Case study

Management of complex head wounds involving the temporalis and sternocleidomastoid muscles: a case series

ABSTRACT

The use of a comprehensive wound assessment tool and appropriate selection of dressing products can aid clinicians in the management of complex wounds. This paper describes the care of two patients presenting with head wounds. The first case is a patient who suffered from a right temporalis flap failure and exposed periosteum after wide excision. The second case explores the management of a sternocleidomastoid abscess that developed during radiotherapy for head and neck cancer. The paper outlines how the choice of healing by secondary intention can prevent patients from undergoing additional surgeries where outcomes may not be favourable.

Keywords Head and neck, wound breakdown, chronic wound, chemo-radiation therapy, split skin graft, wound bed preparation

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INTRODUCTION

Medical advancements in the management of head and neck cancers allow patients the flexibility of choice in their treatment. However, factors such as active immunotherapy treatments or previous surgical resection can affect the healing outcome or result in an unhealthy wound bed[1]. In addition, patients may not be suitable candidates for surgery or may prefer conservative management.

This case series will explore two cases which utilised conventional dressing products to assist with wound closure. The first case discusses a patient with a failed right temporal split skin graft with exposed cranium after wide excision for treatment of basal cell carcinoma. The second case focused on a patient who developed a neck abscess at the sternocleidomastoid region during chemotherapy and had undergone incision and drainage. Both cases were reviewed using the triangle of wound assessment which provided the clinicians with a guide for holistic evaluation[2].

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CASE ONE

Mr A was a 77-year-old Chinese gentleman who presented at the head and neck specialist outpatient clinic in an acute tertiary hospital with a right temporal lesion on 29 April 2016. The lesion had been present since birth; however he had noticed an increase in size to 1x3cm after an accidental injury during a haircut two years ago. The lesion had no contact bleeding, no discharge and was non-tender. Head and neck examination revealed no palpable cervical lymph nodes. Mr A underwent an excision biopsy of the right temporal lump in May 2016. Histology showed apocrine adenocarcinoma and basal cell carcinoma arising from a nevus sebaceous cyst. A positron emission tomography (PET) scan showed no significant Fludeoxyglucose (FDG) uptake in other areas, but Mr A required a wider excision for adequate clearance of the tumour.

On 23 May 2016, Mr A underwent a wide excision in which a right temporalis flap was used to cover the exposed periosteum, followed by a split skin graft to cover the wound bed. The split skin graft was anchored down with a polyurethane foam dressing, and the patient was discharged 2 days later. Initial wound inspection of the right temporalis flap 10 days later showed that the split skin graft had taken well. However, wound inspection a week later showed slough at the edges of the split skin graft, and that the periosteum was

Figure 1. Initial presentation.

Figure 2. One month after initial presentation.

Figure 3. Three months after initial presentation.

Figure 4. Five months after initial presentation.

exposed. The patient's wound was managed with Aquacel® Ag (United Kingdom), a hydrofiber with silver, and he was offered another surgery for flap coverage as the wound remained stagnant despite every other day change of dressing. His primary surgeon referred him to the wound care team as Mr A refused surgery and requested a conservative approach instead.

On inspection, the right temporalis wound measured 3x5cm overall with a depth of 1cm (Figure 1). The wound bed contained the exposed periosteum measuring 2x3cm with sloughy wound edges and areas of grafted skin which had taken. No signs of local infection were detected. Shaving of hair around the periwound region was done to maintain a good margin for the application of dressings. Wound clinicians did conservative sharp debridement of devitalised tissue at the wound edges. The wound was cleaned with normal saline and primarily dressed with Heliaid®, a collagen sheet dressing. The patient was taught to change the external gauze if stained for exudate control.

On presentation 1 month later, the patient's wound showed friable, hyper granulating tissue at the inferior aspect of the wound bed (Figure 2). Shave excision using a blade was done to manage the hyper granulating tissue weekly, and the collagen dressing was not changed if it had not degraded as it served as a scaffold for granulating tissue to migrate and cover the exposed periosteum[3].

A review by the surgeon 3 months later showed the edges of the wound contracting, covering the periosteum (Figure 3). Hypertrophic granulation was still present at wound edges and required periodic shave excision. Collagen dressing was used until full epithelialisation occurred 5 months after the initial consultation with the wound care team (Figure 4).

