

Case Report

Immediate pelvic defect reconstruction with unilateral gracilis flap in a postoperative patient with vulvar carcinoma

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ABSTRACT

Vulvar cancer is a rare malignancy that primarily affects postmenopausal women. Squamous cell carcinoma is the most common histological type. Clinical presentation can be variable and non-specific, and treatment involves a combination of surgery and radiotherapy. This article presents a clinical case of a 61-year-old patient with squamous cell carcinoma of the vulva, treated with chemotherapy, brachytherapy and radiotherapy, who experienced recurrence. A pelvic exenteration and immediate reconstruction were performed using a unilateral gracilis flap, with satisfactory results. A 2-year follow-up showed no complications.

Keywords: Vulvar cancer, Pelvic reconstruction, Squamous cell carcinoma

INTRODUCTION

Vulvar cancer is an uncommon entity, but it has seen a considerable increase in incidence over the past 10 years, especially among young women. Surgery is considered the cornerstone of treatment in early stages; however, extensive resection is necessary, making reconstruction essential, which offers good oncological and aesthetic outcomes.¹

CASE REPORT

A 61-year-old female patient, originally from Puebla and residing in the State of Mexico, homemaker, with a medical history of bilateral tubal ligation (BTL) in 1990 without complications, diagnosed with moderately differentiated squamous cell carcinoma of the vulva, clinical stage IIIA, treated with chemotherapy based on cisplatin for 5 weekly cycles, high-dose iridium brachytherapy, and radiotherapy of 50 Grays in 25

fractions. The patient showed no tumor activity in the vulva and vagina but had the presence of a left inguinal lymph node, with PET/CT reporting partial response to neoadjuvant chemotherapy and brachytherapy.

Gynecological and obstetric history includes menarche at 11 years, menopause at 43 years, initiation of sexual life at 21 years, 1 sexual partner, family planning method BTL in 1990, denied sexually transmitted infections, normal cervicovaginal cytology 1 year prior, and no colposcopy performed.

She attended the gynecology outpatient clinic on February 18, 2022, referred from a secondary-level hospital with a diagnosis of vulvar cancer, clinical stage IIIA, with a histopathological report of invasive squamous cell carcinoma, treated with radiotherapy, showing a partial response. She was evaluated by gynecology, oncology, and plastic surgery for radical vulvectomy, bilateral inguinal lymphadenectomy, extrafascial hysterectomy with bilateral salpingo-oophorectomy, formation of ileal

conduit, diverting colostomy, and reconstruction of the resulting defect.

She was admitted for hospitalization on May 26, 2022. Physical examination revealed the following vital signs: Temperature: 36 °C, blood pressure: 99/60 mmHg, heart rate: 79 bpm, respiratory rate: 19 rpm, oxygen saturation 90%, capillary blood glucose 132 mg/dl. On directed examination, the abdomen was soft and depressible, without signs of peritoneal irritation, tenderness in the hypogastrium on superficial and deep palpation, no palpable mass. Genital examination revealed an irregular lesion at the level of the right labia minora covering the urinary meatus and extending to the vulva. A vaginal examination showed irregular stenosis with indurated, friable tissue, and active bleeding upon palpation. Extremities showed changes due to peripheral vascular disease.

Laboratory studies reported: leukocytes $8.6 \times 10^3/\mu\text{l}$, erythrocytes $2.9 \times 10^6/\mu\text{l}$, hemoglobin 10.5 g/dl, hematocrit 25.6%, platelets $422.0 \times 10^3/\mu\text{l}$, neutrophils $6.1 \times 10^3/\mu\text{l}$, lymphocytes $1.31 \times 10^3/\mu\text{l}$, PT 11.3 seconds, INR 1.05, aPTT 26.5 seconds, thrombin time 16.7 seconds, glucose 94 mg/dl, urea nitrogen 12.9 mg/dl, creatinine 0.9 mg/dl, calcium 8.6 mg/dl, phosphorus 4.3 mg/dl, sodium 136 mEq/l, potassium 4 mEq/l, chloride 102 mEq/l, total cholesterol 135 mg/dl, lactate dehydrogenase 86 UI/l.

On March 27, 2022, a CT scan of the chest, abdomen, and pelvis was requested, reporting the following significant findings: increased density and striation of the fat in the superficial soft tissues of the perineal region with skin thickening at the vulvar level that enhances after administration of contrast.

