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CASE REPORT

LIMBERG FLAP – A RELIABLE RECONSTRUCTIVE METHOD FOR SUPERFICIAL DECUBIT ULCERS

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Abstract

Introduction. The reconstructive surgery of bedsores is a current topic in the medical field, especially in multidisciplinary hospitals, where the varied pathology, the high complexity of the cases and the large number of intensive care beds are defining elements of the increased number of patients with such injuries.
Case presentation. We present the case of a 45-year-old patient admitted in the neurosurgery department following a polytrauma caused by a fall from aproximately 3 m height. After stabilization, the patient was transferred to the plastic surgery department for the treatment of the sacral eschar acquired during hospitalization.
Conclusions. Reconstruction using the Limberg flap proved to be the optimal choice in this case. No postoperative complications were identified, the patient benefited from a quick recovery and full functional rehabilitation.

Keywords: Limberg flap, sacral eschar, local flap, decubitus eschar, eschar surgery

Résumé

Lambeau de Limberg – une méthode de reconstruction fiable pour l'ulcère de décubitus superficiel

Introduction. La chirurgie reconstructive des escarres est un sujet d'actualité dans le domaine médical, en particulier dans les hôpitaux multidisciplinaires, où la pathologie variée, la grande complexité des cas et le grand nombre de lits de soins intensifs sont des éléments déterminants du nombre croissant de patients atteints de telles escarres. blessures.
Présentation du cas. L'article présente le cas d'un patient de 45 ans admis dans le service de neurochirurgie suite à un polytraumatisme provoqué par une chute d'environ 3 m de hauteur. Après stabilisation, le patient a été transféré au service de chirurgie plastique pour le traitement de l'escarre sacrée acquise lors de l'hospitalisation.
Conclusions. La reconstruction par lambeau de Limberg s'est avérée être le choix optimal dans ce cas. Aucune complication postopératoire n'a été identifiée, le patient a bénéficié d'une récupération rapide et d'une rééducation fonctionnelle complète.

Mots-clés: lambeau de Limberg, escarre sacrée, lambeau local, escarre de décubitus, chirurgie des escarres.

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Introduction

The rhomboid flap was first described more than 90 years ago. Since then, this reconstruction technique has undergone multiple changes. In 1928 at its first presentation, Limberg demonstrated the utility of this reconstructive technique for covering soft tissue defects[1]. Dufourmentel and then Webster contributed to the improvement of the technique, to increase its applicability for solving more and more complex cases[2,3]. The rhomboid flap is a reconstructive technique that can be found in the armamentarium of all experienced plastic surgeons. Its versatility, low rate of complications, as well as the reduced postoperative recovery period representing the main advantages of using this technique[10] (Fig. 1).

The rhomboid flap can be used to cover any defect, regardless of the anatomical region and its dimensions, as long as the dimensions of the sides and angles are respected. This type of reconstructive method has been successfully used to cover soft tissue defects in the facial, thoracic, abdominal, and limb regions[11-13].The viability of the flap is ensured by the rich vascularization of the subparilar and subdermal plexuses, a network evenly distributed throughout the entire flap and which facilitates rapid integration.

The experience of the surgeon allows in these situations to assess the degree of vascular suffering of the deep planes, the devitalized appearance of the muscle mass, the presence of pathological secretions, as well as the existence of a marked tissue infiltrate, representing signs that guide the widening of the excision, to reduce postoperative septic complications.

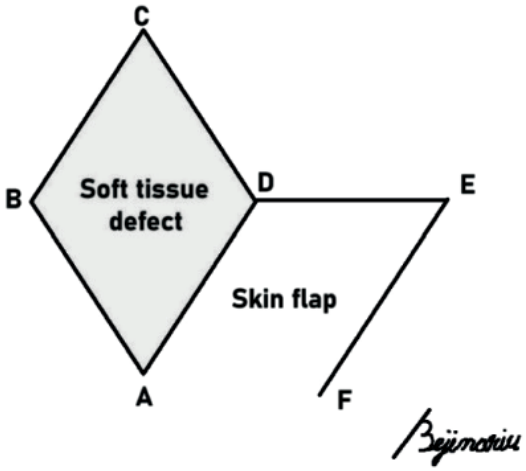


Figure 1. Limberg flap



Figure 2. Preoperative aspect

Case presentation

We present the case of a 45-year-old patient admitted to the plastic surgery department after transfer from the neurosurgery department, where he was admitted with a very serious general condition (GCS 3) for the treatment of injuries acquired after falling from approximately 3 m height.

On admission, the patient had a cerebral laceration, bilateral frontal hematomas and multiple fractures of the skull bones (left sphenoid wing, bilateral orbit, ethmoid, left nasal bones, left zygomatic bone, left frontal sinus walls and bilateral maxilla). The general clinical picture also included the consequences of thoracic trauma (sternal body fractures and costal fractures VII, VIII, X, XI), T3 vertebral body compression fracture, as well as bilateral pulmonary contusions. In this clinical context, the patient presented psychomotor agitation, being hospitalized in the intensive care unit for 25 days.

