ANNALI ITALIANI DI CHIRURGIA

Digital Edition
e-publish on-line
ISSN 2239-253X
Direttore Nicola Picardi

Modifield musculocutaneous gracilis flap

A case report

Ann Ital Chir, Digital Edition 2019, 8
pii: S2239253X19030962 - Epub, Oct. 9
free reading: www.annitalchir.com

Emilio Trignano*, Manuel Baccari*, Alberto Bolletta*, Luca Fiorot*, Pedro Ciudad**, Michele Maruccia***, Nefer Fallico****, Corrado Rubino*

**University of Sassari, Department of Medical, Surgical and Experimental Sciences, Sassari University Hospital Trust, Plastic Surgery Unit, Sassari, Italy*
***Department of Plastic and Burn Surgery, Arzobispo Loayza National Hospital, Lima, Peru*
****Department of Emergency and Organ Transplantation, PLastic and Reconstructive Surgery and Burns Umit, "Aldo Moro" University of Bari, Bari, Italy*
*****Department Plastic and Reconstructive Surgery, "Sapienza" University of Rome, Rome, Italy*

Modifield musculocutaneous gracilis flap. A case report

A heterogeneous range of malignant pathologies affects vulvar and perineal regions. Today standard radical mutilating surgery for the treatment of invasive vulvar carcinoma is being replaced by a conservative and individualized approach. Defects of the external pelvis and perineal lining are usually reconstructed with local or regional fasciocutaneous flaps. However, in particular situations, the asymmetrical distribution of the defect and its location, close to sources of infec-tion such as the perineal area, may suggest a different approach.
This report presents a patient who underwent conservative vulvectomy bilaterally and reconstruction with a unilateral modified gracilis flap. A V shaped incision was designed in the skin paddle of the flap, allowing it to fit the loss of substance around the remaining vulvar skin. Patient was highly satisfied with the result, she had no pain, no problem in defecation or urination nor during deambulation.
In case with asymmetrical defect in the vulvo-perineal area the modified gracilis flap can be considered as a valid reconstructive option.

KEY WORDS: Modified gracilis flap, Vulvo-perineal reconstruction

Introduction

A heterogeneous range of malignant pathologies affects the vulvar and perineal regions. The most frequent ones are squamous cell carcinomas (95%) followed by melanomas, adenocarcinomas and sarcomas.
The incidence rate of vulvo-perineal tumors in the United States[1] in the 2017 is about 6,000 with more than 1000 deaths for years, representing 4% of all gynecological cancers and 0,6% of all female cancer.

Today standard radical mutilating surgery for the treatment of invasive vulvar carcinoma is being replaced by a conservative and individualized approach [2]. This, associated with primary reconstruction, shortens recovery and reduces morbility [3].
The location of the resection and its extension usually determine the need of vulvo-perineal reconstruction presetting a limited choice of options.
Defects of the external pelvis and perineal lining are usually reconstructed with local or regional fasciocutaneous flaps when primary closure or skin graft is not applicable.
If the defects extend deeper in the pelvis, in particular when vaginal reconstruction is required, myocutaneous flap can be used with established benefits. They allow soft tissue coverage and provide the bulk after extensive resections. ALT, VRAM and gracilis flaps are the best known options.
The use of muscle sparing flaps based on the perforators has been reported in suitable cases. However, the

Pervenuto in Redazione Giugno 2019. Accettato per la pubblicazione Luglio 2019
Correspondence to: Manuel Baccari, via Repubblica Romana 2, 07100 Sassari, Italy (e-mail: manuelbaccari@gmail.com)

role of free tissue transfer remains limited to isolated situations[3].
The purpose of this report is to present the use of a unilateral modified gracilis flap for vulvo-perineal reconstruction in a patient with squamous cell carcinoma.