Magnetic resonance imaging performed on March 28, 2022, reported: lesion in the anterior two-thirds of the vulva with adjacent fat striation and no evidence of locoregional lymph node enlargement (Figure 1 A-D).

She entered the surgical theatre on April 1, 2022, where pelvic exenteration, Bricker ileal conduit formation, colostomy, and skin coverage with gracilis flap were performed in a single surgical procedure. Findings included: vulvar tumor infiltrating the middle third of the vagina, urethra, and perineum up to the rectum with bleeding of 1500 cc (Figure 2 A-F).

She continued with good evolution in the gynecology ward; however, she presented distal loss of the skin region of the flap, which led to her re-entering the surgical theater on April 9, 2022, for remodeling, primary closure, and placement of negative pressure therapy on the incision. She continued to evolve adequately and was discharged on April 14, 2022.

Follow-up was conducted by surgical oncology and plastic surgery over the course of 2 years without complications

or recurrences, maintaining good functional and reconstructive status.

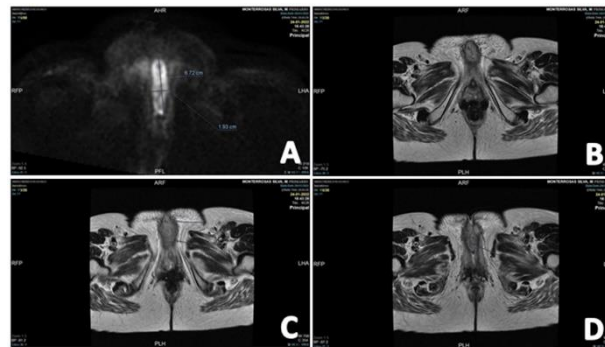


Figure 1 (A-D): MRI of pelvis with contrast irregular thickening of the vulva in its mid and anterior portion, with enhancement after intravenous contrast administration.

Adjacent perilesional fat stranding extends from the mid-third to the clitoral region. Diffusion-weighted imaging shows restricted diffusion in this area. Approximate size: 67×19 mm. No local or regional lymphadenopathy is identified.

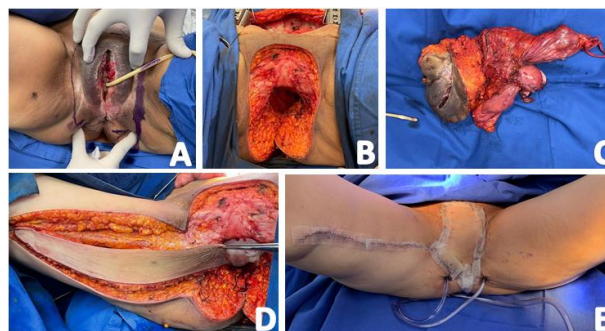


Figure 2: Irregular lesión. (A) Observations show an irregular lesion affecting both labia with friable tissue. (B) Secondary defect: post-resection defect in block resection. (C) Surgical specimen: Post-resection surgical specimen showing vulva, mid-vagina, uterus, bladder and rectum. (D) Myocutaneous flap dissection: dissection of myocutaneous flap. (E) Defect coverage and primary closure: coverage of defect and primary closure of secondary defect with Blake drainage placement.

DISCUSSION

Vulvar cancer is an uncommon malignant entity that primarily affects postmenopausal women, representing 2-5% of gynecological neoplasms. However, the average age of incidence varies by region due to the increase in HPV (human papillomavirus) and other regional factors.²

Histological types include squamous cell carcinoma, melanoma, and a few other rare types. Of these, 80-90% are squamous cell carcinoma, which is subdivided into three types: verrucous, basaloid, and keratinizing. The first two are HPV-mediated, less common, and present in

younger women, while the third represents almost 80% and is observed in older women and is not HPV-dependent.³

The most strongly associated risk factors are HPV types 16 and 11 infection, smoking, contraceptive therapy, chronic inflammation, and immunosuppression.⁴

Clinical presentation may be variable and nonspecific, with symptoms such as itching, pain, dyspareunia, burning, erythema, ulcers, masses, or bleeding, which correlate with the severity of the lesion. A thorough clinical examination of the vulvar, anal, pubic regions, and lymph nodes is necessary.^{4,5} Any suspicious lesion warrants histopathological study with biopsy taking of at least 4 mm, complemented by imaging studies such as CT or MRI to delineate the extent of the lesion. In cases of suspected invasion to the bladder or rectum, cystoscopy and/or rectoscopy should be performed.⁶

