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Case Report Open Access

Reconstruction of Calcaneous Region after Melanoma Excision with Extended Medial Plantar Flap: Case Report

Paulo Rocha de Pádua Júnior[1*], Fernando Henrique Novaes[1], Vinicius Costa Souza[2] and Guilherme Barreiro Cardinali[1]

[1]*Plastic Surgery Service of the Servant Public State Hospital, Sao Paulo, Brazil*

[2]*General Surgery Service of the Servant Public State Hospital, Sao Paulo, Brazil*

[*]**Corresponding author:** Paulo Rocha de Pádua Júnior, Department of Plastic Surgery and Burns, State Public Hospital Hospital, Vila Clementino, Brazil, Tel: +551145738463; E-mail: prpjunior@hotmail.com

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Abstract

Introduction: Acral melanoma has some distinct characteristics of the other melanoma subtypes as a higher frequency of local involvement. This leads to surgical treatment with wide margins of deep and peripheral resection, causing significant tissue loss with frequent exposure of the bone ends. The medial plantar flap uses the skin of the plantar cavus area, an ideal tissue for reconstruction of the calcaneous area.

Objective: To report a case of calcaneal region reconstruction with medial plantar flap after melanoma excision.

Case report: Patient, female, had a lesion diagnosed on the right foot in medical consultation due to unicomycosis. There were no complaints related to the injury. The biopsy revealed malignant acral lentiginous melanoma with a Breslow thickness of 1.9 mm, surgical margins free of neoplastic involvement and T2NxMx pathological staging. After the anatomopathological result, a 2 cm margin magnification was programmed with extensive resultant defect. The plastic surgery team opted for immediate reconstruction with ipsilateral extended medial plantar flap and graft of the donor area.

Conclusion: The medial plantar flap provides adequate coverage for the calcaneal region, resistant to local inherent traumas of the region, with low morbidity in the donor area, good esthetic effect, rare complications, easy reproducibility and satisfactory functional recovery. It can be extended including a lateral plantar artery depending on the case, besides being able to remove the graft from the flap itself to avoid an increase in morbidity in other areas.

Keywords Melanoma; Calcaneus; Reconstruction

Introduction

Melanoma accounts for less than 10% of all neoplasms of the skin, but is responsible for the majority of skin cancer-related deaths [1,2]. Its incidence is increasing daily, especially among whites, and can develop anywhere in the body, including the soles of the feet [1,2]. Despite the increase in its incidence, data suggest that mortality is stagnant, most likely due to broad access to information and early diagnosis [3].

The Acral Lentiginous Melanoma (ALM) has some distinct characteristics of the other melanoma subtypes and is usually diagnosed late, allowing it to present, more often than not, a greater local impairment (greater Breslow thickness). This leads to surgical treatment with greater margins of deep and peripheral resection, causing significant tissue loss with frequent exposure of the bone ends [1,3-5].

For local reconstruction of the sole of the foot, the ideal is the use of tissues with similar physical characteristics, taking into account the location and size of the defect [2,5-7].

The medial plantar flap was initially described by Harrison and Morgan in 1981. It consists of a fasciocutaneous flap based on the medial plantar artery using the skin of the plantar cavus area (non-body-bearing area), an ideal tissue for reconstruction of the calcaneus area [6,8-9]. The author presents a case of calcaneal region reconstruction with medial plantar flap, showing the possibility of extension of the flap including the lateral plantar artery, besides being able to remove the graft from the flap itself to avoid an increase of morbidity in other areas.

Materials and Methods

We reviewed the clinical data records of the patient who had submitted to heel defect reconstruction, after melanoma excision, with an extended medial plantar flap. The patient signed the free and informed consent term and agreed to the publication of photos for publication.

Surgical Technique

After enlargement of margin performed by the oncologic surgery team, the resulting defect in the right foot plantar region was 6 × 6 cm with exposure of ligaments and part of the calcaneus bone.

The flap was then drawn by maximally utilizing the plantar cavus region (approximately 6 × 6 cm) and drawing a curvilinear line (representing the medial plantar artery) beginning 1 cm posterior to the medial malleolus and extending to the first interdigital space (Figure 1).

Figure 1: Resulting defect after melanoma excision; Surgical marking preoperative to flap.