Case Report

A 68 year-old patient was affected by T2 vulvo-perineal squamous cell carcinoma. The tumor measured approximately 5 cm in diameter and it was localized in the perineum (Fig. 1).
The patient underwent surgical removal of the carcinoma by Hacker's technique of conservative vulvectomy. In order to ensure oncological radicality, the surgical incision must include 1 cm of clinically clear surgical margins and, in depth, the perineal membrane or deep fascia must be reached [2].
In our case the lesion could be safely removed because it was unifocal and well-localized.
Since the loss of substance was asymmetrical, different reconstructive options were contemplated, including unilateral or bilateral fasciocutaneous or myocutaneous flaps. We decided to use a unilateral modified gracilis flap, harvested on the same side of the major defect. Pre-operatively, the patient was supine, hip and knees in flexion and externally rotated legs (frog-leg position). The skin paddle of the flap was designed on the medial side of the thigh, large enough to cover the defect on both sides. A V shaped incision was designed in the skin paddle, allowing the flap to fit the loss of substance around the remaining vulvar skin (Fig. 2). Flap harvesting started by incising the anterior margin of the skin paddle down to the fascia of the adductor longus muscle and the entire fascia of the adductor was exposed. The fascia over the adductor longus was incised longitudinally over the middle portion of the muscle and elevated posteriorly. The adductor longus muscle was retracted laterally.
The main vascular pedicle and the anterior motor branch of the obturator nerve to the gracilis muscle were visualized. The posterior incision was then made down through the subcutaneous tissue to the gracilis muscle. The branch of the obturator nerve supplying the gracilis muscle was ligated and the vascular pedicle was dissected up to its origin, clipping all side branches into adjacent muscles in order to prevent bleeding. The proximal gracilis myocutaneous flap was then elevated. The septocutaneous and musculocutaneous vessels connect with the proximal pedicle and supply the skin over the proximal third of the gracilis muscle. This compound flap was then harvested and transferred; the muscle was inset into the defect and the skin paddle was rotated and advanced to cover the area.
At this stage it was possible to compare the skin paddle with the defect and to correctly incise it in a V shaped manner. This incision allowed the flap to cover the loss of substance on both sides of the remaining vulvar skin. The flap was then sutured in layers in the final position and a suction drain was inserted.
The procedure lasted 50 minutes.
After surgery the patient was mobilized on day 1 but she was not allowed to sit for the first 3 days. On the 7th postoperative day infection signs were detected along with distal skin suffering of the flap. Microbiological assessment of the wound detected two infecting agents (Escherichia coli - Proteus mirabilis).
Infection was treated with targeted antibiotic therapy as well as daily wound cleansing and dressing change.
A rectal catheter was also used in order to protect the area from further contamination.
No more signs of infections were noticed and the patient was discharged on the 12th postoperative day.
The patient was followed-up for 1 year and no other complications occurred. The patient was highly satisfied with the result, she had no pain and no problems in defecation or urination nor during ambulation (Fig. 4).

Fig. 1: Preoperative aspect.

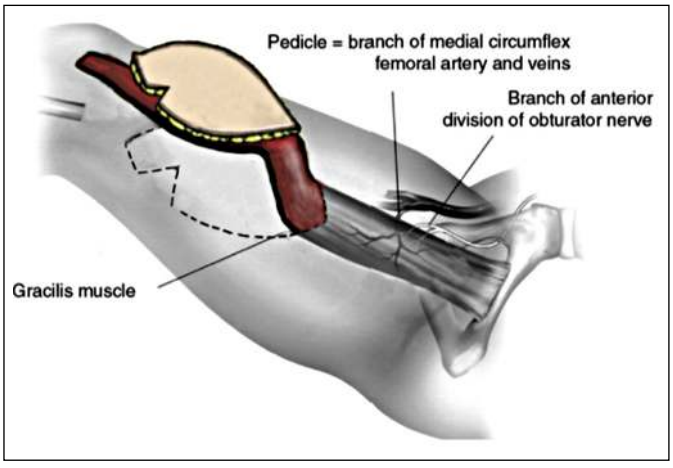

Fig. 2: Schematic drawing of the modified gracilis flap.

