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Treatment of urethrorectal fistulas caused by radical prostatectomy – two surgical techniques

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Introduction The repair of complex urethrorectal fistulas, which can be the result of treating prostate cancer with radical prostatectomy, is a big problem in urology and its final result is not always satisfactory. There are no universally accepted methods for repairing such fistulas. In our work we present a retrospective analysis of patients treated for urethrorectal fistulas after previous radical prostatectomy. The methods used were the initial excision and suture of the fistula, or a gracilis muscle flap interposition.

Material and methods In the years 2000–2012, four patients were treated because of urethrorectal fistulas after radical prostatectomy. In two patients, open radical prostatectomy had been performed. Two other patients had been operated laparoscopically. Two patients had a primary fistula repair. They were operated using anterior perineal access. Two others were treated with the use of a gracilis muscle flap.

Results During the follow up, there was no recurrence of fistulas. Medium follow up for the first two patients was 120 and 156 months, and follow up of two other patients was 16 and 23 months. Until now, there were no final postoperative complications.

Conclusions Repair of the fistulas requires an individual approach to each case. Excision and suturing of the fistula gives a very good final result, especially when the primary reconstruction is performed. Repair of urethrorectal fistula using a gracilis muscle flap appears to be an excellent option in cases of complex recurrent fistulas. It is also associated with low morbidity in patients and a high success rate.

Key Words: urethrorectal fistulas ‹› surgical repair ‹› radical prostatectomy ‹› gracilis muscle

INTRODUCTION

Fistulas are defined as abnormal connections between two organs in close proximity or between an organ and the external body surface. Fistulas most often occur in the gastrointestinal tract, although they may occur anywhere throughout the body. Undetected or non–successfully treated fistulas usually cause patients discomfort, but can also be fatal depending on their severity and location. Urethrorectal fistulas (URF) are uncommon and etiologically may be the result of a congenital malformation, trauma, neoplasm, infection or inflammation [1]. However, it has been reported that approximately 60% of URF cases are iatrogenic [2]. These may be consequences of radio–teletherapy [3], brachytherapy [4], cryotherapy, laser vaporization, and endoscopic or open surgery [5]. The urological procedure that has been shown to cause most of the URF in males is the radical prostatectomy [6, 7, 8]. Generally, the incidence of iatrogenic fistulas is low, but taking into account the number of radical prostatectomies performed, the number of patients with URF is clinically important. URFs increase mortality and morbidity rates in patients, inevitably decrease their quality of life, increase the length of hospital stay and increase costs [2]. Fecaluria or passage of urine through the rectum leading to liquid stools and pneumaturia are the most typical symptoms of URF [9, 10]. Although it

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has been reported that fecaluria may not be seen in many patients [11]. Other signs of URF are gastrointestinal disturbances which have been noted in 60% of cases [12]. Clinically, patients with URF most commonly present with recurring cystitis and dysuria [2]. Spontaneous closure of small URFs have been documented [13], although it occurs infrequently [9], therefore challenging surgical repair is usually required. Despite the numerous procedures and surgical advances that have been documented, the best technique utilized to correct this problem has yet to be established. Many authors advocate a two–step approach. First, the surgical management should be transient urinary or fecal diversion [9, 13], followed by repair with interposition of well vascularised tissue between the suture lines of the fistula. In 1979 Ryan et al. first described the gracilis muscle flap interposition as an effective technique [14]. The gracilis muscle not only separates the rectum and urethra but its dense blood supply allows faster and adequate wound healing. In this paper we retrospectively discuss our experience of four cases. In two of them we have used the gracilis muscle transposition technique.

MATERIAL AND METHODS

In the years 2000–2012 four patients reported to our clinic because of the formation of URF after radical prostatectomy. Surgery had been performed using an open technique in two patients and a laparoscopic approach in the other two. In the first two patients we performed primary repair. Two other patients had recurrent fistulas following failure of previous repairs which had been performed elsewhere. In both of these cases the primary repair was performed a few days after radical prostatectomies and consisted of closure of the fistula without colostomy. The recurrence occurred within 3 months and the patients were referred to our center.

