The use of a failed flap as a biological dressing

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ABSTRACT

A patient with a narrowly excised squamous cell carcinoma on the scalp underwent a wider excision that involved burring of the underlying calvarium. The defect was reconstructed with a superficial temporal artery pedicled flap, which unfortunately failed. The patient had multiple co-morbidities, limiting reconstructive options. The failed flap was therefore maintained as a 'biological dressing' for several weeks. During this time, the patient was reviewed regularly in the dressing clinic and did not develop a wound infection. Six weeks later, he was taken back to theatre and the flap was debrided under local anaesthesia. Beneath the flap, there was sufficient healthy granulation tissue over the site of previous bony debridement to permit split skin grafting. We advocate this technique as a useful method for managing difficult wounds in complex patients with multiple co-morbidities where other reconstructive techniques are limited.

KEYWORDS

Wound healing – Flap – Skin cancer

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Cutaneous scalp malignancies are a common problem and seem destined to increase in prevalence with our ever ageing population, particularly among Fitzpatrick skin types I and II. Over 100,000 cases of non-melanoma skin cancer (NMSC) were registered in the UK in 2011, with around 640 deaths in 2012.¹ These lesions are encountered regularly by plastic surgeons as they often require a resection that cannot be closed primarily and need formal reconstruction with skin grafting or flap cover. In the case of invasive cancers on the scalp, a common site for NMSC, burring of the underlying calvarium may be required, leaving a defect that cannot be managed with skin grafting and that requires more robust flap reconstruction.

To further complicate these cases, patients presenting with such lesions often have other co-morbidities, making them high risk for general anaesthesia, and complex free flap reconstructions are often not viable options for this group. Multiple co-morbidities can also lead to problems with wound healing and failure of the reconstruction, leaving the patient with a complex, unhealed wound that requires further intervention. We present a case in which a novel and previously undescribed 'salvage' procedure was undertaken to turn a failed flap into a graftable wound bed.

Case history

Our patient was an 80-year-old man who had previously had a poorly differentiated squamous cell carcinoma excised from his frontal scalp. The resulting defect was reconstructed with a split-thickness skin graft but histological analysis of the specimen revealed a close deep margin

and further deeper excision was recommended by the multidisciplinary team. He had multiple co-morbidities including coronary artery disease, atrial fibrillation and chronic obstructive pulmonary disease, and he was on multiple medications including warfarin.

The patient underwent a wider and deeper excision of the lesion with burring of the underlying calvarium, and the new defect was reconstructed with a fasciocutaneous superficial temporal artery pedicled flap (Fig 1). Although the lesion was then completely excised (with no residual tumour histologically) and the patient recovered well from the anaesthesia, the flap failed (Fig 2). Given his age and co-morbidities, the decision was made to leave the flap in place as a temporary biological dressing, with regular checks in the dressing clinic and with the community nursing team to ensure he remained well and free from infection. No prophylactic antibiotics were used.

Six weeks later, the patient returned to theatre where the flap was debrided to reveal a granulating bed beneath the necrotic flap (Fig 3). The neogranulation fully covered the previously exposed bone, leaving a defect that was now able to support a split-thickness skin graft. Indeed, some areas of the wound beneath the necrotic flap had completely healed, reducing the area needing grafting. This second procedure was carried out under local anaesthesia, saving the patient the risk of further general anaesthesia.

Discussion

The use of biological dressings is becoming more widespread and they can be a valuable adjunct to plastic surgery

Figure 1 Incompletely excised scalp squamous cell carcinoma requiring further excision, for which the planned flap markings can be seen

Figure 2 Necrotic flap two weeks following surgery

practice.² They are of particular use when co-morbidities negate the use of complex reconstructions or when donor autograft sites are in limited supply, such as in a large burn injury. Biological dressings can be synthetic, xenograft (ie porcine skin), autograft (ie human amnion) or allograft (eg cadaveric skin). Dermal substitutes such as Integra® (Integra LifeSciences, Plainsboro, NJ, US) have also revolutionised wound care³ and would probably have been our second-line treatment for our patient if he had succumbed to wound infection and the necrotic flap had required debridement before the underlying wound bed was graftable.

A comparable form of our type of wound salvage has been described once previously when failed lower limb free flaps were used as a temporary biological dressings in a similar way.⁴ In this series, the failed flaps underwent delayed debridement and often obviated the need for a second free flap procedure. Unfortunately, flap failure is a recognised surgical complication and if debrided early, it can leave patients with areas of exposed bone that take many months to heal (if they heal at all). Although our patient required six weeks of dressings between procedures, the skin graft then healed well and expedited his recovery.

This technique of delayed debridement can be likened to the crane principle, first described by Millard in 1969, which describes the use of a pedicled flap to lift vascularised subcutaneous tissue from one area to another, later returning the pedicle to its original position.⁵ This procedure renders the recipient area able to support a

Figure 3 At debridement of the necrotic tissue six weeks following surgery: Healthy granulation tissue capable of supporting a split thickness skin graft was visible at the wound bed.

Figure 4 At six months with a fully healed wound

split-thickness skin graft. In our case, rather than a vascularised unit of composite tissue being transported, the necrotic failed skin flap was used as a temporising measure while new granulation tissue formed beneath.

Conclusions

We would urge others to consider this technique if faced with a similar problem, and believe it is especially useful for scalp defects in elderly patients with multiple co-morbidities and polypharmacy. Involvement of the plastic surgery nursing team is essential as keeping the wound clean and free from infection is vital between procedures. If immaculate wound care is observed and the patient remains free of infection, then the use of more costly interventions such as allograft or synthetic skin substitutes is also avoided.

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