%) following diversion (urinary ± fecal diversion), and a minority of patients (30%) required an operation to close the fistula. One patient (10%) required cystectomy for positive margins. During a mean follow-up of 27 months, no recurrent fistula was observed in any of the patients. All patients had normal anal continence, but the majority of patients were incontinent of urine.
Conclusions Patients who develop a rectourethral fistula following laparoscopic radical prostatectomy often require additional operations for symptoms control and/or healing of the fistula. Urinary continence is affected in the majority of patients.

Keywords Rectourethral fistula · Rectal injury · Laparoscopic radical prostatectomy

Introduction

Rectal injury during radical prostatectomy is uncommon with a reported incidence ranging from 0.12 to 9% [1–3]. A rectourethral fistula can develop if the rectal injury is unrecognized at the time of radical prostatectomy or when primary repair of the rectum fails to heal properly. Rectourethral fistula impacts the patient's quality of life and often requires multiple additional interventions for symptoms control or repair of the fistula. Over the last decade, laparoscopic and robotic-assisted radical prostatectomies have become the preferred methods to treat prostate cancer [4, 5]. But despite the many perceived advantages of the minimally invasive techniques, including better visualization and less tissue trauma, rectal injuries have not been eliminated [3, 5]. The management of post-radical prostatectomy rectourethral fistula remains a challenge. Due to the rarity and complexity of this condition, no standardized algorithm exists to guide the colorectal surgeon involved in the care of such patients. The purpose of this study was to review the presentation, management, and outcome of patients who were treated at our institution for rectourethral fistula following laparoscopic radical prostatectomy.

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Patients

The study was approved by the Institutional Review Board of Kaiser Permanente Southern California (KSPC # 5908). A retrospective review was conducted for all patients who presented with rectourethral fistula following laparoscopic radical prostatectomy. The patients were evaluated and treated by the colon and rectal surgery service at Kaiser Permanente Los Angeles Medical Center, a tertiary care institution that serves as a regional referral center for the 13 Kaiser Permanente Hospitals in Southern California ($\sim$3.4 million patients). The outpatient and inpatient electronic medical records were reviewed, and the abstracted data included demographics, presenting symptoms, spontaneous healing, subsequent interventions for symptoms control or for definitive fistula closure, and functional outcome. No statistical analysis was conducted since this was a descriptive study.

Results

Between 2004 and 2009, 28 men were treated for rectourethral fistula at our institution. Laparoscopic radical prostatectomy was the etiology of the rectourethral fistula in 10 of the 28 patients. The 10 cases that were the focus of this study were all done with standard laparoscopy, and none were robotics. This report focused only on rectourethral fistula following laparoscopic radical prostatectomy. We excluded fistulas related to other conditions (open prostatectomy, cyrotherapy, brachytherapy, and external beam radiation) due to the significant heterogeneity of such fistulas in terms of location, morphology, quality of surrounding tissue, and spontaneous healing rate. In addition, open prostatectomy cases were excluded as during the study period most of the radical prostatectomies performed within our organization were done laparoscopically, and the open technique was reserved for a smaller number of cases not deemed appropriate for the laparoscopic technique (prior abdominopelvic surgery and/or morbid obesity).

Mean age at presentation was 60 years (median 61, range 52–67). None of the patients had a prior history of radiation therapy. In two patients, the rectal injury was recognized intraoperatively, and both patients were converted to open procedure for primary repair of the rectal laceration without fecal diversion. One patient had a positive margin with carcinoma. The remaining 8 patients had unrecognized injury at time of the radical prostatectomy and presented postoperatively with symptoms of rectourethral fistula. Mean time from radical prostatectomy to presentation with fistula symptoms was 9.5 days (median 10, range 6–13). The most common presenting symptoms were rectouria (60%) and fecaluria (50%). Two patients (20%) presented with a pelvic abscess. All fistulas were $\leq$1.5 cm in greatest dimension. All patients had received perioperative intravenous antibiotics at the time of prostatectomy and following diagnosis of the rectourethral fistula, and all received either oral or intravenous antibiotics for a period of 7–28 days.

