Video Article

Radical vulvectomy with right gluteal and left medial thigh V-Y advancement flap reconstruction

Selçuk et al. Radical vulvectomy and flap reconstruction

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Abstract
Vulvar cancer is rarely seen. Vulva corresponds to the external female genitalia and it is in association with the perineum with the intersection of urinary, sexual and anal systems. The deep anatomy of the perineum in the urogenital and anogenital triangle should be well-known by the gynecological oncologists. Radical vulvectomy is the choice of surgical treatment in gross tumors expanding on the vulvar skin. After this type of excision, the reconstruction is critically important because it is not always feasible to suture the vulvar defect in a primary manner. Thus, the reconstruction options should also be known by the gynecological oncologists. Here we demonstrate the video of radical vulvar cancer surgery which was performed on a cadaver with gluteal and medial thigh V-Y advancement flap reconstruction.
Keywords: Vulvar cancer, flap, vulvectomy, perineum, cadaveric

Introduction

Vulvar cancer is the least common gynecological malignancy and corresponds to 2-5% of gynecological cancers. It presents with pruritus and sometimes with a vulvar lesion which is commonly detected on the labia majora. Squamous cell carcinoma is the most common histological type, approximately 90%, and management does not significantly change among the subtypes. Vulvar cancer is generally diagnosed in the early stages and surgical removal of the vulva with a conservative or radical approach generates the cornerstone of the treatment especially for early stage disease (1,2). Inguinal lymph nodes are the site of lymphatic dissemination and they are the most important prognostic factors associated with stage, adjuvant treatment and survival, thus inguinofemoral lymphadenectomy is a part of surgical treatment (3). Due to the small number of cases learning curve of vulvar cancer surgery is a dilemma for gynecological oncology fellows. Additionally, after removal of the vulva the reconstruction phase is not always feasible with primary suturation. Hence, plastic surgeons will apply vulvar flap replacement and this is not particularly performed by all the gynecological oncologists. Nowadays, wide local vulvar excision which excise just the tumor side with similar lateral, medial and deep margins as the radical vulvectomy is the main type of surgery in early stage vulvar cancer to maintain better surgical results after the excision. On the other hand, radical vulvectomy is the choice of surgical treatment in gross tumors expanding on the vulvar skin. By the way, here we demonstrate the video of radical vulvar cancer surgery which was performed on a cadaver during the Vulvar Cancer Surgery Cadaveric Workshop; an international and European Society of Gynaecological Oncology endorsed meeting held on the 31th August 2018 at Bahcesehir University Faculty of Medicine Department of Anatomy, Istanbul/Turkey.

Vulvar anatomy

The entire external female genitalia are named vulva. Vulva is comprised of mons pubis, labia majora, labia minora, clitoris, vaginal vestibule and vestibular glands. The anastomotic vessel arc of external and internal pudendal artery supplies the vulvar region. The innervation of vulva is done by the ilioinguinal nerve, genitofemoral nerve and pudendal nerve (dorsal clitoral nerve and perineal nerves). Superficial inguinal lymph nodes are the primary site of lymphatic drainage of vulva and after the superficial lymph nodes, the drainage flows over the cribriform fascia to the deep femoral lymph nodes (4).

Perineum is the region between the anus and the upper portion of clitoris called mons pubis. The boundaries of the perineum are; anteriorly pubic symphysis and arcuate ligament of the pubis, posteriorly coccyx, anterolaterally ichiopubic rami and ichial tuberosities, posterolaterally sacrotuberous ligament, superiorly pelvic floor and inferiorly the skin. Superficially the skin covers the perineum; and the pelvic diaphragm, the levator ani muscle, forms the deepest part (5). A line between the ischial tuberosities divides this diamond-shaped region into the anteriorly located urogenital and posteriorly located anal triangle (Table 1). These vulvar structures lie over the deep perineal facia which covers the superficial perineal muscles located at the superficial perineal pouch.

Radical vulvectomy with right gluteal and left medial thigh V-Y advancement flap reconstruction: Surgical technique

1. The circumferential outer incision on the vulvar skin aims to excise the tumor with clear margins. A pathological margin of 0.8cm is critical after the tissue shrinkage with formalin.

