Tech Coloproctol (2014) 18:201–203
DOI 10.1007/s10151-012-0917-3

TECHNICAL NOTE

The trans-sphincteric posterior sagittal repair of recto-urinary and recto-vaginal fistulae using Surgisis™ mesh and fibrin sealant

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Received: 8 June 2012 / Accepted: 1 October 2012 / Published online: 25 October 2012
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Abstract Recto-urinary, recto-vaginal and ileo-anal pouch-associated fistulae are rare yet a significant clinical problem due to their profound impact on patients' quality of life and are a challenge to repair. In this report, we describe repair of these complex fistulae using a modified trans-sphincteric posterior sagittal approach with Surgisis™ mesh and fibrin sealant and review our repair outcomes.

Keywords Recto-urinary · Recto-vaginal · Fistula · Surgisis™ · Fibrin

Introduction

Fistula formation between the rectum or anus and other pelvic organs such as the urinary tract (bladder, urethra) and vagina is uncommon but devastating complications of variable etiology including trauma, radiation, inflammatory bowel disease, infection, malignancy and iatrogenic secondary to pelvic surgeries [1, 2]. Recto-urinary (RU) fistulae complicate 1.5–2.2 % of prostatectomies (open and laparoscopic) and 3.3–16 % of female patients develop recto-vaginal (RV) fistulae following ileal pouch restorative proctocolectomy [2, 3]. Surgery is the primary treatment of these fistulae; however, post-repair fistula healing can often prove challenging depending on fistula location, etiology and previous attempts at repair. This is further reflected in the number of available surgical repairs including trans-anal, trans-vaginal, trans-abdominal, perineal and trans-sphincteric posterior sagittal (TPSR) [4].

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In 1917, Dr. Bevan described a trans-sphincteric posterior sagittal approach to rectal exposure, which was subsequently modified and popularized by Dr. Mason and often referred to as the York-Mason repair [5, 6]. Since its original description, this repair has been shown to have good functional and anatomic outcomes in a number of retrospective case series, the largest one (24 patients) being that of Renschler et al. [7].

In this short technical note, we describe a further modification of the original Bevan operation where the repair is reinforced by Surgisis™ mesh and fibrin sealant (Tisseel™). We also report our outcomes using this repair not only for recto-urinary fistulae but also for recto-vaginal, pouch-vaginal and pouch-urinary fistulae.

Operative technique

Pre-operatively, all patients undergo mechanical bowel preparation and administration of standard colorectal pre-operative prophylactic antibiotics. Once under anesthesia, a Foley catheter is inserted. All repairs are protected with a defunctioning stoma constructed at the time of TPSR repair or at an earlier operation depending on the patient's presentation and symptom severity. TPSR requires a prone jackknife positioning with the buttocks taped apart. A strict midline incision is made extending from the coccyx through the posterior wall of the rectum and anal canal including the sphincter complex. The coccyx is resected for increased exposure. Peña muscle stimulator (Integra Neuroscience Implants S.A. Sophia Antipolis, France) (Fig. 1) is used to identify the levator ani, puborectalis and external sphincter fibers (Fig. 2). Limited suture tags are used to mark the limits of the anal canal (anal verge and dentate line) and puborectalis. The rectal mucosa and submucosa

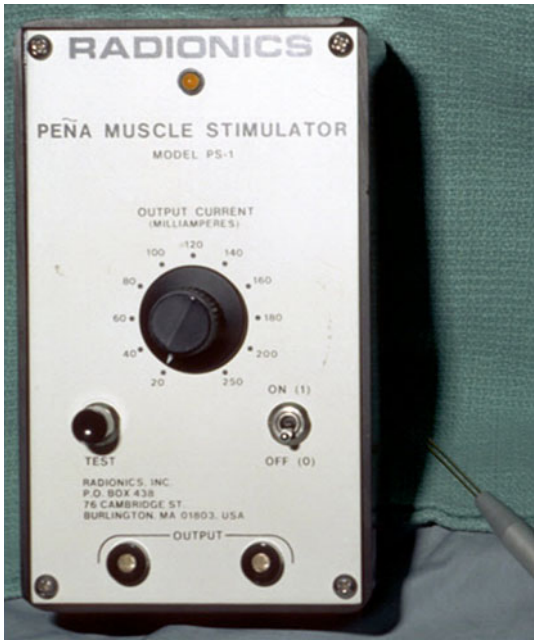

Fig. 1 Peña muscle stimulator used to identify the levator ani, puborectalis and external sphincter fibers during closure

