Invited Surgical Technique

Rotational labial and inferior pudendal artery based inner thigh flaps for vaginal defect after reconstructive surgery

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Abstract

For vaginal reconstructive surgery, the vaginal defect sometimes cannot be closed with primary intention due to poor tissue quality or loss of the vaginal wall. To cover the defect, plastic surgeons may be consulted with regard to a tissue advancement flap, a very complex procedure, and urologists may not feel familiar with it or comfortable with carrying it out. The rotational labial and inferior pudendal artery based inner thigh flap, devised by Professor Shlomo Raz, is a simple and useful procedure which urologists can perform with a short learning curve. Therefore, this article aims to demonstrate the surgical technique involved in this flap which can be widely used as an adjunct to any vaginal reconstructive procedures.

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Introduction

In vaginal reconstructive surgery for lower urinary tract problems, many flaps have been used for many purposes. To summarize, the aims of the use of the flap are to create a new urethra for luminal stricture, interposed between the urinary tract and vagina after genitourinary fistula repair and prevent further scar formation after lysis adhesion. Sometimes, a large vaginal defect is unintentionally created after reconstructive surgery or wide excision, and it cannot primarily be closed in an appropriate manner. As a consequence of the unclosed vaginal defect, urologists need to know how to perform a rotational cutaneous flap from the perineal area. Many cutaneous flap techniques have been reported[1] but the majority are complex and may not be appropriate for vaginal reconstructive surgery. This surgical illustration aims to demonstrate step by step the techniques involved in the carrying out of this simple cutaneous flap, namely the rotational labial and inferior pudendal artery based inner thigh flap. This flap is known, in brief, as the rotational labial and inner thigh flap, a procedure which was invented and disseminated by Professor Shlomo Raz.[2] In our experience, this flap is mostly used as an adjunct to transvaginal closure of irradiated vesicovaginal fistula (VVF) but is sometimes used in cases of severe labial agglutination with distal vaginal stenosis, in which simple vaginoplasty has failed.

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Materials and Methods

This is a case study in which rotational labial and inner thigh flap was performed. A 67-year-old woman presented with continuous urinary incontinence for 1 year. The patient had been diagnosed with cervical cancer and treated by hysterectomy with adjuvant external beam combined with intracavitary radiotherapy 23 years ago. After carefully evaluation, VVF was confirmed as a cause of the symptoms and was suitable for transvaginal closure.

In cases of irradiated VVF, repairs can successfully be carried out if the bladder and urethra are of good quality. The criteria for successful completion are bladder capacity more than 200 mL with low pressure after occluded fistula, no detectable telangiectasia or scarring on endoscopic examination and no luminal or extraluminal urethral stricture defined by easy passage of a larger than 22 Fr cystoscopic sheath. In addition, if hydroureteronephrosis is presented preoperatively, the surgery has a high likelihood of failure or requires supravesical diversion.

Surgical steps

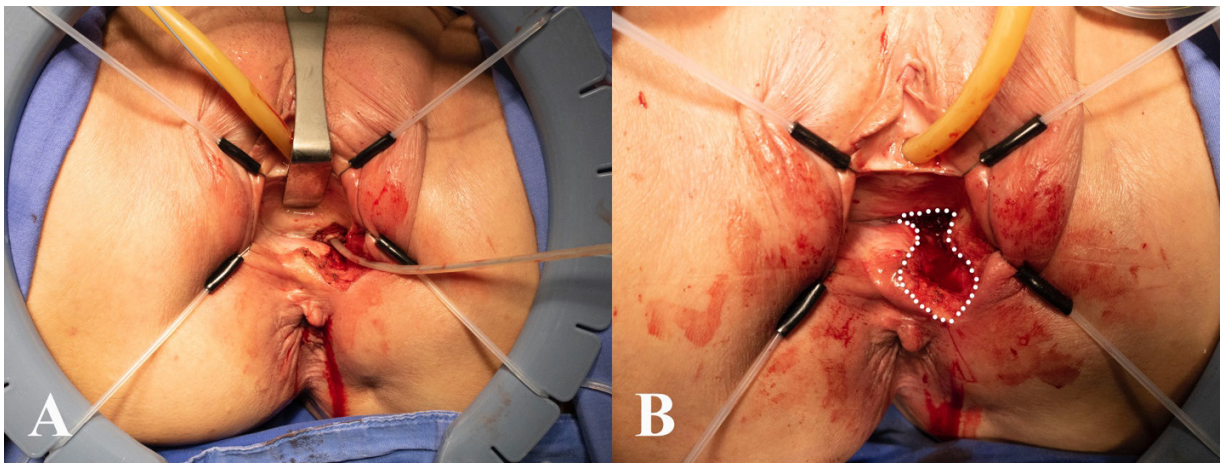

Figure 1. (A) In order to decrease tension on the bladder wall before closing the fistula, the vaginal wall needed to be dissected and released from the bladder wall. (B) After the bladder wall had been closed in a watertight fashion, the vaginal defect was revealed (area indicated by the dotted line) and it could not be repaired by primary intention because of poor tissue quality and tension.

