

Reconstruction of a large scalp defect after wide excision of malignant melanoma. A case report

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Background: Scalp melanoma is an aggressive cutaneous malignancy associated with high mortality and complex reconstructive challenges following oncologic resection. Although split-thickness skin grafting is the most commonly reported reconstructive technique, local rotation flaps provide well-vascularized tissue, durable coverage, and favorable aesthetic outcomes in selected cases.

Case Presentation: An 85-year-old man presented with a one-year history of a progressively enlarging scalp melanoma involving the coronal region. Clinical examination revealed a 15 × 15 cm ulcerated lesion with irregular borders, and intermittent bleeding. Following preoperative evaluation, the patient underwent wide local excision with approximately 3-cm margins. Reconstruction was performed using a semicircular scalp rotation flap combined with split-thickness skin grafting harvested from the left thigh to cover the secondary donor defect.

Results: Tumor resection and reconstruction were completed successfully under intravenous sedation and local anesthesia. The rotation flap provided adequate vascularized tissue coverage, while the skin graft achieved satisfactory coverage of the donor area. The postoperative course was uneventful, and the patient was discharged with outpatient follow-up. At seven days, both the rotation flap and split-thickness skin graft demonstrated appropriate integration and satisfactory wound healing without early postoperative complications.

Conclusion: This case demonstrates that a scalp rotation flap combined with split-thickness skin grafting is a reliable reconstructive option for large scalp defects following melanoma excision. Careful oncologic planning, meticulous flap design, and preservation of vascularity enabled successful reconstruction with favorable early functional and wound-healing outcomes. This technique represents a valuable alternative for selected patients requiring reconstruction after extensive scalp melanoma resection.

Keywords: Scalp reconstruction, melanoma, case report.

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Case Report

Plastic Surgery



Cutaneous melanoma represents a major public health concern, particularly among fair-skinned populations. It is a complex malignancy that arises from the interaction of multiple genetic and environmental factors.⁽⁶⁾ Although the head and neck account for only 9.0% of the total body surface area, they harbor approximately 20% of all melanoma cases, highlighting the clinical relevance of this anatomical region.⁽⁵⁾

Scalp melanoma accounts for approximately 35% of head and neck melanomas and 5% of all melanomas.⁽⁵⁾ According to the literature, scalp melanoma is associated with the highest mortality rates among cutaneous melanomas, with a 10-year survival rate of approximately 60%. Furthermore, patients with scalp melanoma have nearly twice the risk of death compared with those presenting with melanoma of the extremities.⁽⁵⁾

All suspicious lesions should undergo an initial biopsy to establish a definitive diagnosis and assess the depth of invasion. Excisional biopsy with 2-mm margins is generally considered the preferred diagnostic approach.⁽⁶⁾ The surgical management of scalp melanoma follows the same oncologic principles as melanoma arising in other anatomical locations. Surgical margins are determined according to Breslow thickness. Melanoma in situ requires a 5-mm margin of normal surrounding skin. Melanomas measuring <1 mm in Breslow thickness should be excised with 1-cm margins, whereas lesions measuring 1–4 mm require 2-cm margins. For melanomas with a Breslow thickness >4 mm, 3-cm surgical margins have been suggested. Most defects resulting from scalp melanoma excision are reconstructed using split-thickness skin grafts, while flap reconstruction is rarely required, except in cases involving calvarial



Figure 1. Marking site for resection of the tumor lesion, with margins of approximately 3 cm.

bone resection. Several studies comparing narrow (1–2 cm) and wide (3–5 cm) excision margins have demonstrated no significant differences in local recurrence or overall survival between these approaches.(6)

Scalp defects are heterogeneous in nature, and multiple reconstructive options are available. Reconstruction is primarily determined by the size and location of the defect. Various techniques have been described for small- and medium-sized defects, including rhomboid, keystone, and bilobed flaps, each with specific advantages and limitations.(2)



Figure 2. Complete tumor excision.

