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Management of skin defect following resection of Stage IV scalp melanoma: A case report



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ABSTRACT

INTRODUCTION: Surgical defect left following excision of a large and neglected scalp melanoma of can pose a significant challenge for the surgeon. Scalp reconstruction encompasses options such as skin flaps, grafts, and various mechanical techniques. In scalp excision that involves dissection beyond the galea, skin grafts and flaps may not take well and not enough tissue may be available for a skin flap.

PRESENTATION OF CASE: We present the case of a 64 year-old male with a giant scalp melanoma. The patient underwent excisional surgery of the tumor that left behind a large, galeal scalp wound defect. We used a dermal regeneration template (INTEGRA®) followed by negative pressure wound therapy (wound V.A.C.®), followed by split-thickness-skin-graft (STSG) to cover the wound. The patient was operated on and discharged home the same day and home health wound care was utilized for wound V.A.C.® maintenance. The patient underwent same day surgery for STSG two weeks later with great results. His one-month follow-up visit showed 100% graft take and a well-healing wound.

DISCUSSION: The combination of INTEGRA®, negative pressure dressing, and skin graft proved to be a safe and effective solution to dealing with large wound defects following surgical excision of the tumor. This is likely secondary to neovascularization and regeneration of a dermal template that is achieved with the dermal regeneration matrix INTEGRA®. Other studies have shown that combination of negative pressure wound therapy with INTEGRA® promotes faster integration of the matrix and decreases wound complications such as infection.

CONCLUSION: The excellent results for this case present a very effective, time-expedient operative approach to surgical challenges in treating giant scalp melanomas. A four-week follow-up visit after INTEGRA® and wound V.A.C.® application indicated that Integra was well integrated to the calvarium with good neovascularization and granulation tissue evident. Skin grafting not only covered the defect completely, but also took to the scalp 100% with no wound breakdown or wound-healing issues.

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1. Introduction

Scalp melanomas currently comprise 3–5% of all cutaneous melanomas, with higher recurrence and mortality [1,2]. They tend to occur in older men, usually with a history of solar keratosis, and are often amelanotic and rapidly growing [1]. As these melanomas are often hidden by hair, they may reach a substantial size before diagnosis. Giant melanomas are treated via surgical excision, but leaves behind a large post-operative defect that can extend down to the bony scalp. Due to the distinctive features of this anatomic site, reconstruction of the scalp is a challenge for surgeons [3].

Surgical methods of scalp reconstruction vary widely depending on the location and size of the defect, the presence of periosteum, and comorbid conditions. Although free tissue transfers, local

flaps, and skin grafts are often used in scalp reconstruction, they pose challenges with elderly patients. Furthermore, they may not take well if the excision involves dissection beyond the galea, due to the lack of a vascularized bed. A more flexible solution is the Integra Dermal Regeneration Template (INTEGRA®), an artificial dermis manufactured as a synthetic bilaminate from bovine collagen linked to chondroitin-6-sulfate, with a silicone epidermis. INTEGRA® has been successful in covering both complex scalp defects following tumour excision and is often used for chronic wounds [2].

Wound vacuum-assisted closure (wound V.A.C.®) has also been used in scalp reconstruction in difficult wounds. It is thought to debride devitalized tissue, promote blood flow and remove excess serous fluid, thereby promoting tissue granulation and decreasing wound volume [4]. Thus, wound V.A.C.® therapy in conjunction with INTEGRA® may maximize the success of STSG. Here we present a patient with a giant scalp melanoma treated by excision followed by application of INTEGRA® and negative pressure

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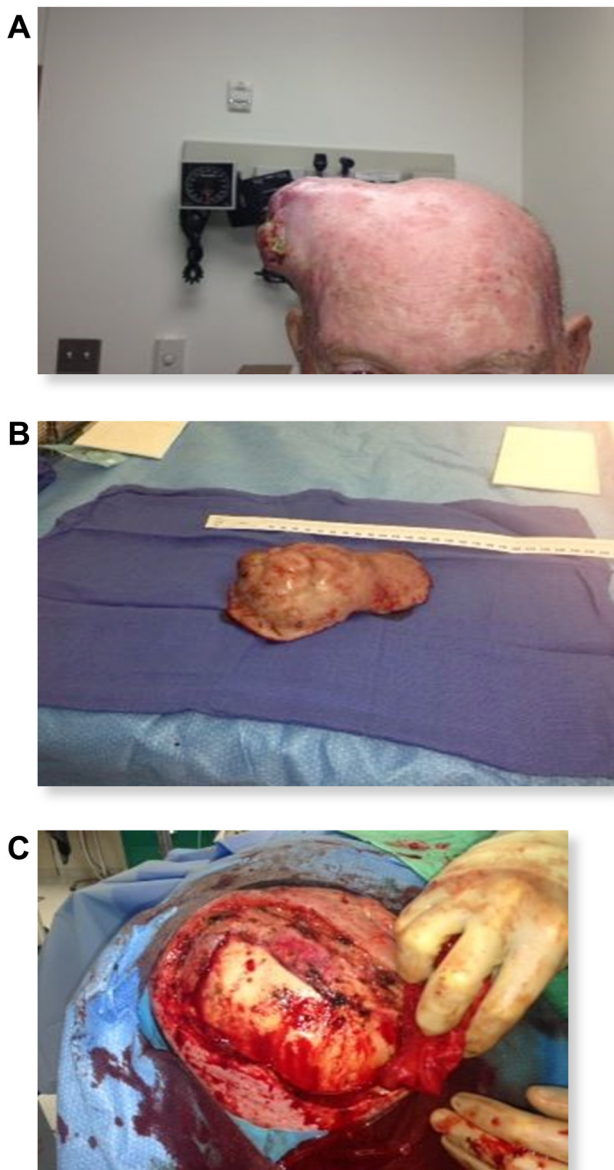


Fig. 1. A. Stage IV nodular scalp melanoma diagnosed at initial office visit. B. Excised well-encapsulated scalp melanoma. C. Intraoperative excision of scalp melanoma down to calvarium.

wound dressing, with split-thickness-skin-grafting following neovascularization of the calvarium. All procedures were done on an outpatient setting and patient was able to go home the same day of his surgeries.

