

A case series on management of complex scalp wounds

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ABSTRACT

The management of wounds after surgical excision of dermatofibrosarcoma protuberans or squamous cell carcinoma at the head-and-neck region can be challenging. The aim of this case series is to profile the characteristics of two patients who experienced rotational flap wound infection and dehiscence with bone exposed and described the management of their head-and-neck wounds using NPWT. These two patients had unique experiences, as they did not undergo a second flap construction after the failure of a first flap. Management of their wound was hence complex, requiring close collaboration between physicians, wound care nurses, ward nurses, the patients themselves and their caregivers, in order to promote wound healing through secondary intention.

Keywords: Complex scalp wound, negative pressure wound therapy, collagen dressing

INTRODUCTION

Dermatofibrosarcoma protuberans (DFSP) is a rare, slow-growing soft tissue neoplasm arising in the dermis region; and can involve the head and neck, although the incidence is even smaller¹. It usually occurs among young to middle-aged adults with the first line of treatment being surgical excision with 3 to 5 cm wide margins. Although the potential for distant metastasis is not high, DFSP frequently recurs locally after incomplete excision².

On the other hand, cutaneous squamous cell carcinoma (cSCC) is the second most common skin malignancy in the United States, with most occurring in the head and neck region. However, similar to DFSP, the mainstay of treatment for cSCC is also surgical resection³.

In the above-mentioned clinical conditions, postoperative wound management is paramount in ensuring optimal healing and promoting the patient's wellbeing⁴. However, there are limited reports in the literature on the management of such head-and-neck wounds post-surgical excision.

In a small number of case studies, the use of negative pressure wound therapy (NPWT) via a vacuum-assisted closure (VAC) device has been reported to be effective in the management of scalp wounds. NPWT was reported to be able to optimise blood flow, decrease local tissue oedema and remove excessive fluids from the wound, which facilitate bacterial clearance⁵.

To illustrate, in a case series of five patients, Powers *et al.*⁶ concluded that VAC dressings were safe and well tolerated in the management of complex cranial wounds, providing a functional barrier and preventing infection. Similarly, in another case report, NPWT helped with wound healing on a 10-year-old boy who suffered from a chronic wound after multiple neurosurgeries and infected with community-associated methicillin-resistant *Staphylococcus aureus*⁷. NPWT via the VAC device was deemed as a safe, reliable adjunct in the closure of large cranial defects with exposed dura and provided an option for complex defects of the head and neck⁸.

In this paper, we described our experience with the use of NPWT in the wound management of two patients with complex scalp wounds post-surgical excision of DFSP and cSCC. The aim of the wound management was to optimise the wellbeing of the two patients. People living with a wound face major changes in their daily lives as they are required to incorporate several treatment-related procedures that may be in conflict with their personal priorities, preferred way of living and behaviours⁴. In both case studies, patients chose to forgo further surgical procedures and opted for conservative management. It entailed complex wound management in order to ensure that the wounds healed by secondary intention.

CASE STUDY 1

A 38-year-old Chinese female initially presented with a left scalp nodule in November 2011. Computed tomography revealed a 6.6

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Figure 1



Figure 2



Figure 3



Figure 4



Figure 5

cm x 4.2 cm x 5.8 cm large, well-circumscribed heterogeneously enhancing mass in the left posterolateral aspect of her neck. Histopathological examination revealed DFSP.

The patient was offered surgical treatment but failed to return for treatment or further evaluation. The patient opted instead for traditional Chinese medicine. Two years later, in June 2013, she presented again with a sudden increase in the size of the mass, with persistent pain and occasional bleeding. Repeat computed tomography showed that the mass has since increased to 10.2 cm x 10.3 cm x 11.3 cm in the left lateral aspect of her neck. It extended to the left parotid fossa and retro auricular region with involvement of the cutaneous layer, subcutaneous fats and undulating musculature.

She subsequently underwent wide excision of the left post auricular DFSP. The trapezius muscle was used to cover the space post excision. A split-thickness skin graft was harvested from her left thigh. The skin graft was meshed using a 1:3 apparatus, placed over the muscle and stitched down with polyurethane foam. Two drains were inserted over the neck and posterior of the trunk. The skin graft donor site was then covered with a semi-permeable dressing. Postoperatively, the patient was given systemic amoxicillin clavulanate.

On postoperative day 5, the top of the wound was observed to be of dusky appearance and the wound edges had started to dehisce (Figure 1). The polyurethane foam with staples was removed and necrosed portions of the skin graft were trimmed away at the bedside and the patient commenced on NPWT foam dressing with a continuous pressure of 80 mmHg. The NPWT dressing was changed every two days. Conservative bedside wound debridement (CBWD) of necrotic tissue was performed at each dressing change. The wound continued to dehisce and some necrotic tissue was also observed on the muscle layer. The patient narrated feelings of numbness but no pain was experienced during dressing change; she opted to continue with the therapy. By postoperative day 10, the skin flap had totally dehisced, and the scalp bone could be seen at some spots (Figure 2).

A collagen dressing was used to cover the spots of exposed scalp bone; and an alginate Ag or hydrofibre Ag dressing was used to

cover the rest of the viable muscle tissues present. The choice for collagen dressing was made, given collagen's critical role in all phases of wound healing (haemostasis, inflammation, proliferation and remodelling) and the dressing's ability to absorb wound exudate and maintain a moist wound environment⁹.