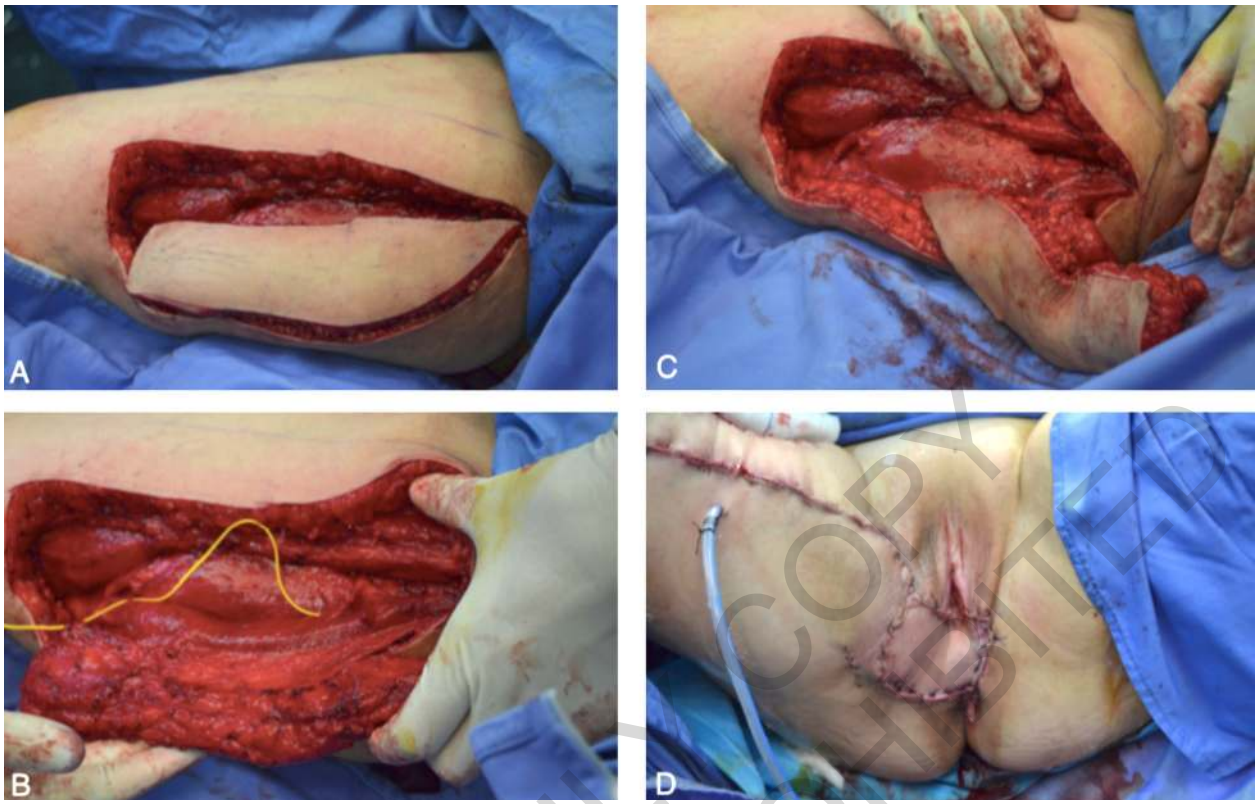

Fig. 3: Intraoperative view: A) Isolation of the flap; B) Identification of the pedicle; C) Rotation of the flap; D) Flap sutured in final position.

Fig. 4: Result after 12 months.

Discussion

There are different surgical techniques that can be used during the reconstructive phase such as fasciocutaneous and myocutaneous flaps and perforating or microsurgical flaps [4]. The choice is in relation to the location and extent of the loss of substance. Abdominal flaps such as VRAM and DIEP can be used in perineal and pelvis reconstructions.

The use of the gracilis muscle flap, well known in reconstructive surgery [5-9], it can be used in vulvar reconstruction and anterior and posterior portions reconstruction without distortions and bulky effect. However, the extension and asymmetrical distribution of the defect in our case needed an individualized approach. When conservative vulvectomy is realized, there is no use bilateral gracilis flap reconstruction as the vagina does not have to be fully reconstructed [10-11].

In these cases we suggest a modified unilateral gracilis flap to cover the defect.

The proximity of the donor site to the pelvis and external genitalia makes it a logical option for reconstructions after oncological surgery in this regions. Harvesting gracilis flap does not create functional defects for the patient. The flap is easily dissected with shorter operating times and the donor site can usually be closed directly; the scar on the medial side of the thigh is well concealed [12].

As a disadvantage the skin island over the distal third of the flap is not reliable and may undergo distal necrosis. This complication can be treated with surgical excision of the necrotic area.

Fasciocutaneous flaps are also described in reconstruction of perineal lining defects, especially in larger ones, because of their bigger skin island and less bulky effect. However, perineal wound healing, due to its peculiar

location, can be interested by complications, such as infections, secondary dehiscence, non-healing, and chronic draining sinus tract formation, with reported complication rates ranging from 14.6- 65% [13].
In view of the high incidence of complications, a myocutaneous flap can be preferable compared to fasciocutaneos flaps. The use of a highly vascularized flap is extremely beneficial to wound healing because it brings healthy tissue and new blood supply to the pelvic defect. When compared to other myocutaneous flaps such as the TRAM flap, the gracilis flap shows some important advantages. Abdominal flaps are reliable and they can permit intrapelvic and vaginal reconstruction since they contain enough vascular tissue. However, the use of abdominal flaps determines the risk of hernia formation in the abdominal wall and bulging.
Moreover, the operative time is shorter with the gracilis flap. The shorter operating time compared to other myocutaneous flaps can be explained by the shorter flap harvest time [5].
In conclusion, we suggest considering the use of unilateral myocutaneous gracilis flap as a valid option when reconstructing the vulvar and perineal region. Our modified V-shaped flap allowed the coverage of a relatively large loss of substance bilaterally located with a minimal bulky effect.