Figure 1 depicts the management and outcome of the 10 patients. Overall, 7 of the 10 patients (70%) required 1 or more operations to treat the rectourethral fistula (median 2, range 1–4 operations). All patients presented with an indwelling urethral catheter, and 7 had subsequent placement of a suprapubic bladder catheter. One patient had CT-guided percutaneous drainage of a pelvic abscess. Three patients (30%) required colostomy within 1 month of radical prostatectomy due to severity of symptoms: 2 patients with failed repair of the rectum at time of the initial prostatectomy and 1 patient with positive margins and postoperative pelvic abscess. The latter patient had subsequent completion cystectomy with ileal conduit and a permanent end colostomy 3 months after the radical prostatectomy. Healing of the fistula without the need for local repair was noted in 6 patients (60%): 3 patients with urethral catheter drainage alone, 2 patients with urethral and suprapubic catheters drainage, and 1 patient following diverting colostomy (median time to healing was 2 months [range 2–6 months]). Definitive surgical repair was performed successfully in 3 patients approximately 8 months after initial radical prostatectomy (transanal endorectal advancement flap in 2 and dartos flap in 1, all 3 patients healed within 2 months). The temporary colostomy was closed in the 2 patients. During a mean follow-up of 27 months (median 17, range 8–53 months), no recurrent fistula was observed in 9 out of the 10 patients (excluding the patient who underwent completion cystectomy with ileal conduit). All patients had normal anal continence, but 7 patients (70%) were incontinent of urine on a daily basis. All patients had erectile dysfunction.

Discussion

Rectourethral fistula is a rare condition but most cases are iatrogenic and are related to the treatment of prostate cancer by radiation therapy or surgical excision. Laparoscopic radical prostatectomy has gained wide acceptance because of several benefits including shorter hospital stay, faster recovery, and similar oncologic control when compared to open radical prostatectomy [5–7]. However, the laparoscopic approach has not eliminated most of the morbidity associated with radical prostatectomy including rectal injury, which is observed in 0.47–2% of laparoscopic cases [3, 6–11]. A rectal injury during radical

