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ORIGINAL ARTICLE

Early laparoscopic repair for supratrigonal vesicovaginal fistula

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Abstract Laparoscopic repair of supratrigonal vesicovaginal fistula is less morbid and equally effective compared to open repair. This approach is advisable when transvaginal repair is difficult.

Keywords Vesicovaginal fistula · Trans abdominal repair · Trans vaginal repair · Laparoscopic repair

Introduction

Vesicovaginal fistulas (VVF) always represent a distressing medical condition for the patient and demand much attention. Gynecological surgeries account for the majority of iatrogenic fistulas. Lee et a1. [1] reported that 82% of fistulas were attributable to gynecological procedures. The best chance for ultimate success of vesicovaginal fistula repair is achieved not only with the first repair, but also the approach most familiar to the surgeon. VVF may be treated with various surgical techniques depending on the etiology and location [2]. One of the most controversial aspects of surgical repair of vesicovaginal fistula is the choice between the vaginal vs abdominal repair. The emergence of laparoscopy has added a new dimension to this debate. We present our retrospective results of laparoscopic trans-abdominal transvesical repair.

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Materials and methods

A total of 13 patients were treated with this transperitoneal laparoscopic approach February 2001 to November 2005. Average age was 37.2 years (range 20–55). Mean duration of symptoms was 16.7 days. All the patients had a history of abdominal hysterectomy and had presented with urinary incontinence at 5–17 days after abdominal hysterectomy. All vesicovaginal fistulas were diagnosed with the methylene blue test. Cystoscopy, retrograde cystourethrography, and excretory urography confirmed VVF and ruled out ureteral injury. In all cases, the location of the fistula was supratrigonal. The mean size of the fistula was 18 mm (14–31 mm). In all patients, conservative treatment of at least 2 weeks and failed. Laparoscopic repair was undertaken at 2–4 weeks after initial surgery. Transvaginal approach was not preferred in these cases either due to a high-retracted fistula in a narrow vagina or because of the close proximity to the ureter.

We chose a transperitoneal laparoscopic approach following the same principles as those of open surgery. An informed consent, which included options for other surgical alternatives, was available and a chance for conversion to laparotomy was taken. H.K.Nagraj performed all cases. After general anesthesia is administered, the patient is placed in lithotomy position in stirrups. Initially, cystoscopy is performed and the two ureters are catheterized. This facilitates ureteral identification and protection during excision and closure of the fistula. A ureteral catheter of a color different than those used for the ureters is then pulled through the fistula into the vagina and retrieved outside through the vaginal introitus to facilitate identification during excision (Fig. 1). To prevent gas leak, 22 Fr Foley catheter is inserted into the bladder with gentle traction and vagina also plugged with vaseline gauze. The

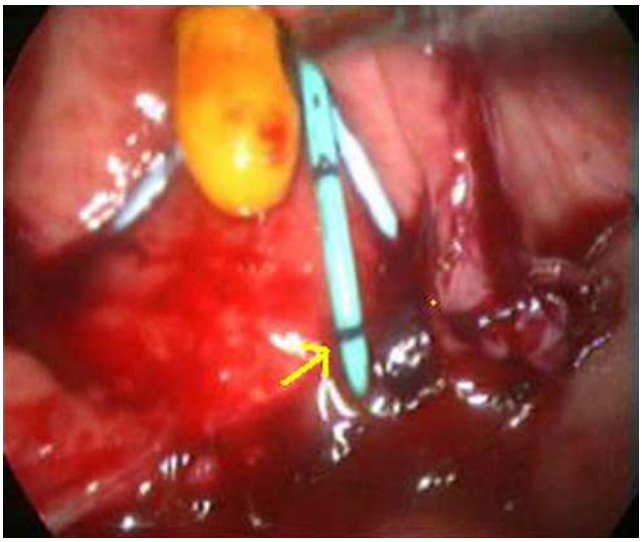

Fig. 1 *Arrow* points to ureteric catheter placed into vagina through the fistula. Also shown are the two ureters catheterized and Foley catheter in bladder