Initially the thick partial skin graft was removed from the flap itself to be used later in the donor area covering the plantar cavus (Figure 2).

Figure 2: Appearance of the region of the plantar cavus after removal of the graft.

After the graft removal, the flap approach was initiated by incision posterior to the medial malleolus where the posterior tibial artery is evidenced and meticulously dissected until identification of its branches (medial and lateral plantar artery) located deep to the abductor hallucis muscle and flexor brevis of the fingers muscle that had to be sectioned for complete release of the pedicle without tension. With the complete release of the pedicles, were performed the flap of the plantar cavus with the incision of its edges (previously marked) and dissection by a delicate subfascial plane were performed, aiming at preserving the pedicle vessels (Figure 3).

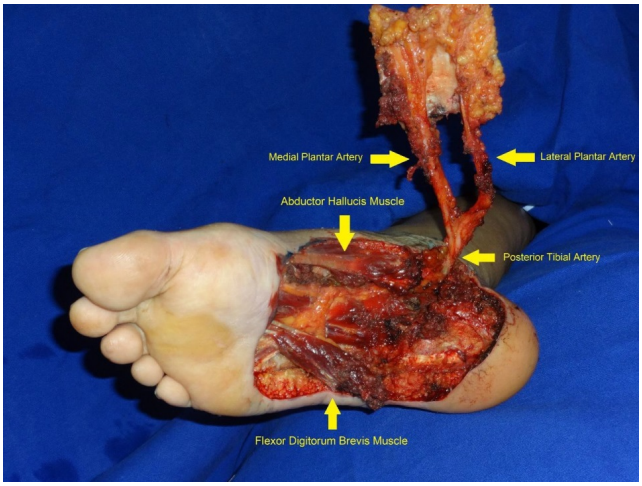

Figure 3: Fasciocutaneous flap of the plantar cavus identifying the main structures.

After meticulous hemostasis, the flap was accommodated over the calcaneus region, without rotation, and subcutaneous sutures interrupted with 2-0 polyglactin thread were applied to keep the flap without tension. Subsequently, the donor area was grafted, at the same surgical time, using the thick partial skin graft, from the flap itself, initially removed. Simple stitches were given at the center of the graft to reduce space between the bed and the graft. After fixation with a 5-0 nylon continuous suture, stitches were made with 2-0 cotton to make Brown curative on the graft. Penrose drains were placed on the suture lines to prevent fluid accumulation under the flap (Figures 4 and 5).

Figure 4: Flap and graft of the donor area aspect after fixed with continuous suture. Observe the penrose drains in the suture lines.

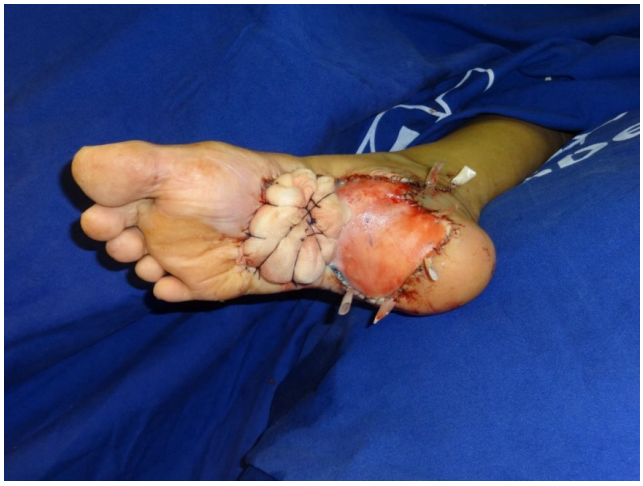

Figure 5: Aspect at the end of the surgery with the Brown curative on the graft.

Case Report

Patient, female, 64 years old, retired teacher, had an ambulatory follow-up with the dermatology team due to unicomicosis in the nails of the feet. There were no other complaints. On physical examination by this medical team, a hyperchromic lesion in the right foot of the calcaneal region of approximately 3.0 cm in the largest diameter was noted. When questioned, the patient reports the appearance of the lesion for a year with slow growth. An incisional biopsy was performed by the dermatology team due to the differential diagnosis hypothesis between melanoma and Spilus nevus. This biopsy revealed malignant acral lentiginous melanoma.