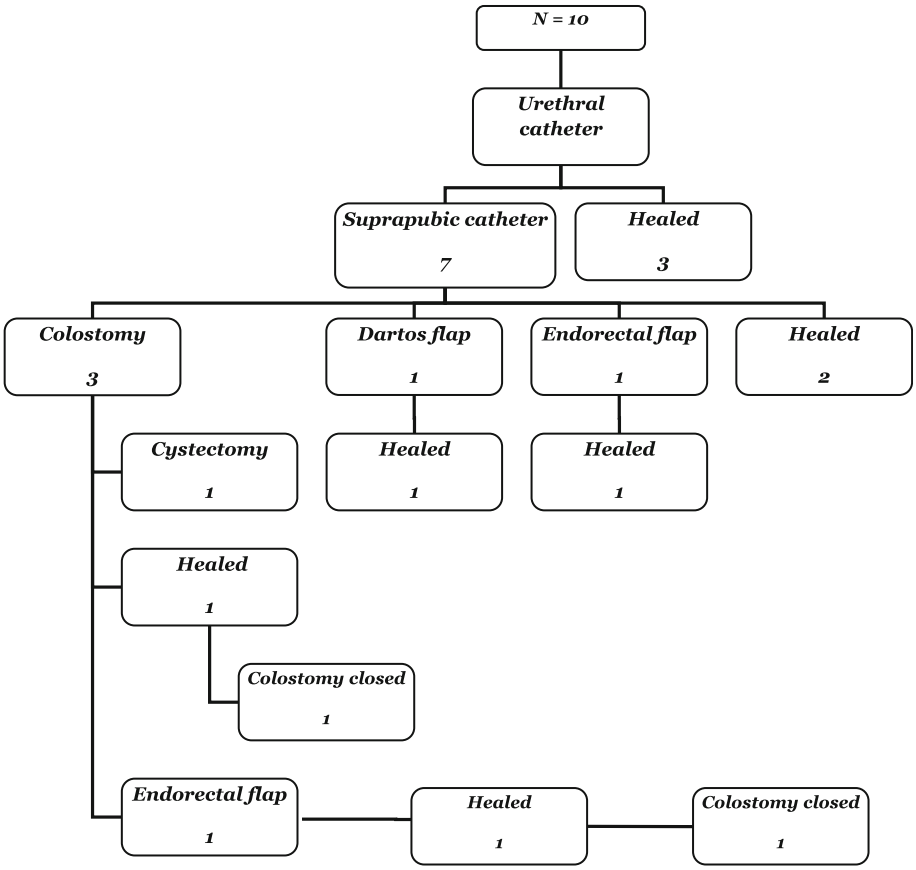

Fig. 1 Outcome of 10 patients with rectourethral fistula following laparoscopic radical prostatectomy

prostatectomy can lead to a postoperative rectourethral fistula with significant morbidity to the patient. Because of the rarity of this condition, no standardized algorithm exists to guide the care of patients with rectourethral fistula, and very few surgeons and centers have developed enough expertise to provide firm recommendations for management and treatment [3, 4, 6–11].

The goal of our study was to review a single-center experience with patients referred over a 5-year period with rectourethral fistula following laparoscopic radical prostatectomy. Although this study is limited due to its retrospective nature and small number of patients, we have made several observations that can be helpful in the management of this condition. The majority of patients had unrecognized injury at the time of laparoscopic radical prostatectomy and presented with symptoms of rectourethral fistula following hospital discharge. Most patients required further intervention in addition to an indwelling urethral catheter for symptomatic control or to repair the fistula. However, spontaneous healing of the fistula was noted in 60% of the patients following urinary diversion alone (urethral catheter ± suprapubic bladder catheter) and colostomy in 1 patient. A minority of patients (30%) required an operation to close the fistula. Spontaneous healing was usually observed within 2 months of the radical prostatectomy. None of the patients who healed spontaneously had fecaluria. This finding is consistent with the results of a prior study that reported no spontaneous healing in patients with fecaluria [8]. Fecal diversion was performed in 3 patients for symptomatic control, and 1 patient healed the fistula following diversion. One-third of the patients required local repair for fistula that persisted beyond 6 months. A transanal or transperineal approach was used and all healed following 1 repair. Various surgical options are available to treat rectourethral fistula including transanal endorectal flap with or without biologic mesh reinforcement and transperineal repairs with the dartos or the gracilis interposition flap [3, 8, 12–22]. Recently, advancement flap through a transanal endorectal microsurgery and closure after application of biologic glue have been described [23, 24]. A transabdominal approach is rarely needed and in our series only 1 patient required laparotomy because of positive margin. The choice of operation depends on the etiology and the morphology of the fistula. In the absence of prior radiation, most rectourethral fistulas can be approached with an endorectal advancement flap or a dartos flap [3, 12, 14–18]. Large fistulas and those related to radiation therapy are best treated with transanal repair with biologic mesh or a gracilis interposition flap [13, 19, 22].

Finally, it is important to note that the primary goal of surgical intervention is to control symptoms or eradicate the fistula and that the patient's expectations regarding sexual and urinary function need to be addressed at the time of preoperative counseling. In our study, all patients were sexually impotent and the majority had urinary incontinence. However, anorectal function was preserved, and once the fistula healed, no recurrences were noted.

Conclusions

Most patients with rectourethral fistula following laparoscopic radical prostatectomy require additional operations for temporary control of symptoms, to allow for spontaneous healing, or for repair of the fistula. Spontaneous healing occurs in majority of patients following urinary diversion, usually within 2 months of the rectal injury. Persistent fistulas beyond 6 months can be successfully treated with local repair. Anal continence is usually preserved, but long-term urinary function is compromised in the majority of the patients.

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