Squamous cell carcinoma of the heel with free latissimus dorsi myocutaneous flap reconstruction: case report and technical note

Ahmed Mahmoud Al Maksoud1,*, Adel K. Barsoum2, and Mohammed Moneer2

1Department of Surgery, Sligo University Hospital, Sligo, Co. Sligo, Ireland, and 2Department of Oncosurgery, Mataria Teaching Hospital, Cairo, Egypt

*Correspondence address. Department of Surgery, Surgical North, Level 6, Sligo University Hospital Sligo, Co. Sligo, Ireland. Tel: 353873861684; Fax: 353719136834; E-mail: ahmedaziz293@gmail.com

Abstract

Squamous cell carcinoma (SCC) is the second most common skin cancer; however, it is relatively rare on the foot. Wide excision of SCC is the recommended surgical treatment. The extent of the excision may involve resection of muscles and bone in cases of deep lesions. The functional and anatomic properties and lack of sufficient locally available tissues make the reconstruction of post-oncosurgical defects of the foot a challenging process. Heel reconstruction poses the biggest challenge due to the unique weight-bearing requirements. We present a case of a Marjolin’s ulcer on the heel in a 62-year-old woman complicating a chronic non-healing wound. The heel defect was reconstructed with a free latissimus dorsi myocutaneous flap with delayed secondary closure. The outcome was successful both functionally and cosmetically. No further procedures were needed.

INTRODUCTION

Trauma is the commonest cause of soft tissue defects of the weight-bearing heel (63.7%). Squamous cell carcinoma (SCC) is relatively rare on the foot [1, 2]. Free flaps are acknowledged as the standard tool for foot reconstruction; especially in large weight-bearing defects [1, 3].

We decided to report this case in view of the uncommon occurrence of SCC on the heel and the successful application of free latissimus dorsi myocutaneous flap (LD MCF) with delayed secondary closure to improve the cosmetic and functional outcomes.

CASE REPORT

A 62-year-old woman with no significant medical history presented to our clinic with a complaint of a lesion on her right heel. She had a trauma to her heel about 15 years earlier with chronic non-healing wound. The wound had been managed with repeated dressings and antibiotics without significant improvement.

Physical examination of the right foot showed a 10 × 15 cm ulcer with fungating everted edges on the heel and ankle region (Fig. 1). The distal pulses were normal and symmetrical. The regional lymph nodes were not palpable.

Core biopsies confirmed the diagnosis of SCC and abdominal and chest computed tomography scans did not show evidence of distant metastasis.

Intra-operatively, a wide local excision of the ulcer with safety margins was performed. The right heel and ankle region was exposed at the end of the excision (Fig. 2).

With the patient in the right lateral position, the skin paddle was designed in a bilobed fashion (Fig. 3). The muscle
was contoured to cover the defect with exposed calcaneal surface and the tailored skin paddle was wrapped around in a way that covers the area with thick skin. The donor site was closed primarily with two suction drains inserted. The micro-vascular anastomosis was performed by the senior author as interrupted end-to-end using 10/0 black nylon sutures.

Post-operatively, the flap viability was monitored closely for the first few days. The flap was bulky, thus primary closure was judged to be risky (Fig. 4). The pathology report revealed a Grade-1 SCC with free surgical margins. The donor site healed with no complications.

Six weeks post-operative, significant reduction in the flap size was noticed due to fibrosis of the denervated muscle. At that stage, closure of the skin edges was judged to be safe and weight bearing was allowed after complete healing of the wound. A small area about 1 cm at the inner aspect of the flap was not closed completely. This was managed with repeated dressings and healed completely without complications (Figs 5 and 6).

Following initial rehabilitation, clear instructions were given to the patient regarding the need for long-term follow-up and foot care. At 34 month’s follow-up, the patient was mobile with no flap complications.

DISCUSSION

Marjolin’s ulcer is a subtype of SCC, primarily described in burn scars, arises from chronic scars and non-healing wounds. Around 60% of these ulcers occur on the lower limb. Tumour size and depth of invasion influence the metastatic potential of SCC [2, 4].