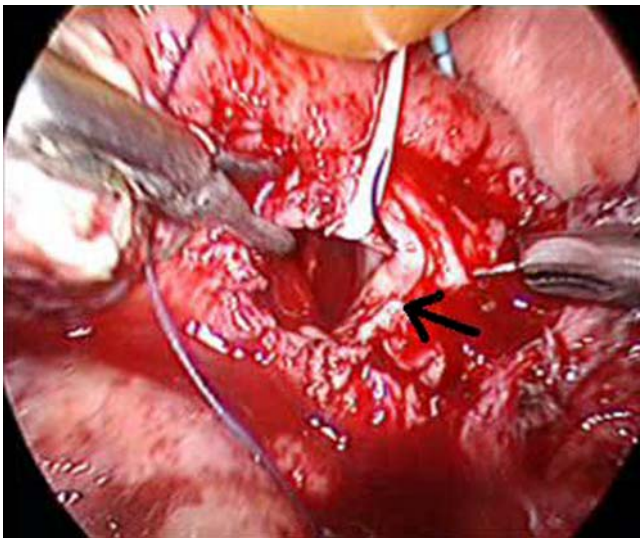

Fig. 3 Vaginal closure; *arrow* points to edges of vaginal wall

bladder was partially filled and the catheter was clamped. The patient is placed in the Trendelenburg position. A 10-mm trocar was inserted through the umbilicus using Hassan's technique for the 30° telescope; 5 mm trocars were inserted in both iliac fossa under laparoscopic vision. Another 5-mm port is placed in the suprapubic region in the midline to aid retraction of bladder. Bladder is distended fully with 300 ml of saline to facilitate identification. Gentle traction on Foley catheter prevents leakage of saline. The intestinal and omental adhesions were released from the posterior surface of the urinary bladder. The peritoneum between the bladder and vagina is incised. Linear opening is made in the posterior wall of the bladder close to the fistulous site (Fig. 2). The ureteral or Foley catheter that runs along the fistulous tract is identified and the incision is carried vertically downward and VVF is identified and the bladder flaps are dissected out from the vaginal wall by sharp dissection. All nonviable or necrotic tissue is excised. The catheter placed through the fistulous opening is removed at this stage. The vaginal opening closed with 2.0 Polyglactin sutures (Fig. 3). A suture is then placed at the anterior vaginal wall, distal to the vaginal closure. This suture is then used to anchor part of the omental flap, which is harvested from the nearest anatomical location (Fig. 4). Alternatively, an epiploic appendix can be mobilized from the sigmoid colon.

The bladder closed with intracorporeal continuous suture in single layer with 2.0 Polyglactin. The bladder is filled with saline to assess how watertight a closure was achieved (Fig. 5). We routinely keep a urethral catheter (18 Fr Foley) instead of suprapubic tube. Ureteric catheters are removed