CASE STUDY 2

Mr B, a 71-year-old Chinese gentleman who had radiotherapy for squamous cell carcinoma (SCC) of the right tonsil presented to the emergency department with an abscess over the right sternocleidomastoid region. A computerised tomography (CT) scan of the neck showed the development of a multi-loculated abscess along the entire length of the right sternocleidomastoid muscle with overlying cellulitis. He underwent emergency incision and drainage of the abscess. As Mr B was undergoing active radiotherapy treatment and was therefore not a surgical candidate for removal of the SCC, he was referred to the wound care team for follow-up management of his surgical site.

An initial assessment was done on 15 August 2016 in the wound specialist clinic in an acute tertiary hospital. The right sternocleidomastoid wound was a sloughy wound base that measured 3x4.5cm with a depth of 1cm and undermining from 12–2 o'clock to a length of 1cm (Figure 5). Periwound erythema, acute radiotherapy hyperpigmentation, and tenderness with a minimal amount of exudate was present. In addition, as the wound bed was near major neck vessels, sharp debridement was not considered an advisable option. As the patient needed to complete his prescribed radiotherapy treatment, plans were made for the initial management of his wound with a topical antimicrobial. Hence the patient was managed with daily povidone-iodine dressing as it was cost-effective and reduced the bioburden on the wound bed[4].

Upon completion of his oncology treatment 2 weeks later, reassessment of his wound was done (Figure 6). Wound measurements were 3x4.5cm with a 1cm depth. Minimal areas of granulation were noted, and the wound bed was mostly covered by adherent slough. Cleansing of the wound was done with normal saline. Mr B was initially started on Iodosorb® (New Zealand) cadexomer iodine powder then switched to cadexomer iodine ointment with Duoderm® CGF® (Denmark) hydrocolloid wafer as a secondary dressing to promote a moist wound healing environment[4]. As the wound progression was slow, after 3–4 months the treatment modality was switched to Askina® Calgitrol (United Kingdom), a silver gel, but this was stopped after 1 month as more fibrotic tissue was deposited on the wound bed (Figure 7). Mr B was then placed back on cadexomer iodine ointment with a hydrocolloid wafer. He was seen twice a week at the wound care clinic for careful debridement of loose devitalised tissue given the anatomy of major vessels around the wound bed. As the periwound skin was dry, Mr B was advised on the application of moisturiser daily.

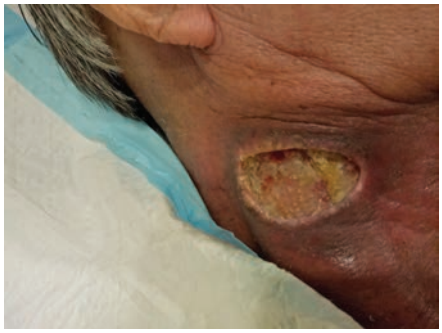

Figure 5. Initial presentation.

Figure 6. Two weeks after initial presentation.

Figure 7. Three to four months after initial presentation.

Figure 8. Six months after initial presentation.

Six months after the initial treatment and review, the wound bed measured 3x4cm with a wound depth of 0.5cm (Figure 8). Mr B continued twice weekly dressings at the wound clinic for debridement of loose devitalised tissue with Iodosorb® cadexomer iodine ointment and Duoderm® CGF® hydrocolloid (Denmark) dressing. Once all fibrotic tissue had been debrided and the wound bed was superficial, the patient continued with hydrocolloid wafer primarily to facilitate granulation[4]. Full epithelialisation occurred 1 year after the initial presentation.

DISCUSSION

Winter's study[5] on wound epithelialisation in porcine models showed that for wound healing to occur, a combination of three factors must be considered – reduction of bacterial burden on the wound bed, vascularisation, and wound hydration. In addition, a recent paper included debridement and oedema management as crucial factors to consider in wound healing[6]. Understanding these principles, combined with the usage of the triangle of wound assessment tool, aided wound clinicians in developing a patient-centric treatment plan which guided their choice of dressing products for these two cases[7].