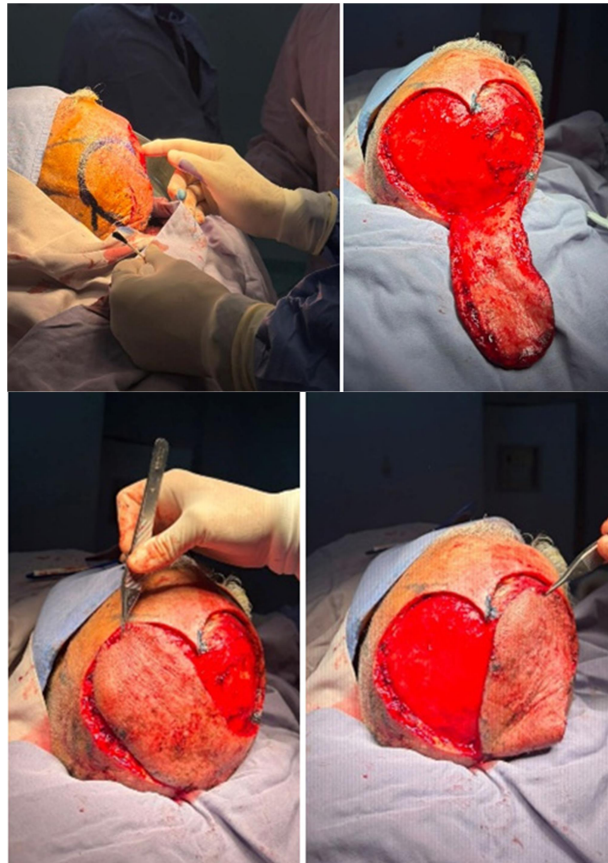


Figure 3. Semicircular scalp rotation flap based toward the left parietotemporal region.

Among local reconstructive techniques, scalp rotation flaps provide three-dimensional tissue coverage, excellent vascularity, and durable reconstruction capable of tolerating adjuvant radiotherapy.(1) Local fasciocutaneous flaps also



Figure 4. the rotation flap is shown positioned at the donor site and secured with sutures



Figure 5. Donor graft harvest site (left thigh). A split-thickness skin graft is harvested.

provide excellent color and texture match while avoiding donor-site morbidity and achieving favorable functional and aesthetic outcomes.(3) Rotation flaps consist of semicircular skin flaps that are rotated around a pivot point to mobilize adjacent tissue into the defect, allowing coverage of relatively large defects through a broad vascular base.(3)

The fundamental principles of rotation flap design include triangulation of the defect, rotation of the flap along a semicircular arc, preservation of vascular supply through either an axial or random-pattern pedicle, distribution of tension along the arc of rotation, creation of a pivot point at the area of greatest tension, and incorporation of an additional rotational arc to facilitate complete defect coverage.(1)



Figure 6. Surgical site, showing the rotation flap and the grafted area at the end of the surgical procedure.



Figure 7. 21 days after the procedure. Both the scalp skin grafts and the rotation flap demonstrated appropriate integration and satisfactory wound healing.

Local advancement, rotation, and transposition flaps are classified as random-pattern flaps because their vascular supply depends on musculocutaneous perforators within the flap pedicle that perfuse the dermal and subdermal microvascular plexus. In contrast, axial-pattern flaps receive their blood supply from a named cutaneous artery incorporated into the flap. Rotation flaps mobilize adjacent tissue through an arc of rotation around a pivot point, whereas transposition flaps transfer tissue across an intervening segment of intact skin.(4)

Case report

An 85-year-old man with a diagnosis of malignant scalp melanoma was referred to our institution for surgical management. His past medical history was significant for long-standing type 2 diabetes mellitus without medical follow-up or treatment due to treatment abandonment. He denied allergies, smoking, and illicit drug use. His surgical history included a remote tonsillectomy, although the exact date was unknown. He reported occasional alcohol consumption, which had been discontinued 20 years earlier.

The patient reported a one-year history of a dermatosis located in the coronal scalp region. The lesion initially presented as a solitary eczematous plaque associated with inflammation, scaling, and pruritus. Subsequently, a progressively enlarging tumor developed, reaching approximately 15 × 15 cm in size. The lesion exhibited progressive changes in pigmentation, irregular borders, non-foul-smelling serous exudate, and intermittent bleeding following minimal trauma. The patient denied constitutional symptoms, including weight loss, fever, or night sweats, and no palpable regional lymphadenopathy was identified during the initial evaluation.

Following initial management at a rural hospital, the patient was referred to our oncology service for comprehensive evaluation and surgical treatment. He had not received previous oncologic therapy, including chemotherapy or radiotherapy. At presentation, he was clinically stable and reported only occasional mild pruritus and local discomfort. Physical

examination revealed extensive ulceration involving the entire lesion, with serous non-fetid exudate and bleeding on manipulation.

The patient was alert, oriented, and functionally independent. Dermatologic examination demonstrated a localized dermatosis involving the coronal scalp, characterized by an asymmetric 15 × 15 cm tumoral lesion with irregular borders, central ulceration, serous non-foul-smelling exudate, and bleeding on manipulation. Multiple smaller erythematous scaly plaques with superficial excoriations were observed in the surrounding sun-exposed scalp. The remainder of the physical examination was unremarkable, except for edema of the right ankle with a clean dressing and preserved active and passive range of motion.