She was then referred to an oncological surgery team who performed tests for staging (abdominal, thoracic and cranial tomography) that did not show any neoplastic involvement at a distance. The program was followed by an excisional biopsy of the lesion to better assessment of the depth of melanoma (Breslow) and total skin grafting by the plastic surgery team. Result of pathology evidenced malignant melanoma of histological subtype acral lentiginous; level Clark IV; Breslow thickness 1.9 mm; vertical growth phase; absent ulceration; mitotic index of 1 mitosis/mm^2; signs of present and focal regression; absent satellites microscopes, undetected perineural and angiolymphatic invasion; surgical margins free of neoplastic involvement. Pathological staging T2NxMx.

After the anatomopathological result, 2 cm margin expansion was programmed, according to Breslow. The resulting defect was extensive approximately 6.0 × 6.0 cm with bone calcaneus exposure. The plastic surgery team opted for immediate reconstruction with ipsilateral extended medial plantar flap and donor area grafting. The detail is that, in this case, we enlarged the flap including the lateral plantar artery and use the thick partial skin of the flap itself.

In addition, popliteal sentinel lymph node screening was performed by oncology. The anatomopathological result of the margin expansion revealed free margins of neoplasm involvement and negative research of the sentinel lymph node.

After the surgery, curative with gauze and bandage was performed and the foot was placed in a neutral and raised position with a 30º angle. The patient received orientations to not rest the foot on the floor for a period of 4 weeks. She was discharged from hospital on the second postoperative day, with an ambulatory return for the first curative change (performed on the fifth postoperative day) when the Brown curative was removed on the graft. The patient was given instructions to apply sunflower oil above the raion over the graft and to clean the place at home, daily.

There was no flap suffering, but partial graft loss, carried out expectantly with daily curative that evolved at the next visit, with a 12-day postoperative period, with a change in the topical treatment for colagenase (Figure 6). It evolved satisfactorily without the need for surgical debridement, with complete healing at the end of the second postoperative month.

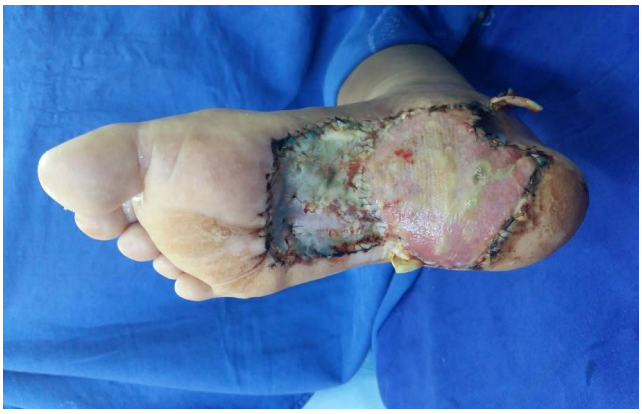

Figure 6: Aspect of the surgical site after 12 days of postoperative.

The patient currently (5 months after reconstruction) walk without assistance from third parties or orthoses, refers to a good local aesthetic effect and denies difficulties to use footwear (Figures 7 and 8).

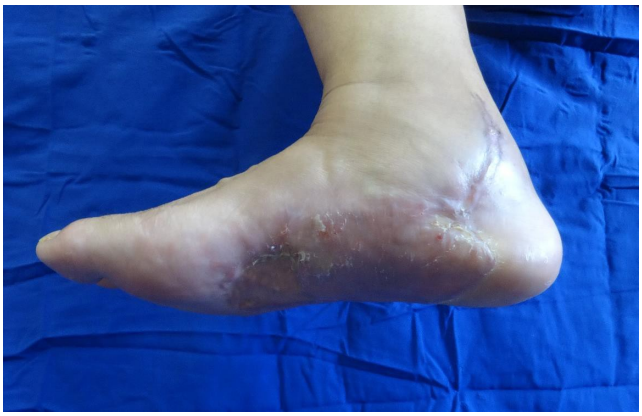

Figure 7: Aesthetic and functional results after 5 months of surgery; Medial view.

She complains of discreet pain in the sole of the foot, a slight alteration of gait and, on physical examination, shows moderate paraesthesia for pain and hot versus cold sensitivity. It is in ambulatory

follow-up with a return of 6 months and 1 year of postoperative already programmed, besides beginning of the activities of motor physiotherapy.