Treatment for vulvar cancer often involves a combination of surgery and radiotherapy. The basis for treatment choice is grounded in stromal invasion indicated by biopsy and complementary studies seeking locoregional extension. In early stages, excision of the lesion (T1a) is preferred, while in late stages, radical vulvectomy with lymphadenectomy (T1b-T4) is indicated.^{7,8}

The Bricker ileal conduit is a urinary reconstruction that can be performed secondary to an anterior or extensive pelvic resection aimed at creating a urinary conduit using a segment of ileum in isoperistaltic orientation, with ureters anastomosed to the proximal end and the distal end functioning as a cutaneous stoma.⁹ The diverting colostomy is the abdominoperitoneal exteriorization of the colon to the anterior abdominal wall, performed for decompression or diversion of colonic content, with the surgical type depending on indication, surgeon experience, and patient condition.¹⁰

Abdominoperineal resection and pelvic exenteration are radical surgical resection techniques commonly used for locally advanced or recurrent malignant pelvic neoplasms. These surgical options are associated with high morbidity due to wound complications arising from large pelvic defects.¹¹ Multiple complications have been reported, including perineal infections, difficulty in skin closure, high tension at wound closure, large pelvic dead space, and fluid accumulation with bacterial superinfection.¹²

Fasciocutaneous or myocutaneous flaps, such as the anterolateral thigh flap, gracilis, gluteus muscle, rectus abdominal myocutaneous flap, V-Y advancement, or Limberg flaps, are preferred; however, there is no ideal flap, so each patient should be individualized for appropriate treatment selection.¹³

To reduce the complication rate, improve function and satisfaction with appearance, Mericli et al conducted a

retrospective review of 30 patients reconstructed for pelvic wounds following the principle of pelvic subunit. An algorithm was developed to select the ideal pedicled flap for each region. This algorithmic approach demonstrated a minimal complication rate for a variety of defects in a complex patient group.¹⁴

Flaps are used to minimize skin tension and fill pelvic dead space. It has been shown that the presence of healthy, vascularized muscle tissue resists bacterial infection and achieves adequate healing because it maintains blood supply to deliver oxygen, allows leukocyte migration, and distributes systemic antibiotics to the defect. A study analyzed treatment between primary closure versus flap closure of perineal defects after oncological resection, including 566 patients. Reconstruction was performed with a vertically oriented rectus abdominal flap and gracilis flap versus primary closure. Total rates of perineal complications were reported for primary closure groups (29 to 72.2%) and flap (16.7 to 64.7%), with pooled averages of 51.9% and 34.5%, respectively. The meta-analysis showed that primary closure was significantly more likely to be associated with total perineal wound complications compared to flap closure.¹⁵

Described for the first time by Bartholdson and Hulten in 1975, the gracilis muscle is a thin, flat muscle band located superficially on the medial thigh. It has a Class II vascular pattern according to the Mathes and Nahai classification, having both a dominant vascular pedicle and minor pedicles. The dominant vascular pedicle is the terminal branch of the medial femoral circumflex artery, with a length of 7 cm and sometimes originates directly from the deep femoral artery. The minor pedicles are generally two, the superior and distal; it also has musculocutaneous perforators that are variable in number and distribution, located in the proximal two-thirds. The artery is accompanied by two concomitant veins with diameters of 1.5-2.5 mm and lengths of 5-6 cm. The gracilis muscle is innervated by a single motor nerve, the anterior branch of the obturator nerve (L2-4); while sensory innervation is provided by the medial cutaneous nerve of the thigh or branches of the obturator nerve.¹⁶

Marking is performed by locating the long axis of the muscle, placing a line from the ischium to the medial condyle of the knee. The long adductor muscle can be palpated by marking a line along its posterior border and another 2-3 fingers proximal to the long axis of the gracilis muscle. The vascular pedicle is located 10 cm below the pubic tubercle. If the skin paddle is limited to a width slightly larger than the muscle (3-4 cm in children and 5-8 cm in adults), the wound can be closed primarily.¹⁶

Due to the versatility of the gracilis muscle pedicle, its low mortality, and low complication rate at the donor site, it is utilized as a reconstructive method for multiple defects, offering the advantage of covering dead space while reducing complications.¹⁷

CONCLUSION

Squamous cell carcinoma of the vulva is an uncommon entity with variable clinical behavior that requires multidisciplinary management for treatment. Extensive resection with areas of dead space will generally require surgical reconstruction interventions; therefore, the use of the gracilis flap is an appropriate reconstructive option that offers lower morbidity and mortality.