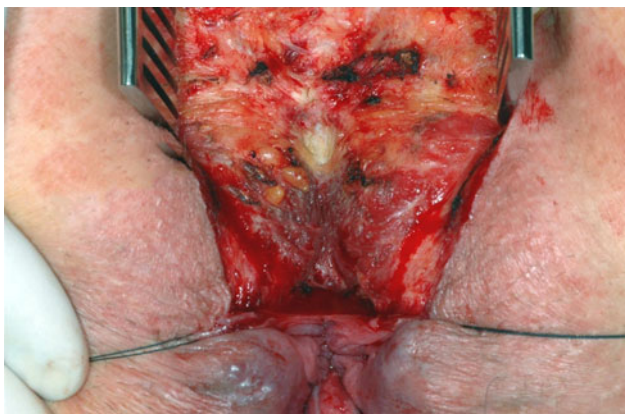

Fig. 2 A midline posterior sagittal incision exposing levator ani muscle fibers and partially resected coccyx

are retracted using a self-retaining Lone Star™ retractor (Lone Star Medical Products, Stafford, TX, USA). At this point, the fistulous opening is readily identified and edges excised and sent for pathology to rule out malignancy (Fig. 3). Full-thickness anterior wall of the rectum is then undermined circumferentially around the fistulous opening creating a rectal flap. The fistulous opening in the urinary tract/vagina is closed primarily using an absorbable monofilament. The repair is then reinforced with an application of fibrin sealant (Tisseel™, Baxter, Deerfield, IL, USA) followed by a small piece of four-ply Surgisis™ mesh (Cook Medical, Bloomington, IN, USA) and a second application of fibrin sealant (Fig. 4). The fistulous opening in the anterior rectal flap is closed in two layers

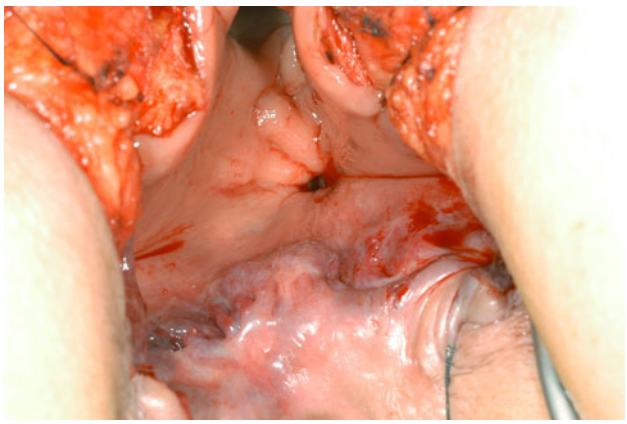

Fig. 3 The completed incision through the posterior rectal wall exposing the fistulous opening on the anterior rectal wall above the *dentate line*

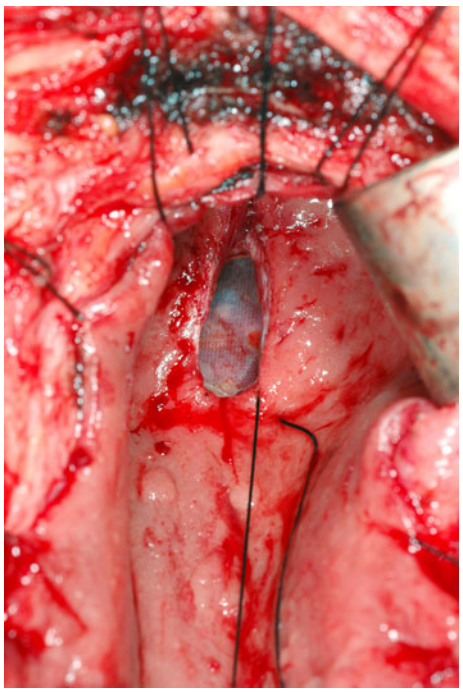

Fig. 4 The interposition of Surgisis™ mesh and Tisseel™ fibrin sealant between the closed urethral fistula opening and rectal fistula opening

(muscularis propria then submucosa with mucosa) with interrupted absorbable stitches.