Prolonged hospitalization in the intensive care unit, the contraindication of mobilization and the systemic general status were causes of the appearance of decubitus ulcers at the level of the sacral region and the left gluteal region (Fig.2).

Following the local assessment, the decision was made to perform excision of the eschar, followed by reconstruction with Limberg flap. Intraoperatively, it was found that the lesions did not exceed the fascial plane, therefore the reconstructive procedure continued with the dissection of the rhomboid flap, followed by its transposition and the coverage of the defect remaining after the excision (Fig. 3).

To ensure the strength of the sutures in the conditions of a mobile patient, without a locomotor deficit, a multi-plane suture was chosen, with slowly resorbable threads in depth, and 2-0 silk threads for the skin sutures. A suction system was installed to ensure drainage (Fig 4).

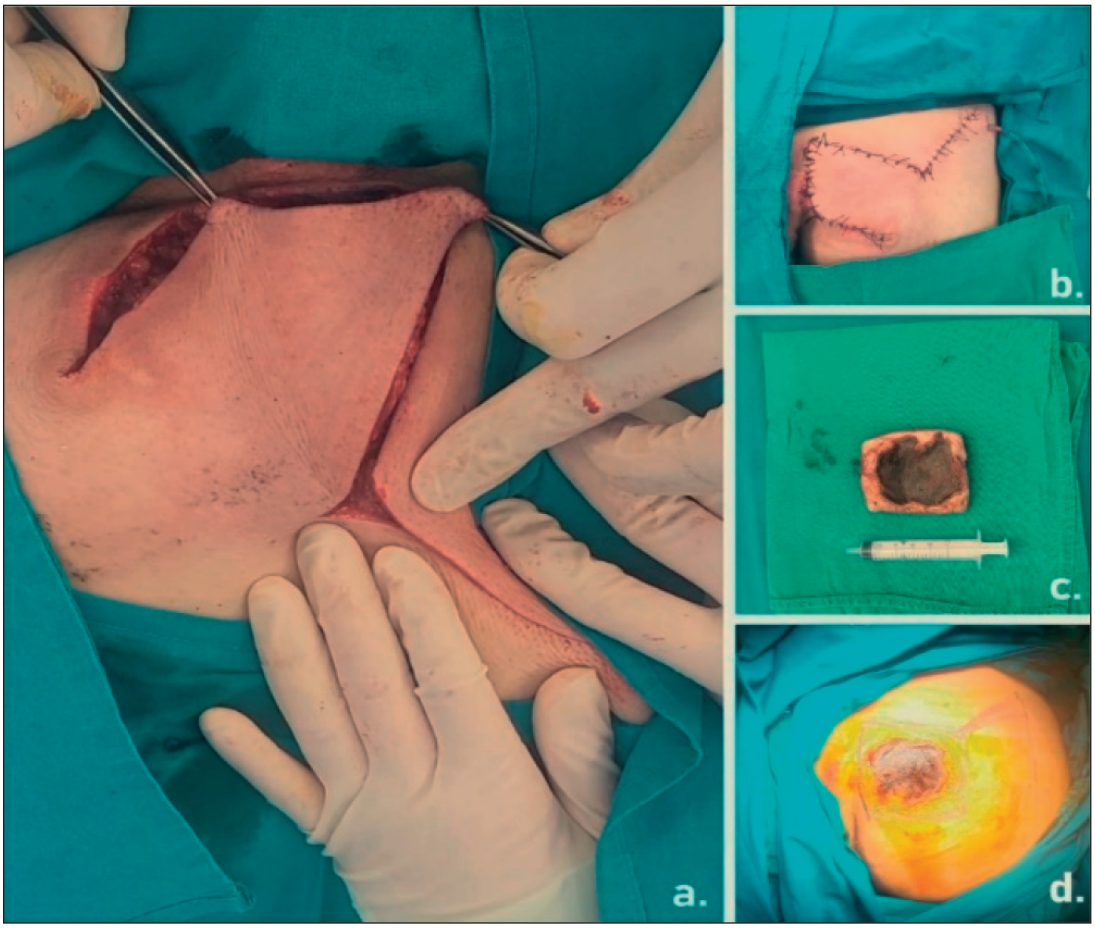


Figure 3. Intraoperative images – a. testing flap mobilisation , b. flap in final position, c. excised pressure sore, d. pre-excisional aspect



Figure 4. Flap monitoring images – a. Postoperative aspect , b. 3 days after surgery, c. 10 days after surgery, d. 14 days after surgery

The postoperative control performed at 24 hours revealed a normal coloring of the flap, without signs of vascular distress, with normal temperature and color at the time of evaluation. The drainage in the first 24 hours recorded the value of 12 ml, which falls within the average of the first day, according to authors' experience.