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REFERENCES

1. Tock S, Wallet J, Belhadia M, Hudry D, Ghesquière L, Narducci F, et al. Outcomes of the use of different vulvar flaps for reconstruction during surgery for vulvar cancer. *Eur J Surg Oncol*. 2019;45(9):1625-31.
2. Rogers LJ, Cuello MA. Cancer of the vulva. *Int J Gynaecol Obstet*. 2018;143(2):4-13.
3. Weinberg D, Gomez-Martinez RA. Vulvar Cancer. *Obstet Gynecol Clin North Am*. 2019;46(1):125-35.
4. Lebreton M, Carton I, Brousse S, Lavoué V, Body G, Levêque J, et al. Vulvar intraepithelial neoplasia: Classification, epidemiology, diagnosis, and management. *J Gynecol Obstet Hum Reprod*. 2020;49(9):101801.
5. Tan A, Bieber AK, Stein JA, Pomeranz MK. Diagnosis and management of vulvar cancer: A review. *J Am Acad Dermatol*. 2019;81(6):1387-96.
6. Wohlmuth C, Wohlmuth-Wieser I. Vulvar malignancies: an interdisciplinary perspective. *J Dtsch Dermatol Ges*. 2019;17(12):1257-76.
7. Merlo S. Modern treatment of vulvar cancer. *Radiol Oncol*. 2020;54(4):371-6.
8. Martínez-Gómez C, Angeles MA, Sanson C, Bernard M, Martinez A, Ferron G. Bricker ileal conduit diversion in 10 steps. *Int J Gynecol Cancer*. 2020;30(2):279.
9. Engida A, Ayelign T, Mahteme B, Aida T, Abreham B. Types and Indications of Colostomy and Determinants of Outcomes of Patients After Surgery. *Ethiop J Health Sci*. 2016;26(2):117-20.
10. Gentileschi S, Servillo M, Garganese G, Fragomeni S, De Bonis F, Scambia G, et al. Surgical therapy of vulvar cancer: how to choose the correct reconstruction? *J Gynecol Oncol*. 2016;27(6):e60.
11. Barker JA, Blackmore AE, Owen RP, Rate A. Prone cylindrical abdominoperineal resection with subsequent rectus abdominis myocutaneous flap reconstruction performed by a colorectal surgeon. *Int J Colorectal Dis*. 2013;28:801806.
12. Mathes SJ, Feng LJ, Hunt TK. Coverage of the infected wound. *Ann Surg*. 1983;198(4):420-9.
13. Devulapalli C, Jia Wei AT, DiBiagio JR, Baez ML, Baltodano PA, Seal SM, et al. Primary versus Flap Closure of Perineal Defects following Oncologic Resection: A Systematic Review and Meta-Analysis. *Plast Reconstr Surg*. 2016;137(5):1602-13.
14. Mericli AF, Martin JP, Campbell CA. An Algorithmic Anatomical Subunit Approach to Pelvic Wound Reconstruction. *Plastic Reconstructive Surg*. 2016;137(3):1004-17.
15. Devulapalli C, Jia W, Anne T, DiBiagio J, Marcelo LB, Pablo AB, Stella MS, et al. Primary versus Flap Closure of Perineal Defects following Oncologic Resection: A Systematic Review and Meta-Analysis. *Plastic Reconstructive Surg*. 2016;137(5):1602-13.
16. Chwei D, Chuang DF, Colgajo G. In: Wei FC, Mardini S. eds. *Colgajos en cirugía reparadora*. 1st Ed. Barcelona España: Elsevier. 2009;395-408.
17. Sasaki K, Yoshimi F, Kawasaki H, Hayashi H, Hiyoshi M, Nagai H, et al. Usefulness of the gracilis muscle flap for reconstruction of large perineal defects following total pelvic exenteration with sacrectomy. *ANZ J Surg*. 2021;91(9):1932-4.

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