Case Report

Excellent outcome of healing by secondary intention after wide local excision of the weight-bearing heel

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Abstract

Background: Plantar defects are difficult to manage due to several reasons. The challenges of plantar reconstructions include lack of abundant local tissue, the requirement of the skin to be sensate, as well as the mechanical demand of the reconstruction to be able to withstand shearing forces and weight-bearing. Although rare, these defects are encountered following infections, trauma, and burns in addition to surgical oncological resections.

Case presentation: This case report describes the management of a plantar defect, measuring 45 × 55 mm, after surgical resection of a melanoma on the weight-bearing heel. The defect was managed with negative pressure wound therapy (NPWT) for 4 weeks, until granulation tissue was flush with the surrounding skin. Conservative treatment with wound care was conducted for another 12 weeks, until the wound, at 16 weeks, was completely healed. The patient tolerated the lengthy time of healing well and experienced no problems with the scar, and the functional and aesthetic outcome of conservative treatment of the plantar defect was excellent.

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Conclusion: Healing by secondary intention is an excellent treatment option for the closure of large plantar defects, despite often being an overlooked reconstructive option.

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Introduction

Plantar defects are difficult to manage due to several reasons. The challenges of plantar reconstructions include lack of abundant local tissue, the requirement of the skin to be sensate, as well as the mechanical demand of the reconstruction to be able to withstand shearing forces and weight-bearing. Although rare, these defects are encountered following infections, trauma, and burns in addition to surgical oncosurgical resections.

Case presentation

A 54-year-old man, with a body mass index of 41, was diagnosed with an T3b (Breslow tumor thickness 2.5 mm and ulceration) acral melanoma on the lateral part of his right weight-bearing heel. Wide local excision with a lateral excision margin of 20 mm, deep resection to the plantar fascia, and sentinel lymph node biopsy (SLNB) of the popliteal fossa were performed. Glabrous dermal grafting from the ipsilateral non-weight-bearing sole was planned at a later stage, when granulation tissue provided a vascularized bed that flush the adjacent skin. This method was chosen to replace with like tissue. The defect, measuring 45 × 55 mm (Figure 1A), was treated with negative pressure wound therapy (NPWT) with a setting of −125 mmHg and a compression bandage (Coban 2, 3M®). The patient was discharged on the day of surgery with a prophylactic antibiotic (dicloxacillin) for five days and instructed in the elevation of his right leg while sitting and lying down. Furthermore, crutches were handed out for easier ambulation without weight-bearing on the heel for the first 14 days. After 5 days, the NPWT was changed to the Avelle™ NPWT System (ConveTec®) (with a setting of −80 mmHg), which was changed every 3–5 days (Figure 1B). With the Avelle™ NPWT System, the patient started full weight-bearing and was not limited in his daily activities. Within 4 weeks, the defect measured 40 × 45 mm, the granulation tissue was flush with the surrounding skin, and the NPWT was therefore discontinued (Figure 1D). The second stage of the reconstruction with glabrous dermal grafting was planned according to Maker et al.; however, the patient decided not to proceed with the second stage as he was worried about potential donor site morbidity. Therefore, conservative treatment with daily showers, wound healing ointment, and adhesive foam dressing (Allevyn®) was planned. Six weeks postoperatively, the defect measured was 35 × 45 mm. Due to microscopic lymph node disease, the patient was started on adjuvant Nivolumab (480 mg iv) 6 weeks postoperatively. Ten weeks postoperatively, the wound measured was 30 × 30 mm, and fourteen weeks later the defect had nearly healed completely (Figure 1E). At 16 weeks, the wound was completely healed, and the patient returned to preoperative activities, including walks of 10 km. The patient tolerated the lengthy time of healing well and experienced no problems with the scar. The patient did not adhere to restrictions regarding avoiding weight-bearing ambulation, but he was compliant with the daily wound care. At a follow-up appointment 10 months postoperatively, the functional and aesthetic outcome of conservative treatment of the plantar defect was excellent. On examination, the skin was stable with no history of skin break downs, no functional deficit, no contour irregularity, only mild hyperkeratosis, and only slightly decreased sensitivity (Figure 1F).

Discussion

Treatment options for plantar defects include immediate or delayed skin grafts, with or without dermal substitute, local flaps, pedicled instep island flap, sural flaps, and free flaps. Interestingly,
the closure of heel defects through secondary intention is seldom described even though this is often described as the first step in the reconstructive ladder\textsuperscript{5}. The advantages of healing by secondary intention are the recruitment of adjacent glabrous skin, few if any postoperative restrictions, lack of complications such as failure of graft take, flap necrosis, and wound dehiscence. Perhaps most important, no donor site morbidity is encountered. Besides, if an undesirable outcome is attained, salvage surgery can be performed with any of the previously mentioned alternatives. The disadvantages of healing by secondary intention are the long time before wound closure, the risk of infection associated with an open wound, and fragile skin prone to ulceration\textsuperscript{6}. Therefore, healing by secondary intention is seldom used by plastic surgeons as the functional and cosmetic outcomes are rarely optimal. This case, however, presents an anatomical region, where healing by secondary intention can provide an excellent functional and cosmetic outcome.

Conclusions

Healing by secondary intention is an excellent treatment option for the closure of large plantar defects, despite often being an overlooked reconstructive option. This case presents the management of a large defect following oncological resection of a plantar melanoma. The treatment consisted of healing by secondary intention with NPWT and dressing changes, until wound closure was achieved after four months. Healing by secondary intention was tolerated well by the patient, and the functional and cosmetic outcome was excellent.
Declaration of Competing Interest

The authors declare that they have no competing interests.

Consent for publication

Written informed consent was obtained from the patient for publication of clinical details and clinical images.

Ethical Approval

Not required.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi: 10.1016/j.jpra.2022.02.009.

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