Riassunto

La regione vulvare e perineale può essere interessata da un'ampia gamma di patologie maligne. Attualmente, l'intervento chirurgico di vulvectomia radicale per il trattamento del carcinoma invasivo della vulva è stato sostituito da un approccio conservativo e individualizzato. I difetti del pavimento pelvico e del perineo sono solitamente ricostruiti con lembi fasciocutanei locali o locoregionali. Tuttavia, in situazioni particolari, la distribuzione asimmetrica del difetto e la sua localizzazione in prossimità di fonti di infezione come l'area perineale possono richiedere un approccio diverso.
Il nostro lavoro presenta il caso di una paziente sottoposta a vulvectomia bilaterale conservativa e ricostruzione con lembo di muscolo gracile unilaterale modificato. Una incisione a V è stata disegnata sulla paletta cutanea del lembo, permettendone il posizionamento a copertura della perdita di sostanza intorno alla rimanente cute della vulva. La paziente è rimasta pienamente soddisfatta del risultato, non ha presentato dolore, né problemi alla defecazione o alla minzione, né durante la deambulazione.
Nei casi di difetti asimmetrici nell'area vulvo-perineale il lembo di gracile modificato può essere considerato una valida opzione ricostruttiva.

References

1. Siegel R, Miller KD: *Cancer statistics.* 2017, CA Cancer J Clin, 2017; 67:7-30.

2. Micheletti L, Preti M: *Surgery of the vulva in vulvar cancer.* Best Practice & Research Clinical Obstetrics and Gynaecology, 2014; 28:1074-87.

3. Wong David Sau-Yan: *Reconstruction of the Perineum.* Ann Plast Surg, 2014; 73:S74-S81.

4. Cigna E, Bistoni G, Trignano E, Tortorelli G, Spalvieri C, Scuderi N: *Microsurgical teaching: our experience.* J Plast Reconstr Aesthet Surg, 2010; 63(6):e529-31.

5. IS Kaartinen, MH Vuento, MK Hyöty, JK Hannu, O Kuokkanen: *Reconstruction of the pelvic floor and the vagina after total pelvic exenteration using the transverse musculocutaneous gracilis flap.* Journal of Plastic, Reconstructive & Aesthetic Surgery, 2015; 68: 93-97.

6. Trignano E, Fallico N, Dessy LA, Armenti AF, Scuderi N, Rubino C, Ramakrishnan V: *Transverse upper gracilis flap with implant in postmastectomy breast reconstruction: A case report.* Microsurgery, 2014; 34(2):149-52.

7. Hollenbeck S, Toranto J, Taylor B, Ho T, Zenn M, Erdmann D, Scott Levin L: *Perineal and lower extremity reconstruction.* Plast. Reconstr Surg, 2011; 128: 551e.

8. Reddy V, Stevenson T, Whetzel T: *10-year experience with the gracilis myofasciocutaneous.* Flap Plast Reconstr Surg, 2006; 117: 635-39.

9. Parodi PC, Moretti L, Saggin G, De Biasio F, Alecci V, Vaienti L: *Soft tissue and tendon reconstruction after achilles tendon rupture: Adipofascial sural turnover flap associated with cryopreserved gracilis tendon allograft for complicated soft tissue and achilles tendon losses. A case report and literature review.* Ann Ital Chir, 2006; 77(4):361-67.

10. D'Andrea V, Catania A, Biancari F, Spirou M, Marzullo A, Covello R, De Antoni A: *Mixed tumour (spindle cell epithelioma) of the vagina: Report of a case.* Ann Ital Chir, 1998; 69(2):225-26.

11. Pariente R: *Surgical treatment of congenital aplasia of the vagina.* Ann Ital Chir, 1956; 33(5):443-51.

12. Fu-Chan Wei, Samir Mardini: *Flaps and Reconstructive Surgery.* Amsterdam, New York, Elsevier, 2009.

13. Windhofer C, Michlits W, Heuberger A, Papp C: *Perineal reconstruction after rectal and anal disease using the local fascio-cutaneous-infragluteal flap: A new and reliable technique.* Surgery, 2011; 149: 284-90.