Surgical techniques
Primary repair – Combined anterior perineal access

The patient is placed in lithotomy position. The midline perineal incision is used to gain access to the urinary tract and the rectum. The rectum is dissected away from sphincters and its posterior mobilization is performed. This is followed by anterior mobilization of the bladder. Excision of the fistula is then performed and the edges of the holes are refreshed. They are closed by multiple layers of stiches on rectum and urethra with transposition of

Figure 1. *Fistula during excision – arrow indicate the place of fistula.*

Figure 2. *Patient position during surgery.*

Figure 3. *Gracilis muscle flap preparation, preservation of the neurovascular pedicle.*

Figure 4. *Gracilis muscle tendon identification and dissection.*

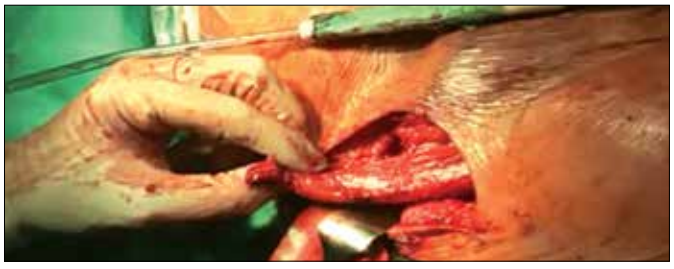

Figure 5. *Gracilis muscle flap interposition.*

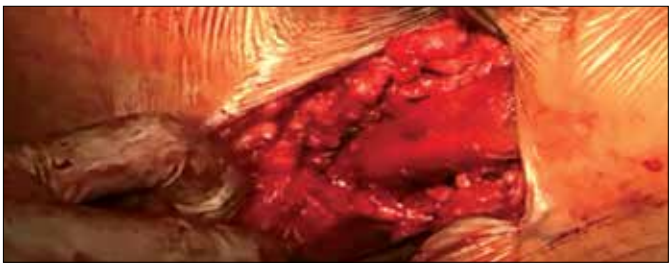

Figure 6. *Gracilis muscle flap in its final position.*

the tissue. A Foley catheter is left for 6 to 8 weeks (Figures 1–6).

Secondary repair – Gracilis muscle interposition technique

In the technique where gracilis muscle flap interposition is used, the patient is positioned in lithotomy position with the legs adducted and knees flexed. Gracilis muscle position is marked from the pubic tubercule to the tibial condyle of the knee. Before the surgery, the location of the primary neurovascular pedicle is also marked out on the skin 10 cm distally from the inguinal crease. Then, an 8 cm proximal incision site is marked above the gracilis, distal to the neurovascular pedicle. A 2 cm counter incision is made over the tendon insertion of the distal aspect of the muscle. The neurovascular pedicle must be identified during preparation of the muscle. Doppler ultrasound can be used for this reason during surgery. The tendon is then dissected using a small 2 cm incision and is disconnected from the condyle of the knee. The muscle can then be dissected creating a tunnel between proximal and distal incisions. The length of the dissected gracilis muscle should be about 30 cm, which is enough to reach the perineum for the repair of the fistula. A tunnel has to be prepared between the perineum and the thigh to transfer the muscle into the perineum. The gracilis muscle is rotated 180 degrees and relocated through the tunnel to the perineum. The muscle is then sutured between the urethra and the rectum to prevent recurrence of the fistula. Sutures are also applied at the apex of the incision to keep the muscle in place. A Foley catheter is also left for 6 to 8 weeks.
During the follow up, patients undergo rectal contrast enema, voiding cystourethrography, cystoscopy and proctoscopy. After the fistula has healed, the Foley catheter can be removed.

RESULTS

There was no recurrence of urethrorectal fistulas during follow up in all patients. Medium follow up for the 2 primary treated patients was 120 and 156 months, and follow up in the last two patients in whom the gracilis muscle was used for reconstruction, was 16 and 23 months. Up to now, there were no serious postoperative complications. It is hard to assess the effectiveness of a surgical procedure on the basis of two patients but in our case the effect of the treatment was very good.

DISCUSSION

The correction of the uncommonly occurring URFs remains a difficult task. They are rare but can be caused by direct injury during surgery, especially after the radical prostatectomy (RP) and can also occur some time after operation. F. dal Moro et al. described the time to develop a URF following surgery as a few weeks, although the range is variable [15]. Thomas R et al. suggest that open perineal prostate surgery was the causality of immediate incidence of URF in 1.4% of cases postoperatively [16].
There have been numerous approaches that have been reported as means to repair URF. These include transabdominal, transanal, transperineal, posterior rectal, and transvesical approaches, performed either independently or in combination [16]. Some have proven to be successful while others have failed to do so. Procedures are unsuccessful when URF occurs multiple times and increases the morbidity and mortality in patients [10]. Recurrent URF may require patients to be subjected to permanent urinary and fecal diversion [17]. Many authors have suggested that there is no ideal method of repair because of the rare occurrence of URF and the fact