Thus, an incision 2cm laterally, medially and deeply from the tumor will be optimal for clear margins. The resection margin will decrease to 1cm around the urethra and anus to protect the functions of these structures. Nevertheless, the distal urethra (1cm) could be sacrificed without any harm to the functions. In some cases, partial external anal sphincter excision may also be applied (6).
2. The incision deepens down to the subcutaneous fatty tissue and afterwards down to the deep perineal facia which covers the superficial perineal muscles; the arteries from the internal pudendal artery come from the 4 and 8 o'clock directions, they should be ligated or sutured. If the incision deepens down to the level of inferior fascia of urogenital diaphragm; the bulbospongiosus, ischiocavernosus and the superficial transverse perineal muscle are excised.
3. The upper part of the vulvar incision deepens down to the pubic periosteum, which is medial to the adductor fascia, here the suspensory ligament of clitoris should be ligated or sutured.
4. At the inferior part of the incision, dissection is done over the rectovaginal septum.
5. A circumferential inner incision encircling the urethra and vaginal introitus is performed.
6. The outer incision on the labia majora and skin is combined with the inner incision which is around the vaginal introitus, and the vulvar specimen is excised totally (Figure 1).
7. The wound is closed primarily in most of the cases. Deep structures are sutured with 2-0 delayed absorbable materials to prevent any dead space. Suction drainage is preferred and the subcutaneous tissue and skin should be closed in a tension-free way.
8. If a tension-free closure could not be administered, the vulvar defect should be closed by a flap in advance with an adequate blood supply which may prevent cosmetic and functional problems. For flap replacement the gluteal or the medial thigh is incised in a manner of 'V-Y' down to the level of muscle fascia (Figure 2). During this step; the perforators arising from the internal pudendal artery are secured, and electrocautery could be used in most of the circumstances. When the flap is mobilized in all directions, it is advanced medially to the vaginal inner wall with a tension-free manner. The dog ear formation which is shaped at the edges is removed and the flap is sutured to the surrounding tissue with the aim of closing all the layers (7) (Figure 3). Always consider a multidisciplinary approach for reconstruction of the vulvar defect (8).

Complications of radical vulvectomy
Since the surgery is extremely radical and in the field of urinary, sexual and anal organs; there may be many dysfunctions related with these systems (9).

- Wound complications
Wound breakdown and wound infection are particularly detected in obese patients at the end of first week. Suction drains are suggested in selected patient groups.

- Flap complications
They mostly arise due to inappropriate vascular supply or increased tension.

- Urinary complications
Infection and involuntary urine loss are the probable complications with regard to the radicality of the surgery.

- Psychosocial and sexual dysfunction

It is an important issue that may be revealed with professional support.

Conclusion

Vulvar cancer is rare and the curable surgery is a radical procedure. The anatomy and the reconstruction techniques should be known by all the gynecological oncologists to apply a better surgery.

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Table 1. Layers of the perineum from inferior to superior (from skin to pelvic floor)
A. Urogenital triangle
Skin
Superficial perineal fascia
Superficial fatty layer (Camper's fascia)
Membranous layer (Scarpa's fascia)
Deep perineal fascia - That fascia covers the superficial perineal muscles located at the superficial perineal pouch. - Superficial perineal pouch (Its lateral border is ischiopubic rami)
Bulbospongiosus muscle
Ischiocavernosus muscle
Superficial transverse perineal muscle
Perineal branch of pudendal nerve
Crura of clitoris
Bulbs of vestibule
Perineal membrane (Inferior fascia of urogenital diaphragm) - The perineal body is continuous with the perineal membrane. - Deep perineal pouch (Its lateral boundary is inferior portion of the obturator internus muscle)
Deep transverse perineal muscle
External urethral sphincter
Proximal urethra
Internal pudendal vessels
Dorsal nerve of clitoris
Superior fascia of urogenital diaphragm
Pelvic floor
Levator ani muscle
Coccygeus muscle
B. Anal triangle
Anal canal, sphincters, the ischio-anal fossa, nerves and vessels are the contents of the anal triangle.
Skin
Superficial fascia
Superficial fascia of anal triangle contains the subcutaneous fatty tissue.
Deep fascia
Deep fascia of the anal triangle is inferior to the levator ani muscle and covers the ischioanal fossa and its lateral part.
Pelvic floor
Levator ani muscle
Coccygeus muscle