Figure 8: Aesthetic and functional results after 5 months of surgery Plantar view.

Discussion

Melanoma is the malignant neoplasm of skin responsible for the larger mortality related to this type of cancer. It can be classified into four main subtypes: superficial, nodular, lentigo maligno and acral lentiginous [3].

Acral lentiginous melanoma differs from other subtypes acting more aggressively: it affects the elderly (between sixth and eighth decade of life), female sex (ratio of 3:1), predilection for the extremities of the body and diagnosed later. At the time of diagnosis, they frequently present with a local ulcerated component and greater thickness of Breslow [4,5]. One series showed a mean thickness of 3.6 mm for women and 4.4 mm for men [1]. In this report, the patient had the lesion diagnosed as an incidental finding at the ambulatory physical examination, although she had no complaints. This allowed a diagnosis with a thickness less than the general mean previously reported.

Surgical treatment includes wide margins of excision that often result in large defects not capable of primary closure. The margin enlargement is based on the thickness (Breslow) of the tumor, evaluated in anatomy pathology of the excisional biopsy. According to the National Comprehensive Cancer Network (NCCN), the magnification should be 0.5 cm for lesions in situ, 1 cm for lesions smaller or equal to 1.0 mm thick, 1 to 2 cm for lesions of 1.01 to 2.0 mm thickness and 2 cm for lesions greater than or equal to 2.0 mm thickness [2,7].

For plantar reconstruction, it is important to remember that plantar skin is anatomically different from the rest of the body's skin in relation to texture, thickness, vascularity and innervation. The subcutaneous tissue of the plantar region has a cushion with fibrous septa providing the characteristics necessary to withstand the stresses caused by weight and activities. Standing, the heel supports up to 80% of body weight, while the rest is supported by the metatarsal and the distal sole [8,10].

The medial plantar flap, after its initial description by Harrison and Morgan, has been widely used in reconstruction of the calcaneal region by offering fasciocutaneous tissue with histological similarities to this region. It also provides reconstruction in a single stage, requires shorter surgical time, provides satisfactory aesthetic and functional recovery without significant deformity at the donor site [6,8].

The donor area can be grafted using a full thickness skin graft of the ipsilateral leg. Color incompatibility is an unavoidable problem with most treatment options available. A partial thickness skin graft from the contralateral foot of the foot may be a reasonable option [8]. The report shows the possibility of using a thick partial skin graft from the flap itself for donor area coverage. With this, the patient's morbidity is reduced by avoiding the removal of skin from other areas. Because it is a flap innervated by the cutaneous branch of the medial plantar nerve that attributes sensitivity, it is important for patient ambulation [9]. Sensitivity gradually returns to normal about one year postoperatively [10]. The advantages of this flap include specialized tissue for a wide range of soft- tissue heel defects, length of surgery, low cost and morbidity [5,8]. Furthermore, the report demonstrates the possibility of extending the size of the flap (if necessary) with the concomitant use of the lateral plantar artery.

A disadvantage of the medial plantar flap is its size and filling limitation, because it is fasciocutaneous. The most frequent surgical complications are partial loss of the graft and partial loss of the flap, both with a rate of 6 to 8%. The development of the surgical technique and postoperative care significantly reduce the prevalence of some complications [6,9].

In addition to the medial plantar flap, the reverse sural flap is also a good option for reconstruction in these cases [9]. Rashid et al. compared the two flaps and concluded that the medial plantar flap presented fewer complications and resulted in an earlier return to activities than the reverse sural flap [8]. Another option would be microsurgical flaps, but these may require more surgical time than the locoregional flaps and require a specialized team to perform them [9]. Regardless of the flap option chosen in the reconstruction of limbs, its indication should be as early as possible, because the importance is in the mobility of the affected limb joints and the return of the patient to his activities [9].

Conclusion

The medial plantar flap provides adequate coverage for the calcaneal region, resistant to local inherent traumas of the region, with low morbidity in the donor area, good esthetic effect, rare complications, easy reproducibility and satisfactory functional recovery. It can be extended including a lateral plantar artery depending on the case, besides being able to remove the graft from the flap itself to avoid an increase in morbidity in other areas.

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