The rectal tube and anal canal are recreated over an appropriate-sized dilator using interrupted and running absorbable sutures with the aid of the muscle stimulator. Finally, the subcutaneous tissues and skin are closed using running absorbable sutures. The patient is discharged home once tolerating oral intake and when pain is well controlled with oral analgesics. The urinary catheter is left in place and removed once fistula healing is confirmed with cystourethroscopy at 2 weeks after surgery. Ostomy is reversed

after complete fistula healing is established with a flexible sigmoidoscopy and a water-soluble enema imaging at 6 weeks after the repair. All patients are seen in follow-up at 3 and 12 months after the ostomy closure or sooner if any symptoms develop.

Results

Between 2002 and 2010, 19 patients with median age of 60 years (range 26–73 years) underwent the described TPSR at a single institution by the senior author and their outcomes have been reviewed retrospectively. Of the 19 patients, 15 had recto-urethral/vesical fistulae following both laparoscopic (11) and open (4) radical prostatectomies (none had radiation), 2 had recto-vaginal fistulae following previous anterior resection with double-stapled anastomosis, one had pouch-vaginal and one had pouch-urethral/vesical fistula. Four patients had previous failed trans-anal attempts at fistula repair. The median time from surgery to fistula repair was 3.9 months (range 0.3–71.9 months). All repairs were protected with fecal diversion, and none of the patients had urinary diversion. Median operative time for TPSR was 120 min (70–160 min) in patients with existing stoma and 170 min (range 150–195 min) for repairs requiring a defunctioning loop ileostomy construction. The overall intraoperative blood loss was minimal (mean 19.0 $\pm$ 10.7 mL). Median post-repair hospital stay was 5 days (range 3–25 days). At the median follow-up time of 1 year, 2 patients had fistula recurrence (11 %). One of the recurrences was recognized during the 6-week pre-ostomy closure workup. This patient underwent a repeat TPSR with subsequent fistula healing and ileostomy reversal. The other recurrence took place in the immediate post-operative period on the same admission due to urinary catheter dislodgement and traumatic disruption of the repair. Although repeat TPSR failed again, this patient underwent a third TPSR, which was successful. At follow-up, no patients were found to have urinary or rectal/anal stricture and no urinary or fecal incontinence. The protective diverting ostomy was reversed in 95 % of patients (18 out of 19). One defunctioning ileostomy was not reversed despite fistula healing due to presence of severe pouchitis.

Discussion

Our reported high success rates of recto-urinary and recto-vaginal fistula repairs can be attributed to the trans-sphincteric posterior sagittal approach and a number of key modifications. The posterior approach allows for outstanding fistula visualization as well as for repair through virgin tissues in patients with previous failed trans-anal and/or trans-vaginal repairs. Keeping the posterior incision strictly in the midline minimizes nerve injury as the nerves travel in the lateral to medial direction, which is reflected in excellent functional outcomes. The Peña muscle stimulator is commonly used in the repair of anal malformations in pediatrics and its use in the TPSR allows for the avoidance of extensive and cumbersome suture tagging yet reliable identification and accurate closure of the pelvic floor and the sphincter complex again contributing to the excellent anatomic and functional outcomes. In terms of fistula healing, the circumferential fistulous tract excision removes the thin, epithelialized tract, a factor well known to keep fistulae open while fecal diversion reduces the degree of repair contamination during healing. And finally, one of the reported limitations of any recto-urinary/vaginal repair is the inability to interpose tissue between the rectum and the urinary tract/vagina. We believe the use of fibrin sealant and Surgisis™ mesh provides the scaffold, tissue bulk and a physical barrier between the urinary/vaginal septum and rectum/anus while both are healing.

The limitations of our review include small number of recto-vaginal fistulae as well as the lack of complex patients such as those with Crohn's disease or post-pelvic radiation as well as relatively short follow-up period (1 year). In addition, caution must be exercised when using this repair in patients with pouch fistulae as this patient population is predisposed to continence issues due to stool consistency, and perhaps in this setting, the TPSR should be reserved as last resort in patients bound for pouch excision and should only be performed by experts well versed in the posterior sagittal approach and pouch operations. Despite these limitations, the described TPSR offers an excellent option in the repertoire of repairs for the often challenging to heal recto-urinary and recto-vaginal fistulae.

Conflict of interest None.

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