In the case of Mr A, his wound bed was the exposed periosteum which was devoid of blood supply[8]. The exudate level on this wound bed provided enough moisture for wound healing and was not excessive. Mr A's wound did not present with any signs of local, spreading nor systemic infection. The wound edges consisted of hypertrophic tissue[3]. The temporal region, which was covered with hair, was the periwound area. The periwound skin condition was healthy, with no signs of eczema, maceration nor dehydration. The management plan was therefore to: promote granulation from the edges to close the wound; shear the hypertrophic tissue at the wound edge; and protect the wound bed from external sources of infection that can occur with non-adherence of the secondary dressing. The wound presentation narrowed down the dressing product selection to the ones that could promote angiogenesis and granulation such as collagen[2].

The outer layer of the periosteum is cell poor; hence, epithelial advancement is challenging in such a wound bed due to the lack of blood supply and viable tissue for collagen synthesis[9]. Elastase, which activates matrix metalloproteinase (MMPs), is often present in such non-healing wounds[3]. It inhibits the extracellular matrix components of elastin and collagen by binding and depleting collagen levels within the wound bed. This resulted in the extracellular matrix degrading and a reduction in fibroblast levels crucial in the proliferative phase for wound healing[3]. Using a collagen dressing can disrupt the elastase levels, reducing MMP levels by binding to growth factors and further inactivating MMPs on the wound bed[3]. Also, using a collagen dressing can improve the deposition of new collagen within the wound bed, as fibroblast and macrophages anchor well to the three-dimensional collagen structure. This can propel the wound from the inflammatory to the proliferative phase, initiating angiogenesis[3]. Lastly, it stimulates cellular migration by providing a moist wound environment and fluid balance within the wound bed[3].

Conservative sharp debridement was done for hypertrophic tissue at the wound edges periodically for easier cell migration laterally[2]. The application of a secondary dressing was challenging; hence shaving of the temporal region was necessary for better visualisation and to prevent foreign bodies such as hair from contaminating the wound bed[10]. Sebum from hair follicles also made adherence of secondary dressing difficult. Hence a layer of non-sting barrier spray was applied to the periwound area before the application of any secondary dressing.

As for Mr B, the wound presentation differed as he continued on radiotherapy treatment. Initial wound presentation was a wound bed which was dry; the initial treatment goal post-incision and drainage was to reduce the bioburden on the wound bed. Subsequent assessment of his wound post-

radiation therapy was a fibrotic, dry and sloughy wound bed. The wound edge and periwound skin were also dry. The management plan was to: rehydrate the wound bed, wound edge and periwound skin to promote a moist wound healing environment; debride the non-viable tissue; and keep the wound free from infection. Conservative sharp debridement was risky to undertake given the anatomical location of the wound and the proximity of large vessels at the sternocleidomastoid region, hence autolytic debridement was selected together with an antimicrobial product which continued to reduce the bioburden on the wound bed[4].

With Mr B, the wound clinicians witnessed the early and delay effects of radiation therapy on wound healing, given its proximity to the sternocleidomastoid wound. The redness that Mr B had immediately post-radiation (shown in Figures 5 and 6 in the periwound region), was due to the dry desquamation caused by radiation therapy[11]. There was also alteration in all layers of tissue post-radiation therapy in which the dermis and subcutaneous tissue were progressively replaced by dense and fibrotic tissue. This was due to the irregularity in collagen fibrils caused by abnormalities in collagen production formed by fibroblasts and myofibroblasts[11].

Cadexomer iodine ointment was selected for its antimicrobial and autolytic properties[12]. The occlusive nature of hydrocolloid dressings helped facilitate granulation and inhibited bacterial growth[4]. Mr B preferred the conformability and exudate absorption capability of hydrocolloid dressings. He was advised to apply moisturiser on his periwound skin as it was dry and caused him some itch and discomfort. Though the wound size is small, it took almost a year before Mr B could achieve full epithelialisation of his wound.

The triangle of wound assessment tool provided wound clinicians with a comprehensive look at the assessment of a wound so a suitable management plan could be developed. The tool was used in combination with the understanding of wound healing in irradiated areas or wound beds devoid of blood supply. It was also noted that it would be costly for patients if the clinicians were unable to select a dressing product for its intended purpose[4]. Armed with this information, the wound clinician and the patient were able to set realistic treatment goals and timeframes for healing.

CONCLUSION

A favourable outcome in wound closures for complex wounds by secondary intention is determined by understanding the challenges a complex wound can pose. The wound clinician can develop a realistic, patient-centric treatment plan and select the appropriate dressing product which is suitable for its intended purpose.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest involved in the studies.

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