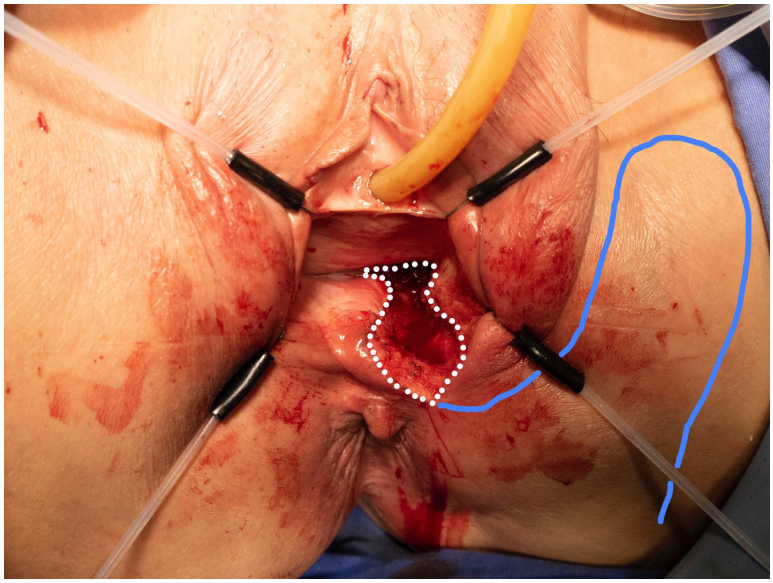

Figure 2. An extended incision (blue line) was made from the introitus as an inverted U shape. The arterial supply of inner thigh flap was based on the inferior pudendal artery. The flap length was dependent on the length of the vaginal defect which was measured from the proximal to distal end. Importantly, the flap length to base ratio needed to be 1.5-2 to 1.

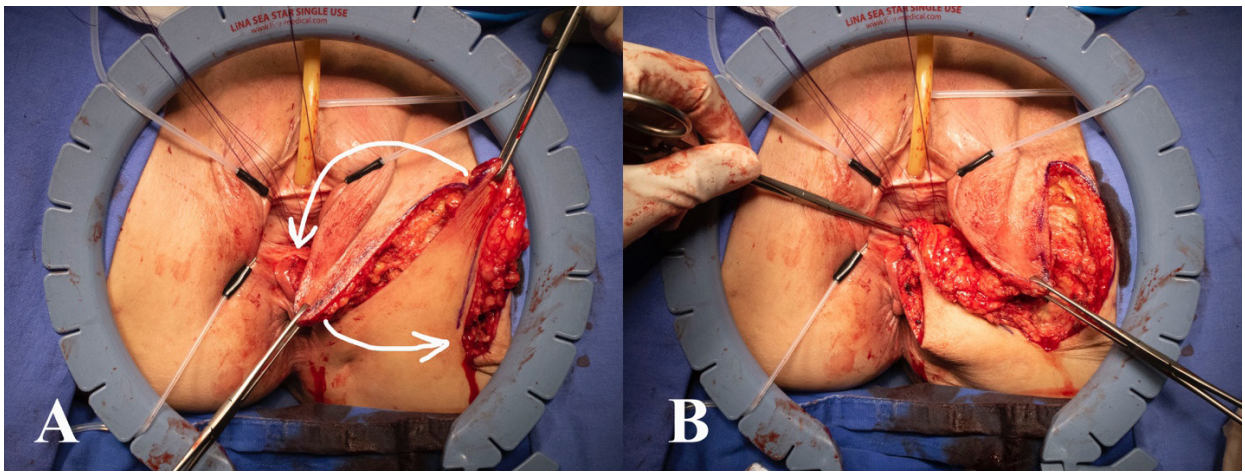

Figure 3. After completion of the incision and dissection of the subcutaneous tissue, the two flaps were detached from underlying structures including fascia and bone. The first one is known as the labial wing and the second one as the inner thigh wing. (A) The inner thigh wing was medially rotated to the vagina whereas the labial wing was laterally rotated to the inner thigh (white arrows). (B) After the flaps were rotated into the appropriate position without tension and the blood supply was not compromised, the inner thigh flap was overlaid onto the vaginal defect and sutured to the vaginal wall with interrupted absorbable suture No. 2-0. The labial flap was overlaid on the inner thigh defect and sutured layer by layer, starting from the subcutaneous layer and proceeding to the skin using interrupted absorbable suture No. 2-0 initially and subcuticular stitches for the closure of the skin.

