Case report

Split thickness skin graft in active psoriasis in patient with clear cell variant squamous cell carcinoma

Lisa Scupham, Atul Ingle

Plastic Surgery, Townsville
Hospital and Health Service,
Townsville, Queensland,
Australia

Correspondence to

Dr Lisa Scupham,
lisa.scupham@uqconnect.
edu.au

Accepted 4 September 2019

SUMMARY

The case report discusses split thickness skin grafting in a patient with active psoriasis. This also reports a case of a rare variant of squamous cell carcinoma.

BACKGROUND

The patient required surgical treatment of a large lesion on his scalp as it was symptomatic and affected his quality of life. However, his background of long-standing, severe psoriasis affecting potential donor sites brought into question the success of skin grafting in inflammatory skin disorders. This prompted a review of the literature, which has shown to be limited. The case contributes to clinical evidence of skin grafting in a psoriatic individual and discussion of wound healing in the context of this pathology. Furthermore, the case reports an extremely rare variant of squamous cell carcinoma (SCC), of clear-cell type.

CASE PRESENTATION

A 70-year-old man, with a background of psoriasis, was referred to the plastics and reconstructive surgery clinic by his general practitioner for opinion and management of a suspicious lesion on his anterior scalp. It started as a protruding lesion 2 months prior which was accidentally traumatised and subsequently formed a wound. This wound became infected with methicillin-resistant *Staphylococcus aureus* associated with purulent discharge. It was treated with antibiotics and regular dressings. The lesion, however, persisted as a large, protruding mass that would irritate and bleed when disturbed. The patient had sought help from his dermatologist of 18 years who had suggested excision for suspicious SCC.

The patient has a background of psoriasis which was diagnosed 19 years prior. He has active disease affecting his trunk, upper limbs and lower limbs, but is head and neck sparing (see [figure 1](#)). He sees a regular dermatologist to help manage this skin condition and is currently using a combination of steroid cream, foams and moisturisers. As advised by his dermatologist in the lead up to skin grafting, the patient applied betamethasone cream to his anterior thigh to reduce psoriatic disease at potential donor sites. Patient had recently ceased oral acitretin used to treat psoriasis (he is transitioning to a palliative phase for his other comorbidities). The patient denies current or previous immunosuppressive therapy.

Other medical history includes diabetes mellitus, peripheral vascular disease, congestive cardiac failure, hepatic cirrhosis with recent encephalopathy and atrial fibrillation. He is a non-smoker. He denies previous skin cancers. He does not have psoriatic arthritis.

On preoperative examination of the patient, there was some presence of active disease bilaterally on his anterior thigh. This was mild compared with his trunks and upper limbs. The donor site was marked in an area with less active psoriasis, noting this area has been treated with steroid creams. The scalp was unaffected by psoriasis, although some chronic skin changes and patches were evident. The lesion was 2×2 cm and slightly mobile on the scalp.

Intraoperatively, the lesion was excised with a 1 cm margin leaving the scalp defect of 4×4 cm. The split thickness skin graft was harvested with a zimmer dermatome (thickness of 8/1000 inch), meshed at 1:1.5, and secured to defect with staples (see [figure 2](#)).

INVESTIGATIONS

Histopathology shows an ulcerated, largely exophytic, moderately differentiated SCC with striking clear cell change. The resection margins were clear. There was no vascular or perineural involvement.

OUTCOME AND FOLLOW-UP

The donor and recipient sites were followed up for 22 days postoperatively (see [figure 3](#)). The grafted recipient site had successful healed with little evidence of psoriasis or complications such as infection or graft failure. On the other hand, the donor site showed evidence of psoriasis surrounding the wound, with evidence of extension and flare-up of disease at this site. This is likely Koebner phenomenon. The patient's psoriasis had also flared up globally. Despite this, the donor site slowly healed without evidence of infection.

DISCUSSION

There is little evidence in the literature of performing skin grafting in the context of chronic inflammatory dermatoses such as psoriasis. As it is, the uncertainties brought up by this case include (1) risk of failure/success of skin grafting in active skin inflammation, (2) delay in wound healing, (3) consideration of the Koebner phenomenon and (4) risk of developing of psoriasis lesion in the graft.

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To cite: Scupham L, Ingle A. *BMJ Case Rep* 2019;**12**:e231295. doi:10.1136/bcr-2019-231295

Figure 1 Distribution of psoriasis in patient with focus to donor and recipient site.

Understanding the histopathology of psoriasis is imperative to discussion of the above.

Psoriasis vulgaris is a common, chronic inflammatory skin disorder caused by inappropriate activation of cutaneous cellular immune responses.¹ It is thought that there is infiltration of a sensitised subset of T cells to the dermis and epidermis, causing secretion of inflammatory cytokines (eg, interleukin (IL)-23, IL-12, tumor necrosis factor (TNF) and interferon- γ).¹ The resulting inflammatory cascade instigates hyperplasia of keratinocytes with rapid, incomplete differentiation, thereby resulting in plaque, scale and flakes, and vasodilation of superficial blood vessels causing redness.¹ In the setting of this patient's severe disease, there was doubt about the wound healing potential of his skin preoperatively.