Table 1. *Patients' clinical characteristics*

No.	Surgery	Clinical Picture	Colostomy	Previous repair	Final result	Medium follow up (months)
1	RP – open	Fecaluria	Yes	No	Healed	156
2	RP – open	Fecaluria	No	No	Healed	120
3	RP – laparoscopic	Fecaluria	Yes	Yes	Healed	23
4	RP – laparoscopic	Fecaluria, pneumaturia	No	Yes	Healed	16

that a randomized clinical trial comparing the various methods has yet to be completed. Nevertheless, a review by Kitamura and Tsukamoto showed that the most common procedures with high success rates and low–morbidity are the gracilis muscle flap interposition, especially in radiated cases, and the rectal flap method with the transsphincteric "York–Mason" approach, as described by Fengler 1997. For example when compared to the transsacral "Kraske" method the York–Mason has a 5–7% occurence of rectocutaneous fistulas whereas the Kraske approach has a morbidity rate of 15–25% following repair [18]. Newer minimally invasive procedures using various sealants and glues in the treatment of URF have recently surfaced with promising results, although further investigation is required [19]. Options for surgical prostate removal are the following: radical perineal prostatectomy (RPP), radical retropubic prostatectomy (RRP), laparascopic RP and robot–assisted laparoscopic RP [20–23]. The review by Kitamura and Tsukamoto described the incidence of rectal injury during RRP based on numerous community–based practice occurred in 1.5– 2.2% of cases where 0.6–9% were actually diagnosed as URFs [10]. Noldus et al. in their study showed it as high 3.9% when taking RRP and cystoprostatectomy into account [6]. The review also concluded that URF can occur following any RP technique because there was no significant difference in the development of rectal injury when comparing the techniques. They did however mention a study by C. Thomas et al., that manifested the risk for URF is 3.6% higher for RPP when compared to RRP [24]. Moreover, when discussing URF following RP, a major risk factor for the development of URF is radiation therapy prior to surgery. Radiation therapy alone has the ability to cause URFs [25]. Perhaps it is because of the increases in pre–surgical treatment, in this case radiotherapy, that we see an increase in the numbers URF that occur. Finally, there have been attempts to repair URFs using various buttock and thigh muscles, although the gracilis muscle is situated favorably as the most superficial muscle on the medial aspect of the thigh. It originates on the inferior ramus of the pubis and inserts on the medial surface of the tibial shaft. Wexner et al stated its function as being "vestigial". The vascular density of the gracilis muscle is a very important property that aids in the healing and recovery process [26]. A case report by Miller W. showed that the greater omentum is another tissue that can be used as means of repair because of its location and rich vascular supply [27]. The main problem with using an omental flap is obtaining it via an invasive laparotomy [28], which may not be a practical approach if the patients undergoing the surgery has had prior abdominal surgeries. Together, the natural thickness of the muscle, which offers a physical structure able to separate the URF, and its optimal and easily accessible anatomical position, make the gracilis an ideal muscle to transpose in order to inhibit the recurrence of URF [26].

Table 2. *Comparison of two different techniques*

Primary repair – combined anterior perineal access
Patient in lithotomy position
↓
Midline perineal incision
↓
Dissection of the rectum away from sphincters
↓
Posterior mobilization of the rectum
↓
Anterior mobilization of the bladder
↓
Fistula dissection
↓
Transposition of the surrounding tissue near fistula
↓
Multiple layers of stiches on rectum and urethra
↓
Foley catheter for 6–8 weeks
Secondary repair – Gracilis muscle interposition technique
Patient in lithotomy position, legs adducted, knees flexed
↓
Gracilis muscle localisation
↓
Primary neurovascular pedicle localisation
↓
Proximal incision above the muscle – distal to the neurovascular pedicle
↓
Counter incision over the tendon insertion of the muscle (distal aspect)
↓
Primary neurovascular pedicle identification
↓
Subcutaneous tunnel preparation between proximal and distal incisions
↓
Muscle tendon dissection
↓
Muscle rotation through the tunnel to the perineum
↓
Fistula dissection, multiple layers of stiches on rectum and urethra
↓
Muscle fixation between the urethra and the rectum
↓
Foley catheter for 6–8 weeks

CONCLUSIONS

The effectiveness of the procedure is hard to assess on the basis of so few patients, but in this study we

showed that URFs can be successfully treated and that gracilis muscle transposition is a viable and effective procedure in patients after primary failure of surgical treatment. A "gold standard" treatment protocol currently ceases to exist. This may be due to the low occurrence rate, the unique nature of the URFs, patient history itself, or perhaps the experience of the surgeon. What may help establish a universal protocol would be the further investigation of the costs of the procedures, the invasiveness of the procedure, the duration of hospital stays and length of recovery time of the patients.

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