2. Presentation of case

During an initial clinical preoperative visit of a 64 year-old male patient, a giant scalp mass was found (Fig. 1A). The patient had been a farmer for most of his life and had not been to see a physician in over a decade. Biopsy result of the mass showed suspected nodular melanoma that had been growing for approximately 3 years and diagnosed as Stage IV nodular melanoma with metastases to the lungs. The patient was scheduled for excisional surgery as the scalp mass was debilitating to the patients day to day life.

The scalp melanoma was excised with minimal complication as it was contained in a capsule (Fig. 1B). Excision defect extended down to the calvarium (Fig. 1C). INTEGRA® dressing was applied



Fig. 2. A. Split thickness graft took 100% and wound healed well.

to the scalp defect and stapled. A wound V.A.C.® was then applied. A four-week course of wound V.A.C.® therapy showed a good take of INTEGRA® with neovascularization of the calvarium sufficient enough for split-thickness-skin-grafting procedure approximately one month after his initial surgery.

A 0.012 in. donor skin graft was taken from his thigh and meshed in a 1:1.5 ratio and grafted on top of the INTEGRA® two weeks after initial surgery. Staples were used to attach the STSG onto the epidermis. A light compressive dressing was then applied on top of the grafted area and the patient was sent home the same day. A follow-up visit showed 100% graft take and a well-healing wound (Fig. 2A). The patient was happy with the results and had significant improvement in sleeping and day to day life activities following procedure.

3. Discussion

Scalp melanomas, while considered the only site-specific melanoma to be associated with increased mortality, can be neglected and delayed in diagnosis due to the lack of visibility under hair [1]. Although giant scalp melanomas are treated with surgery, their size can pose significant difficulties in scalp reconstruction, especially if they require deep excision and the patient has comorbid medical conditions.

For larger scalp wounds where primary wound closure is not possible, traditional reconstructive techniques include local flaps, tissue expanders, and skin grafting. However, these procedures present many limitations with giant scalp melanomas. Local flaps are more effective for smaller defects given the limited source available, and the poor mobility of the scalp and lack of tissue available makes the procedure even more challenging. Surgeons can choose between the traditional long-term tissue expansion and intraoperative tissue expansion, but the former is a painful, time-consuming procedure while the latter involves substantial risks and hospitalization [5]. Although skin grafts are an easy and reliable method, an adequate nutrient blood supply is needed for the graft to become incorporated. This may require an additional pericranial or sub-galeal fascia flap or drilling into the diploe to allow formation of granulation tissue [4].

The dermal regeneration template INTEGRA® is a more novel reconstruction method that serves as a scaffold for regenerating dermis, and has shown success in covering full thickness scalp defects [5]. Furthermore, it has been shown that during the third week after application, blood vessel lumen develops in the template [6]. Studies have also shown a positive association between dermal regeneration templates and negative-pressure therapy by promoting faster integration of the matrix and fewer complications

such as infection [7]. This suggests that a combination of INTEGRA[®], negative pressure dressing, and skin graft may favor faster maturation of the dermal template and increase the chance of the graft taking well.

In our patient, this procedure was proven to be highly successful. A four-week follow up after INTEGRA[®] and wound V.A.C.[®] application indicated that Integra was well integrated to the calvarium with good neovascularization and granulation tissue evident. Skin grafting not only covered the defect completely, but also took to the scalp 100% with no wound breakdown or wound-healing issues.

This procedure is highly advantageous not only from a cosmetic and functional standpoint but also in regards to patient maintenance. The operation was relatively short and non-invasive, which is a safe endeavor compared to microvascular reconstruction for elderly patients, especially for those with multiple medical comorbidities. Furthermore, both the INTEGRA[®] application, wound V.A.C.[®] therapy, and skin grafting were done on an outpatient basis, allowing the patient to avoid additional hospitalization times and costs.

4. Conclusion

Debilitating and unsightly giant scalp melanomas, while primarily treated by surgery, can reach substantial sizes such that surgeons are faced with an extensive defect post-excision. In our patient with Stage IV nodular scalp melanoma, the use of INTEGRA[®] followed by negative pressure wound therapy followed by split-thickness skin-graft was highly successful in covering the post-surgical defect. The excellent results for this case present a very effective, time-expedient operative approach to surgical challenges in treating giant scalp melanomas.

Conflict of interest

The authors of this paper have no conflict of interest to declare.

Disclosures and funding sources

None.

Author contribution

Yana Puckett and Eileen Bui performed literature review and manuscript preparation of this case report. Dr. Sharmila Dissanaïke performed procedure and proofreading of this case report.

Ethical approval

Not applicable.

Informed consent

Informed consent was obtained from the patient in written and verbal form.

Guarantor

Sharmila Dissanaïke, MD, FACS.

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