As it is, there is scarcity in the literature regarding the effect of psoriasis in wound healing outcomes in surgical wounds.² Some evidence suggests delayed wound healing and increase infection rates, whereas others suggests rates are similar to the general population.² A study by Young *et al*² looked at traumatic wound healing outcomes in psoriasis and found no difference of wound complications compared with controls. In fact, the authors suggest that increased growth factors and antimicrobial peptides found in psoriatic plaques, with increased keratinisation, may actually prevent infection and promote wound healing, respectively.² Furthermore, in this study, the Koebner phenomenon was not elicited, which remains a concern for surgeons.²

The Koebner phenomenon describes the extension of psoriasis to areas subjected to trauma.² In our case, there is a risk of Koebner phenomena occurring in the donor and recipient site given the inherent trauma of surgery. However, the aetiology

Figure 2 Scalp lesion and donor site with removed split thickness skin graft (STSG).

Figure 3 Progress of healing of graft and/or donor sites postoperatively at (A) 6 days (donor site remained dressed for 2 weeks), (B) 17 days and (C) 22 days.

and risk factors of Koebnerisation and the manifestations related to type, degree and site of trauma remains poorly understood.³ A review article by Weiss *et al*³ reports various traumas such as skin incisions, lacerations, bites, burns, etc. occurring in various dermatoses. Furthermore, the time of occurrence is also highly variable, usually between 10 and 20 days, but can occur up to 2 years.³ In the 3-week follow-up of this patient, there was evidence of psoriasis to the donor site which was likely from Koebner phenomenon, but none to the grafted site. However, longer term follow-up of the latter may be required. The dermatologist would follow-up the patient postoperatively and manage exacerbations that follow in his severe, chronic disease. However, Koebnerisation may not be the only explanation of psoriasis developing in the patient's grafted site.

Indeed, as suggested by site-specific Koebner phenomenon, psoriatic disease may be 'transferable' in grafts. Animal models have shown spontaneous psoriasis arising from grafted, uninvolved skin of psoriasis patients to immunosuppressed mice.¹ This suggests there might be a reservoir of pathogenic immune cells in psoriatic skin that may not be clinically evident of disease, and therefore a risk for skin grafting.

However, there are virtually no cases of skin grafting in psoriatic patients in the current literature to elucidate our questions above. The only study of note was conducted in 1965 by Clendenning *et al*,⁴ where different types of skin autografts were performed in five patients with—normal to normal skin, normal

to psoriatic skin, psoriatic to psoriatic skin and psoriatic plaque to normal skin. The highest success of takes was normal donor skin to either normal or psoriatic recipient skin (approximately 80% for both), whereas there was only a 20% success rate of psoriatic to normal skin.⁴ The authors reason that psoriatic grafts have higher metabolic demand during the initial period of relative anoxia in first 2–3 days of grafting, thus making diseased skin more prone to failure.⁴ Additionally, Koebner phenomenon was variable, occurring in 50% of successful normal to normal grafts, 9% of successful normal to psoriasis grafts and 100% in all successful psoriasis grafts.⁴ Thus, this evidence suggests more donor ‘dominance’, rather than recipient ‘dominance’ for disease-free grafting, wound healing and Koebner phenomenon. This means, a disease-free skin graft is key to success.

There are limited alternatives to wound healing in a large defect on the scalp. Healing by secondary intention would prove difficult as it would require moist dressing for months which would be costly, logistically difficult and expose the periosteal base to infection. A local flap to the scalp would almost always require split thickness skin grafting in conjunction.

This case also warrants discussion because of its unique histopathology. Clear cell is an extremely rare variant of SCC associated with ultraviolet radiation.^{5 6} There are less than

10 cases reported in the literature, most commonly involving head and neck area.^{5–7} Clear cell refers to hydropic degeneration of neoplastic cell with accumulation of intracellular fluid showing characteristic histology.⁶ The aetiology is uncertain, but factors such as chronic ulceration, radiation, immunosuppression and HPV oncogenesis, may be involved.^{5 6} Its link to psoriasis is absent in the literature, and perhaps can be related to the chronic, degenerative changes in this skin disease. The literature suggests that these lesions present as rapidly growing, large exophytic masses, as in our patient.⁵

Contributors LS is the primary author who has written the case report, assisted in the primary surgery and followed the patient in clinic. She has taken the photographs and liaised with the patient regarding publication. AI is the primary supervisor for the case report who supervised the surgery and followed the patient up, with the primary author, in clinic. He has helped in editing the paper for publication.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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Learning points

- There is very limited evidence of split thickness skin grafting in psoriasis patients.
- To optimise success of graft take, using unaffected ‘normal’ donor skin is more important than disease at the recipient site.
- Koebner phenomenon and dormant disease in the graft are important considerations of psoriasis occurrence in long-term grafted skin.
- Clear cell-type squamous cell carcinoma is a rare variant of unknown aetiology which often presents as rapid-growing, large exophytic masses.

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