Preoperative laboratory studies performed on May 11, 2026, revealed a hemoglobin level of 14.6 g/dL, hematocrit of 41.6%, leukocyte count of $7.67 \times 10^3/\mu\text{L}$, platelet count of $279 \times 10^3/\mu\text{L}$, prothrombin time of 13.3 seconds, INR of 1.24, activated partial thromboplastin time of 35.3 seconds, blood type O Rh-positive, serum glucose of 150 mg/dL, urea of 19 mg/dL, blood urea nitrogen of 9 mg/dL, and serum creatinine of 1.13 mg/dL. Preoperative anesthetic evaluation classified the patient as ASA II, Goldman Cardiac Risk Index class I, Detsky score 0, and Lee Revised Cardiac Risk Index class II.

Surgery was performed on June 2, 2026. The surgery was performed on June 2, 2026, and was divided into two consecutive stages. During the first stage, the surgical oncology service performed the resection of the tumor. During the second stage, a rotation flap was created and split-thickness skin grafts were applied.

Under intravenous sedation combined with local anesthesia. Intraoperative findings included a bilateral temporoparietal scalp tumor measuring approximately 15 × 15 cm with central ulceration. Surgical orientation sutures were placed as follows: one silk suture in the frontal margin, two in the right lateral margin, three in the occipital margin, and four in the left lateral margin.

After standard skin preparation and sterile draping, a wide local excision was performed using approximately 3-cm surgical margins. Dissection proceeded with electrocautery down to the galea aponeurotica while maintaining meticulous hemostasis (Figure 1). Following complete tumor excision (Figure 2), reconstruction was performed using a semicircular scalp rotation flap based toward the left parietotemporal region (Figure 3). The flap was elevated and rotated into the defect, and the wound edges were approximated using continuous simple 2-0 polypropylene sutures (Figure 4). A split-thickness skin graft was subsequently harvested from the left thigh (Figure 5) and applied to the donor area created

by flap mobilization (Figure 6). A moist Organdil dressing with Estericide and sterile gauze was applied over the graft. Adequate flap perfusion was confirmed by satisfactory capillary refill, and a compressive head dressing was placed. Silver sulfadiazine ointment was applied to the skin graft donor site, followed by a sterile dressing, concluding the procedure.

The postoperative course was uneventful, with satisfactory anesthetic and surgical recovery. The patient was discharged and scheduled for outpatient follow-up seven days later. At postoperative evaluation, both the scalp skin grafts and the rotation flap demonstrated appropriate integration and satisfactory wound healing (Figure 7).

Discussion

Scalp melanoma represents one of the most challenging cutaneous malignancies because of its aggressive clinical behavior, poor long-term survival, and the reconstructive difficulties associated with achieving adequate oncologic margins. Although the scalp accounts for a relatively small proportion of the total body surface area, it is disproportionately affected by melanoma and has been associated with significantly higher mortality than melanomas arising in other anatomical locations.(5)

The primary objective in the treatment of scalp melanoma is complete oncologic excision with margins determined by Breslow thickness.(6) In the present case, a wide local excision with approximately 3-cm margins was performed, consistent with current surgical recommendations for thick melanomas. The resulting 15 × 15 cm scalp defect required immediate reconstruction, highlighting the importance of selecting a reconstructive technique capable of providing durable soft-tissue coverage while preserving vascularity and minimizing postoperative complications.

In this patient, reconstruction was achieved using a semicircular scalp rotation flap combined with split-thickness skin grafting to cover the secondary donor defect. This approach allowed mobilization of well-vascularized adjacent tissue while avoiding the morbidity and technical complexity associated with regional or free tissue transfer. The broad vascular base of the rotation flap contributes to reliable perfusion and favorable wound healing, making it an attractive reconstructive option for appropriately selected scalp defects.

Successful application of rotation flaps depends on adherence to fundamental design principles, including adequate defect triangulation, preservation of a broad vascular pedicle, appropriate arc of rotation, and careful distribution of tissue tension.(1) Respecting these principles facilitates flap mobilization while reducing excessive tension that

may compromise perfusion or wound closure. In the present case, these surgical concepts enabled tension-free coverage of the primary defect with satisfactory flap viability.

The postoperative course was uncomplicated, with successful integration of both the rotation flap and the split-thickness skin graft at early follow-up. Although long-term oncologic surveillance remains essential because of the aggressive nature of scalp melanoma, the early reconstructive outcome demonstrates that this technique can provide stable coverage and satisfactory wound healing after extensive tumor resection.

Conclusion

Scalp melanoma remains a challenging malignancy because of its aggressive biological behavior, poor prognosis, and the complex reconstruction often required following oncologic resection. Although split-thickness skin grafting is the most commonly reported reconstructive option after scalp melanoma excision, this case demonstrates that a rotation flap combined with split-thickness skin grafting can provide effective coverage of large scalp defects while preserving tissue vascularity and achieving satisfactory wound healing. Careful preoperative planning, adherence to oncologic resection principles, and appropriate flap design allowed successful reconstruction with an uneventful postoperative course and good early integration of both the flap and skin graft. This case highlights the value of local rotation flaps as a reliable reconstructive alternative for selected patients with extensive scalp defects following melanoma resection.

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