In this case, the postoperative evolution was favorable, the patient started mobilizing 48 hours after the reconstruction. During this time he received anticoagulant medication in the form of enoxaparin sodium (60mg/0.6ml), anti-inflammatory medication by administering ketoprofen (100mg/2ml) in a single dose, followed by administration of a gastric protector (pantoprazole). The standard antibiotic therapy applied to these patients is 3rd generation cephalosporins.

The patient was discharged 5 days after surgery, maintaining contact with the operative team through online consultations. The sutures were removed at 16 days after surgery, the flap being fully.

Discussion

The Limberg flap is a feasible solution for most patients with lessions limited to the skin and subcutaneous cellular tissue. The ease of the surgical technique, its relatively large dimension, the rich vascularization, and the large angle of mobilization represent indisputable advantages of this therapeutic approach.

The basic principle of using the Limberg flap consists in covering a local defect, by transpositioning a nearby skin flap, respecting the preoperative rhomboid markings[4-6]. The indications for this reconstructive technique are extremely varied, the Limberg flap representing an effective reconstructive method in many situations, such as tumours, pressure sores, cicatricial sequelae and extensive hyperpigmentary nevi[7-9].

The reconstructive technique involves circumscribing the defect through a quadrilateral with equal sides (regardless of their dimensions), its opposite angles being 120° and 60°, respectively. From the 120° angle, a straight line is drawn outwards, so as to form three 120° angles. The dimensions of the line must be identical to the dimensions of the sides of the quadrilateral. Afterwards, a straight line is drawn at an angle of 60° to the previously drawn line, parallel to one of the sides of the rhombus and having the same length as it. After making the drawing, the dissection is carried out in anatomical planes, including the integument and subcutaneous cellular tissue in the flap, its thickness varying according to the volumetric requirement at the level of the receptor zone. To ensure the strength of the flap in the final position, the authors decided for the suture in anatomical planes, using resorbable threads in depth and silk threads on the surface.

The Limberg flap in its various forms, as imagined by Dofourmentel and Webster, proves to be the ideal solution for the treatment of skin lesions, especially deep ones, as long as the defect remaining after the excision does not require the use of myocutaneous flaps in order to coverage large volumetric defects.

Reconstruction using the Limberg flap can be indicated in all cases of sacral bedsores, in which the depth of necrosis does not exceed the fascial plane. Deep lesions involving the muscle mass most often require the use of locoregional myocutaneous flaps as gluteal flaps and tensor fascia lata.

Although this reconstructive technique proves its versatility in most situations, greater attention should be paid to patients with low body mass, those with limited skin reserves, as well as diabetics with a poor glycemic control. Smoking is also associated with a slightly increased risk of marginal necrosis of the rhomboid flap[14].

Multidisciplinary hospitals characterized by the presence of multiple surgical departments such as neurosurgery, general surgery and orthopedics, together with intensive care departments, dedicated to the treatment of patients with severe coronary pathology, represent the main sources of such patients who need the reconstructive treatment of pressure ulcers[15].

Certainly, in most cases, the use of gluteal myocutaneous flaps in their various forms is the optimal solution, but in carefully selected situations, where the necrotic lesions are limited to the skin and the subcutaneous cellular tissue, the use of Limberg flap with angles of 60°/120° represents the solution for covering postexcisional defects[16]. The modified forms of Doufourmentel and Webster greatly broaden the applicability of this class of flaps, so that three-dimensional defects can be covered in anatomical regions with irregular relief[17].

The surgical treatment of eschar requires special attention from the perspective of analyzing the quality of the remaining tissues, an incomplete excision being associated in most situations with an unfavorable evolution[18].

The rapid healing and low complications profile associated with these reconstructive procedures qualify them as the first reconstructive option in carefully selected cases, where patient mobilization is essential for the smooth progress of the convalescence process.

Conclusions

The Limberg flap is the first therapeutic option for patients with medium and large skin defects. The increased reliability of this flap, the rich

vascularization and the low risk of postoperative complications make this reconstructive method the best therapeutic option in the case of superficial lesions located at the level of the sacral region. The Limberg flap proved to be the optimal solution for covering the soft tissue defect remained after the skin necrosis excision, in order to rapidly mobilize the patient.

Author's Contributions:

B.C.G and B.A. conceived and drafted the article. B.C.G. revised it critically for important intellectual content. All authors have read and agreed to the published version of the manuscript.

Compliance with Ethics Requirements:

"The authors declare no conflict of interest regarding this article"

"The authors declare that all the procedures and experiments of this study respect the ethical standards in the Helsinki Declaration of 1975, as revised in 2008(5), as well as the national law. Informed consent was obtained from the patient included in the study"

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