Limb salvage is the main goal when treating SCC of the lower extremity; however, limb amputation may be considered in cases of limb or life-threatening lesions. Wide excision of SCC is the recommended treatment. The extent of the excision may involve resection of muscles and bone in cases of deep SCC [2, 5].

The advances in microsurgical techniques have expanded the use and donor sites of free flaps for reconstruction. The free flaps available for foot reconstruction include fasciocutaneous,
muscle and MCF. The LD, the rectus abdominis and radial forearm flaps are the commonly used donor sites [6].

Fasciocutaneous flaps can offer a thin and pliable tissue that is easily contoured, but the shear in the subcutaneous plane causes instability during mobility. Muscle flaps may provide a bigger and larger contour coverage and better stability on the long run. Moreover, muscle is rich in blood supply; thus, it is more resistant to infection. A muscle flap also has the advantage of reduced thickness due to muscle atrophy. However, there were no statistically significant differences comparing both flaps in heel reconstruction [1, 3].

Proper footwear post-operatively can prevent ulceration of weight-bearing surfaces by providing additional padding, decreasing shear or shifting weight to a more stable area [1].

The donor properties of the LD muscle make it the workhorse of free tissue transfer especially when dealing with large-sized defects. It can be sacrificed with little functional impairment in most cases. Its advantages include large size, easy dissection and long pedicle of relatively large-sized vessels. Its main disadvantage is the excessive thickness [6].

LD MCF combining the durability of fasciocutaneous flap and the better long-term stability and larger size of the muscle flap offers, by virtue, the ideal reconstruction for extensive weight-bearing defects. Many authors advocate the use of skin-grafted muscle flap for stable planter surface foot reconstruction. The LD MCF usually requires repeated de-bulking procedures and the use of custom-made footwear post-operatively [1, 3, 7].

Careful flap tailoring and inset at the time of initial surgery may reduce the need for further revision procedures. In the present case, the flap was fashioned in a bilobed way offering efficient wrap coverage of the large heel defect.

The size of the free flap reduces following transfer as the denervated muscle undergoes fibrosis. However, the timing and degree of this reduction in size is variable and has not been accurately evaluated [1, 3].

Delayed secondary closure, after shrinkage of the flap, may overcome the main barrier in the application of LD MCF for heel reconstruction. By applying delayed secondary closure of the bulky transferred MCF, we benefit from this physiological process to avoid the risk of vascular compromise of the flap affecting its viability and improve the stability of the flap during mobility.

In the authors’ personal experience, primary closure of the bulky LD MCF may jeopardise the vascularity of the flap ending in partial or complete flap loss. Delayed closure is a simple procedure; it avoids the need for more demanding de-bulking and scar refashion procedures. In our opinion, this technique may reintroduce the LD MCF to the armamentarium for weight-bearing heel reconstruction.

CONFLICT OF INTEREST STATEMENT

None declared.

REFERENCES

1. Fox C, Beem H, Wiper J, Rozen W, Wagels M, Leong J. Muscle versus fasciocutaneous free flaps in heel reconstruction: systematic review and meta-analysis. J Reconstr Microsurg 2015;31:59–66.
2. Cheng C, Lee Y, Hsiao S, Chang K, Tsai Y. Squamous cell carcinoma of the ankle. J Cancer Res Pract 2011;27:181–5.
3. Kang M, Chung C, Chang Y, Kim K. Reconstruction of the lower extremity using free flaps. Arch Plast Surg 2013;40:575–83.
4. Smith J, Mello L, Nogueira N, Meohas W, Pinto L, Campos V, et al. Malignancy in chronic ulcers and scars of the leg (Marjolin’s ulcer): a study of 21 patients. Skeletal Radiol 2001;30:331.
5. Fleming MD, Hunt JL, Purdue GF, et al. Marjolin’s ulcer: a review and reevaluation of a difficult problem. J Burn Care Rehabil 1990;11:460–9.
6. El-Shazly M, Makhoul M. Microsurgical free tissue transfer as a valuable reconstructive procedure in foot reconstruction. Indian J Plast Surg 2007;40:141–6.
7. Reigstad A, Hetland K, Bye K, Waage S, Rskkum M, Husby T. Free flaps in the reconstruction of foot injury 4 (1–7) year follow-up of 24 cases. Acta Offhop Scand 1994;65:103–6.