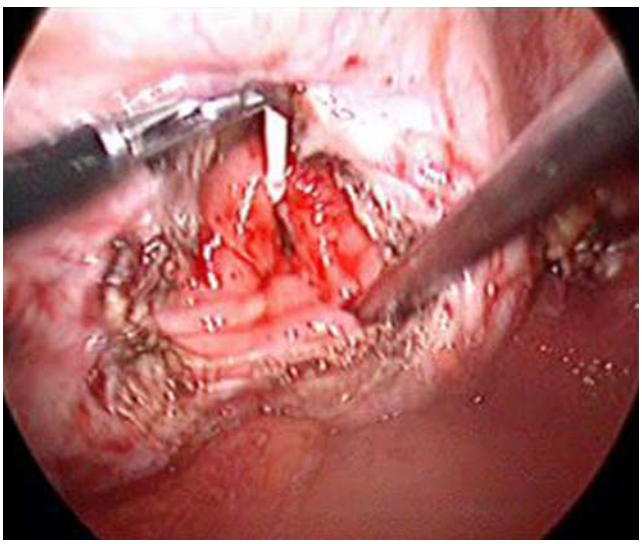

Fig. 2 Small longitudinal cystotomy

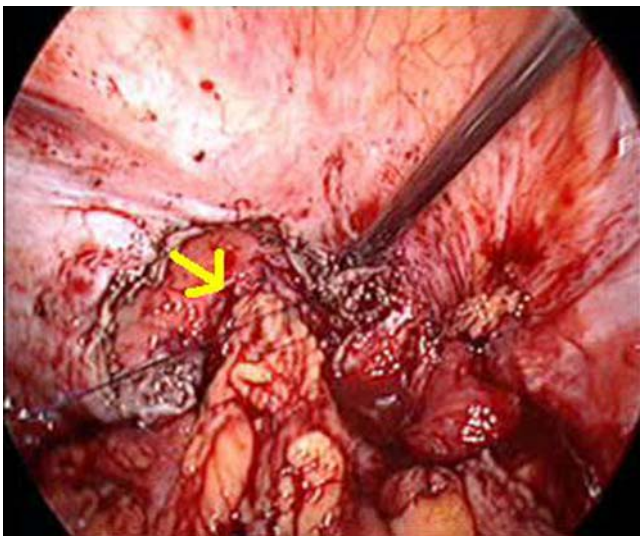

Fig. 4 Omental placed over the sutured vaginal wall

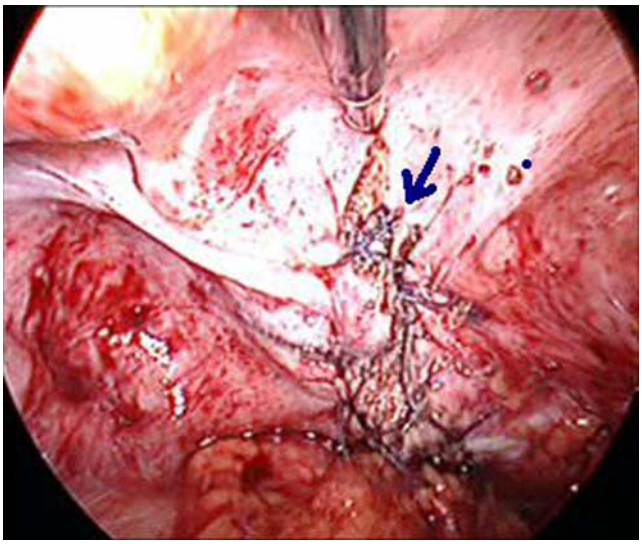

Fig. 5 Watertight cystotomy closure

at the end of procedure. In instances of extensive dissection around a ureter, the catheter is retained for 72–96 h. Vagina is packed with betadine ointment soaked gauze. The vaginal pack is removed after 48 h and vaginal toilet given daily. Ambulation is encouraged and appropriate prophylactic antibiotics are generally given. Anticholinergics started to prevent bladder spasm. The closed drainage system is usually removed on postoperative day 2 or 3. The patient is discharged with Foley catheter on day 4 or 5. The urethral catheter is generally removed 15 days postoperatively. A retrograde cystogram is performed before catheter removal to ensure fistula closure. Patients are advised to avoid the use of tampons and refrain from sexual activity for 3 months after the procedure.

Results

The rate of successful correction of fistula is 91.6% (11/12) and conversion to open was 7.7% (1/13). Mean operative time was 130 min (ranges 110 to 160). Average length of hospital stay was 4.5 days (range 3–7). The urethral catheter remained indwelling on an average of 15 days (range 14–16 days). Conversions to open surgery were undertaken in one case due to extensive pelvic adhesions and need for augmentation. At a mean follow-up of 21 months (range 6 to 36 months), laparoscopic VVF repair failed in only one case.

Discussion

The success rate of any technique for vesicovaginal fistula repair is higher when some surgical principles are followed, which includes careful preoperative patient evaluation to exclude the presence of multiple fistulous communications, separation of the bladder and vaginal wall, excision of all devitalized tissue to obtain healthy margins, and closure of the bladder and vagina in distinct planes without tension. The ideal interval between the onset of the fistula and surgical repair is controversial. Some authors prefer delayed closure while others state that early intervention is safe [3, 4]. The classic strategy is to wait for 3 to 6 months after the injury. Blaivas et al. [5] in a study of 24 patients with VVF found that once acute inflammation subsided, there is no benefit in delaying the surgery. According to them, delay can have devastating impact on quality of life. Taking in to account these factors, we also favor an early laparoscopic intervention. A longer interval should be adopted when the fistula results from radiotherapy or if there is extensive local tissue damage due to infection, surgical trauma, or cellulitis.