Figure 4. After the flaps were completely fixed and all defects covered, the final appearance was as shown in this figure. The drain is not required if the dead space is completely obliterated by suturing. For postoperative care, this surgical wound could be easily cared for by the patient themselves with regular cleaning, for example with a sitz bath. In this instance, oral antibiotics, covering gram negative, aerobic and anaerobic bacteria, were prescribed for 2-4 weeks, a practice particularly important in cases involving pelvic radiation.

Results

In Siriraj Hospital, we have performed rotational labial and inner thigh flap in 12 cases between 2016 and 2021 (Table 1). All had small areas of wound dehiscence without infection. No active bleeding, abscess formation, flap necrosis or reoperation were reported.

Discussion

Sometimes, urologists need to perform vaginal reconstructive surgery to treat lower urinary tract problems such as VVF repair. In specific conditions, including those associated with pelvic radiation and multiple vaginal surgery, vaginal wall quality is poor even though topical estrogen is preoperatively applied to improve tissue quality. Therefore, tissue graft or flap may play a role in closure of the vaginal defect. Use of a tissue flap is more appropriate than a graft as it is well tolerated by the vaginal environment, a site with multiple microorganisms[3] and also avoids problems of graft contraction.

Most surgical techniques used for external genitalia reconstruction are complex[1,4] as are those for neovaginal creation.[5-9] To date few studies have reported using a flap for closure of vaginal defect after reconstruction. The flaps which have been described and reported are the gracilis myocutaneous flap[8] and the pedicled profunda artery perforator with gracilis muscle flap.[9] These techniques are reliable, but they need plastic surgeons. From our experience, the rotational labial and inferior pudendal artery based inner thigh flap, as described in this case study, is simple and is associated with low morbidity. We believe that most urologists could perform this procedure with a short learning curve so that it may be useful and helpful in real-life practice.

Table 1. Patient information and outcome of rotational labial and inferior pudendal artery based inner thigh flap

No.	Age (years)	Symptoms	Diagnosis	Outcome at follow up	Comments
1	72	Urinary incontinence	Irradiated VVF	No recurrent VVF at 21 months	-
2	45	Urinary incontinence	Irradiated VVF	No recurrent VVF at 45 months	-
3	60	Urinary incontinence	Irradiated VVF	No recurrent VVF at 30 months	After 30 months, cervical cancer had recurred and involved the bladder. Treatment: Palliative care
4	67	Urinary incontinence	Irradiated VVF	No recurrent VVF at 14 months	After 14 months, VVF has recurred due to urethral stricture. Treatment: Ileal conduit
5	61	Urinary retention	Distal vaginal stenosis Labial agglutination	Spontaneous voiding at 41 months	-
6	76	Urinary incontinence	Irradiated VVF	Failed	Treatment: Ileal conduit
7	73	Urinary retention	Distal vaginal stenosis from prolapse surgery	Failed	Long-term indwelling urethral catheter
8	75	Urinary retention	Distal vaginal stenosis from pelvic radiation	Failed	Long-term indwelling urethral catheter
9	70	Urinary retention	Distal vaginal stenosis from pelvic radiation	Failed	Treatment: transurethral incision bladder neck
10	81	Urinary incontinence	Irradiated VVF	Failed	No further treatment
11	76	Painful lesion	Extramammary Paget's disease at distal urethra and vagina	No perineal recurrence at 18 months	Tumor recurrence in other areas including bladder and ureters Treatment: Chemotherapy
12	70	Urinary retention	Distal vaginal stenosis Labial agglutination	Spontaneous voiding at 6 months	-

VVF = vesicovaginal fistula

Conclusion

The rotational labial and inferior pudendal artery based inner thigh flap is a simple and useful adjunct procedure to vaginal reconstructive surgery which may facilitate repair of a large vaginal defect which has proved difficult to treat with primary closure.

Acknowledgement

We wish to thank the innovative surgeon Professor Shlomo Raz, M.D. who taught us how to perform this simple, useful and highly effective procedure.

Conflict of Interest

The authors declare no conflict of interest.

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