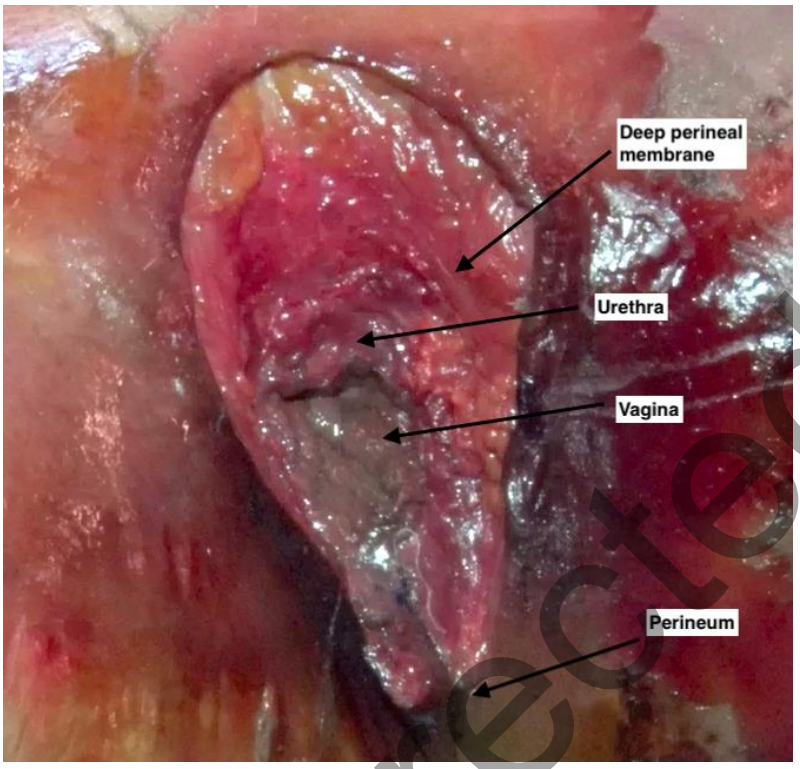

Figure 1. The vulvar region after excision of the radical vulvectomy specimen

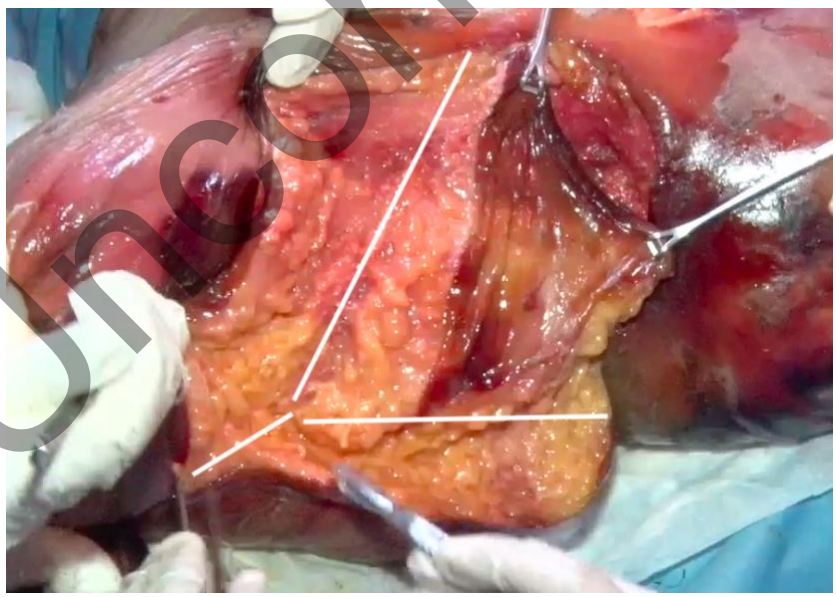

Figure 2. The incision for left gluteal V-Y flap advancement to the level of muscle fascia

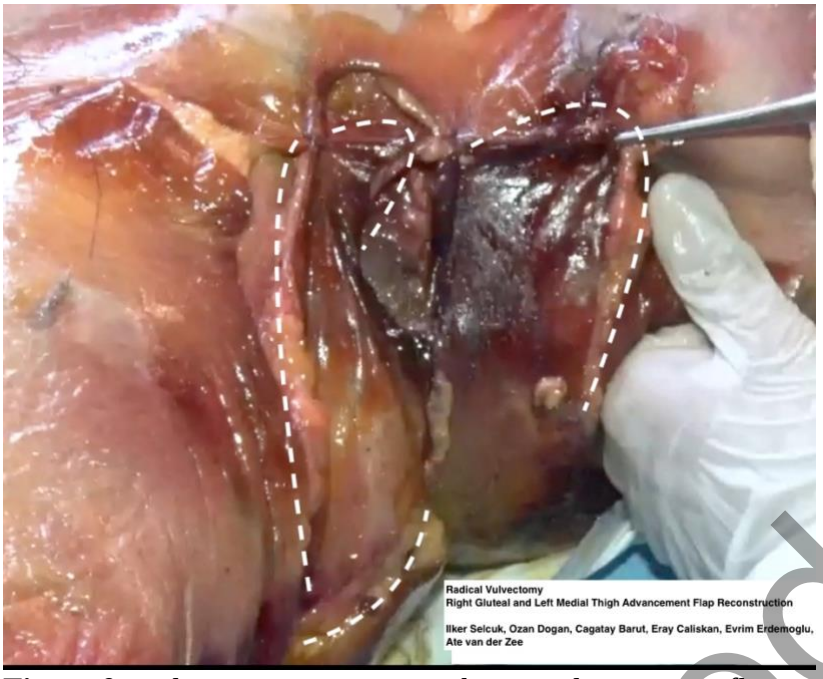

Figure 3. Vulvar reconstruction with V-Y advancement flap and closure of deep and superficial layers