The majority of cases of vesicovaginal fistula can be treated transvaginally with good success rates and less associated pain, and on an outpatient basis [6]. Some authors favor the vaginal approach as they have noted advantages in terms of lower patient morbidity, blood loss, and postoperative bladder irritability. The procedure may be done in an outpatient setting, postoperative pain is minimal, and successful results equal to those of the abdominal approach are achieved [6]. Some argue that the transabdominal approach involves greater postoperative morbidity and longer hospitalization [7].

Proponents of the abdominal approach argue that it has enjoyed reproducible and durable success, and the advent of limited anterior cystotomy has improved the historically more morbid O'Connor procedure, in which the bladder is bivalved to the level of the fistula. The transperitoneal supravesical technique provides wide mobilization of the bladder and vaginal wall, complete removal of devitalized scar tissue, and efficient closure of the healthy layers without tension. This technique also permits safe ureterovesical reimplantation when necessary as well as mobilization of the omentum for interposition between the bladder and vagina. The advantage of an abdominal approach is simultaneous repair of other intraabdominal and intravesical pathology need for augmentation cystoplasty, ureteral repair, bowel repair. Lee et al. [1] recommended an abdominal approach for certain indications, namely, (1) inadequate exposure related to a high or retracted fistula in a narrow vagina, (2) close proximity of the fistulous tract to the ureter, (3) associated pelvic pathology, and (4) multiple fistulas. In complicated cases, a combined transabdominal and transvaginal approach has been reported. However, others use the abdominal approach only in rare cases when an intraabdominal pathological condition requires simultaneous care [2, 8].

In the majority of cases, an uncomplicated vesicovaginal fistula requires only multilayer tension-free repair. However, when complicating factors, such as prior radiation, prior failed surgery, or poor quality of tissues are present, adjuvant measures are required. When the repair is done by an abdominal approach, omentum is commonly used. It is an excellent source of reinforcement and protection of a tenuous closure. Some surgeons use omentum routinely when obtainable.

Laparoscopy is an alternative to laparotomy for many urogynecologic procedures. The advantages of a minimally invasive procedure include magnification during the procedure, good hemostasis, smaller incision, and a shorter hospital stay with less morbidity. Laparoscopy respects the basic principles of successful surgical repair by the abdominal approach, namely, (1) wide exposure of the fistula and surrounding tissues, (2) excision of all fibrous tissue, (3) tension-free closure of well-vascularized flaps, (4) use of suitable suture material, (5) interposition of various tissues, such as omentum, peritoneum, a bladder flap taken from a site away from the fistula, or an epiploic appendix taken from the sigmoid colon, and (6) efficient postoperative bladder drainage [8].

In 1994, Nezhat et al. initially reported laparoscopic VVF repair and several other reports followed [9–11]. Until now, two published series by Chibber et al. [12] and Sotelo et al. [13] has demonstrated the efficacy of laparoscopic repair under experienced hands. Authors in the above-mentioned series preferred to wait unto a period of 6–8 weeks, while in our cases, we proceeded with an early repair. Sotelo et al. in their series used a five-port approach as for radical prostatectomy. We prefer a four-port approach as described by Chibber et al. In our experience, we find that laparoscopic procedure reduces the need for a long cystotomy. The exposure and magnification offered by video laparoscopy facilitate efficient and direct access to the fistula, meticulous dissection, and fistula resection compared to open repair. In addition to these advantages, we have noticed that pneumoperitoneum facilitates the dissection, as gas seeps into the tissue planes near the fistulous tract. We believe that the laparoscopic VVF repair is a feasible and efficacious approach with a successful outcome in the majority of our patients. In our series, we have only one patient in whom laparoscopic fistula repair failed. In this case, we were unable to interpose healthy tissue between the suture lines due to nonavailability.

In spite of relatively small number of cases and lack of randomization, our study confirms that laparoscopic repair is technically feasible, less morbid, and has got good outcome. Laparoscopic free hand intracorporeal suturing can be challenging in the initial stages and the surgery should be taken up by experienced laparoscopic surgeons.

Conclusions

The laparoscopic approach to supratrigonal VVF repair is a safe and effective alternative to the traditional abdominal approach. It offers patients a shorter hospital stay, quicker convalescence, and better cosmesis. Our series of 13 cases would contribute to define the exact role and timing of laparoscopic surgery in managing supratrigonal VVF. The results obtained by early laparoscopic repair are comparable to that obtained by traditional open methods.

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