A hydrocolloid strip paste was used to form a ring around the scalp wound, in order to form an effective seal for NPWT (Figure 3). A continuous suction pressure of 125 mmHg was maintained (Figure 4). During this period, the dressing was changed every five days.

The patient was discharged with NPWT on the postoperative day 14 and reviewed at the nurse-led wound clinic. By July 2013, NPWT was discontinued and the patient continued with a collagen dressing. The patient was offered the option of a repeat skin graft but was not keen. In December 2013, the wound bed finally closed and the patient was discharged from the outpatient clinic (Figure 5).

Throughout the episode of care, the patient expressed concern over her altered body image given the massive hair loss. Therefore, efforts were taken at each dressing change to ensure that any shaving was kept to a minimum and her remaining hair was conserved as much as possible. At the time of discharge, the patient was able to use her remaining hair to conceal the healed wound. This gave her tremendous relief as she could resume her social activities and seek employment.

CASE STUDY 2

In March 2015, a 61-year-old Chinese female underwent a wide excision and rotational flap of her left parietal scalp. Histopathological examination demonstrated poorly differentiated squamous cell carcinoma with clear margins. The flap was secured with staples.

The patient was discharged well and stable after two days. Two weeks later, the patient presented at the outpatient clinic for follow-up. On physical exam, the scalp flap was found to be necrotic, with presence of slough (Figure 6). The patient did not demonstrate other signs and symptoms of infection. The patient was admitted and scheduled for exploration and debridement of the scalp wound. Intraoperative findings showed that the distal



Figure 6



Figure 7



Figure 8



Figure 9



Figure 10

4 cm of flap was ischaemic with underlying infection. The non-viable flap was removed and the skull exposed. There were small discharging sinuses at the base of the flap, with good vascularity for the rest of the flap and some granulation tissue over the exposed periosteum. Subsequent wound culture was positive for the *Serratia* species, and the patient was prescribed with one week of oral ciprofloxacin.

In March 2015, NPWT foam dressing was applied intraoperatively at 125 mmHg continuous, low-intensity mode over the scalp defect. At postoperative day 2, the wound size measured 16.5 cm x 8 cm x 0.5 cm; the skull bone was exposed with presence of some granulating tissue. Haemoserous exudate was present in the canister (Figure 7).

It was challenging to create an effective seal over the scalp wound with the presence of surrounding hair and constant secretion of hair sebum from the hair follicles. To ensure optimal healing, preparation of the wound bed was essential. The patient's hair was shaved with a 3 cm margin from the edges of the wound. This allowed the use of a hydrocolloid strip paste, mouldable ring, and adhesive drape to seal effectively on the scalp (Figure 8). In the initial phase, the exposed skull was protected with a nanocrystalline silver dressing to reduce the bioburden, followed by the application of NPWT. The patient was clinically stable, with no other signs of sepsis. As more granulation tissue appeared, a collagen sheet dressing was used to lay the wound bed, over the periosteum, followed by the NPWT foam dressing. A continuous suction pressure of 125 mmHg low-intensity was maintained. The NPWT foam dressing was changed at least twice per week, or when it leaked. The collagen dressing was left in situ until absorbed.

A week after surgery, the patient was given the options of: (1) continue NPWT; (2) creation of another flap; and (3) use of a tissue expander. However, the patient did not make a conclusive decision for follow-up treatment and chose to return home with NPWT.

She was subsequently discharged a week later to the nurse-led wound clinic and continued with collagen dressing and NPWT.

As her scalp bone became fully covered with granulation tissue (Figure 9), the NPWT dressing was converted to a conservative alginate silver dressing. One month later in May 2015, she was finally discharged and returned to Indonesia. She was follow up at a nurse-led clinic in Singapore on a monthly basis. She was on hydrofibre Ag and subsequently followed by Inadine dressing when the wound exudate decreased. The patient's son was taught how to perform wound dressings for the patient. By October 2015, her scalp wound was healing well with the presence of epithelialising tissue (Figure 10).

In this second case study, the patient's main concern was to be able to go home to her family in Indonesia. Henceforth, education of the patient and her caregiver on wound management and self-care was emphasised immediately after her surgery. In order to facilitate her care at home, NPWT was also stopped at the earliest possible time and her wound was managed using simple dressing materials.

CONCLUSION

Although the pathology of DFSP differs from that of cSCC, the mainstay of treatment for both conditions is surgical resection. Postoperative wound management is challenging, especially when DFSP and cSCC occurred in the head-and-neck region. The choice of dressing materials depends on its ability to adhere to the scalp, conform to the anatomical shape of the region involved, while providing a moist environment for healing to take place. In the two case studies, patients' preferences and priorities were used to direct their wound management. Their management was supported with the use of NPWT, which demonstrated positive outcomes for both patients and enabled wound healing. These case studies suggested an alternative management for patients with complex head-and-neck wounds whereby skin flaps had not been successful.

ACKNOWLEDGEMENTS

As corresponding author, I would like to thank my patients. All photos were taken with the consent of the patients and carers. To Ai Choo, I want to express my deepest gratitude for believing in

me. You have been an excellent friend, teacher, mentor and a great inspiration for me. You have inspired me to pursue my goals with hard work and dedication. I would like to sincerely thank Dr Tracy Carol Ayre, Chief Nurse of Singapore General Hospital and the wound care team for their continuous support and encouragement. Finally, thank you to Ms Ang Shin Yuh, Senior, Nurse Manager, and her team for their assistance in preparing this article.

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