



Original article

Reconstruction of soft-tissue lesions of the foot with the use of the medial plantar flap[☆]



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ABSTRACT

Objective: To study use of the medial plantar flap for reconstruction of the heel and foot.

Method: The authors share their clinical experience with the use of the medial plantar artery flap for coverage of tissue defects around the foot and heel after trauma. Twelve cases of medial plantar artery flap performed from January 2001 to December 2013 were included.

Results: Of the 12 patients, ten were male and two were female. The indications were traumatic loss of the heel pad in ten cases and the dorsal foot in two cases. All the flaps healed uneventfully without major complications, except one case with partial flap loss. The donor site was covered with a split-thickness skin graft. The flaps had slightly inferior protective sensation compared with the normal side.

Conclusion: From these results, the authors suggest that the medial plantar artery flap is a good addition to the existing armamentarium for coverage of the foot and heel. It is versatile flap that can cover defects on the heel, over the Achilles tendon and plantar surface, as well as the dorsal foot. It provides tissue to the plantar skin with a similar texture and intact protective sensation.

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Reconstrução de lesões de partes moles de pé com o uso de retalho plantar medial

RESUMO

Objetivo: Estudar casos de retalho plantar medial na reconstrução do calcanhar e do pé.

Método: Os autores apresentam sua experiência com o uso do retalho baseado na artéria plantar medial para cobertura de defeitos teciduais no pé, especialmente do calcanhar. Doze retalhos da artéria plantar medial, feitos entre janeiro de 2001 e dezembro de 2013, foram incluídos.

Palavras-chave:

Calcânhar

Reconstrução

Ferimentos e lesões

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Resultados: Dos 12 pacientes, dez eram homens e duas mulheres. As indicações foram perda traumática do coxim do calcanhar em dez pacientes e dorso do pé em dois casos. Todos os retalhos cicatrizaram sem maiores complicações, exceto um caso com perda parcial. A área doadora foi coberta com enxerto de pele parcial. Os retalhos apresentaram uma sensibilidade protetora levemente inferior ao lado normal.

Conclusão: De acordo com os resultados, o retalho plantar medial é uma boa opção para cobertura do pé, especialmente da região do calcanhar. A versatilidade do retalho permite a cobertura de defeitos no calcanhar, sobre o tendão de Aquiles e apoio plantar, assim como o dorso do pé. Esse retalho confere para região plantar uma pele de textura similar e sensibilidade protetora intacta.

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Introduction

The reconstruction of the distal third of the leg remains a challenge for reconstructive surgeons. Anatomical characteristics, such as the scarcity of soft tissues and thin skin, lead to great difficulties in the treatment of soft tissue lesions at this location.

The use of fasciocutaneous flaps in the reconstruction of lesions of the lower third of the lower limb, especially of the foot, is well indicated due to the similarities with the tissues of the region. Among these flaps, the medial island flap is noteworthy.^{1,2}

The medial plantar flap was initially described by Harrison and Morgan.³ It is based on the medial plantar artery and consists of a fasciocutaneous flap that uses skin from the plantar arch of the foot, an ideal tissue to cover defects of the heel and other regions of the foot, due to the structural similarity. The innervation of this flap is preserved, giving it sensation, which is a protective factor.⁴

This study aimed at presenting a series of cases in which the medial plantar flap was used for the treatment of foot injuries, especially of the heel, from 2001 to 2013.

Methods

This is a retrospective study of all patients admitted to hospital during the study period who underwent reconstruction of the lower limbs due to loss of cutaneous coverage with the use of the medial plantar flap. The following variables were assessed: gender, age, trauma etiology, presence and location of the fracture, characteristics of the loss of substance, and presence of bone exposure.

The inclusion criteria were patients treated with lower limb trauma in the study period who underwent reconstruction with a medial plantar flap. Doppler assessment of the arterial system of the foot was performed in all patients. The dorsal artery of the foot and the posterior tibial artery were patent in all patients.

The exclusion criteria were hemodynamically unstable patients, tibial nerve lesions, or lesions in the plantar donor area.

The defect was only measured after preparation of the receptor site, and then transferred to the donor site. The flap must be slightly larger than the receiving area.

The study was approved by the Research Ethics Committee under the CAAE (Certificate of Presentation for Ethical Consideration) number: 47391715.6.0000.5553, Recommendation No.: 1.167.841.

Surgical technique

The surgical technique was as follows: the lower limb is placed in the supine position, with the hip flexed and externally rotated, knee flexed, and foot in maximum supination. The area of skin to be transferred from the plantar cavus was marked off, according to the size of the lesion to be covered, limited by the margins of the foot area that does not bear weight. The midline of the plantar surface of the foot and the prominence of the navicular bone determine the lateral and medial borders of the cutaneous territory, that is, 10–12 cm long and 4–6 cm wide. The origin of the medial plantar artery (superficial branch) is identified at the septum between the abductor hallucis muscle and the flexor digitorum brevis muscle and emits several branches through the intermuscular septum to the medial plantar skin. This artery continues along the medial border of the foot, anastomosed with the first plantar metatarsal artery. The medial plantar artery is generally smaller than the dominant lateral plantar artery.⁵⁻⁷

The medial plantar artery is attached distally to the flap, and the proximal stump is sutured to the flap. Subfascial dissection of the flap is then performed; the flap is elevated in a distal-to-proximal direction. The abductor hallucis muscle is sectioned to achieve a greater length of the neurovascular pedicle. The flap is rotated carefully in order to avoid bending the pedicle. The fascicles of the cutaneous nerve are maintained in the flap, and an interfascicular dissection is made proximally. Subsequently, a partial skin graft is performed in the donor area, at the same surgical time.

Results

During the study period, 12 patients with complex wounds caused by lower limb trauma who required the use of a medial plantar flap to cover these lesions were treated. These patients

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