

Cutaneous Melanoma: Principles of Oncologic Resection and Reconstruction

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ABSTRACT

Cutaneous melanoma is a malignant neoplasm of melanocytic origin characterized by high biological aggressiveness and metastatic potential, with tumor thickness representing the most important prognostic factor (1,2). Early diagnosis is essential, as survival is closely related to Breslow depth, ulceration, and mitotic rate (3). We present the case of a 62-year-old female with a pigmented lesion in the right scapular region with progressive growth and ulceration. Excisional biopsy confirmed superficial spreading melanoma with a Breslow thickness of 2.1 mm, Clark level IV, ulceration, and high mitotic rate (6,7). The patient underwent wide local excision with 2 cm margins and sentinel lymph node biopsy, followed by immediate reconstruction using a local V-Y advancement flap. Final pathology confirmed negative margins and a negative sentinel lymph node. The postoperative course was uneventful, with satisfactory functional and aesthetic outcomes. This case highlights the importance of integrating oncologic and reconstructive principles to optimize disease control and patient outcomes (14,15).

KEYWORDS: Cutaneous melanoma, oncologic resection, Breslow thickness, sentinel lymph node, local flap, reconstructive surgery.

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INTRODUCTION

Cutaneous melanoma is the most aggressive form of skin cancer and accounts for the majority of skin cancer-related deaths worldwide (1,2). Its incidence continues to rise, particularly in populations exposed to intermittent ultraviolet radiation. Prognosis depends primarily on tumor thickness, as measured by the Breslow index, as well as ulceration and mitotic activity (3).

Wide local excision remains the cornerstone of treatment for localized melanoma. Surgical margins are determined by tumor thickness and aim to achieve local control while minimizing morbidity (4,5). Sentinel lymph node biopsy is recommended in patients with tumors greater than 0.8 mm or with high-risk features and provides essential staging and prognostic information (8,9).

Reconstruction following oncologic resection is critical, particularly in large defects. Options include primary closure, skin grafts, and local or free flaps. Local flaps provide superior aesthetic and functional outcomes due to better tissue match and vascular reliability (11,13).

CASE REPORT

A 62-year-old female with a history of chronic sun exposure presented with a pigmented lesion in the right scapular region, with an 18-month history of progressive growth and recent ulceration. Physical examination revealed an asymmetric lesion with irregular borders and heterogeneous pigmentation, measuring 2.5 × 2 cm, without palpable lymphadenopathy.



Image 1: Initial clinical image.

Excisional biopsy confirmed superficial spreading melanoma with a Breslow thickness of 2.1 mm, Clark level IV, ulceration, and increased mitotic activity (6,7). Based on

these findings, the patient met criteria for sentinel lymph node biopsy.

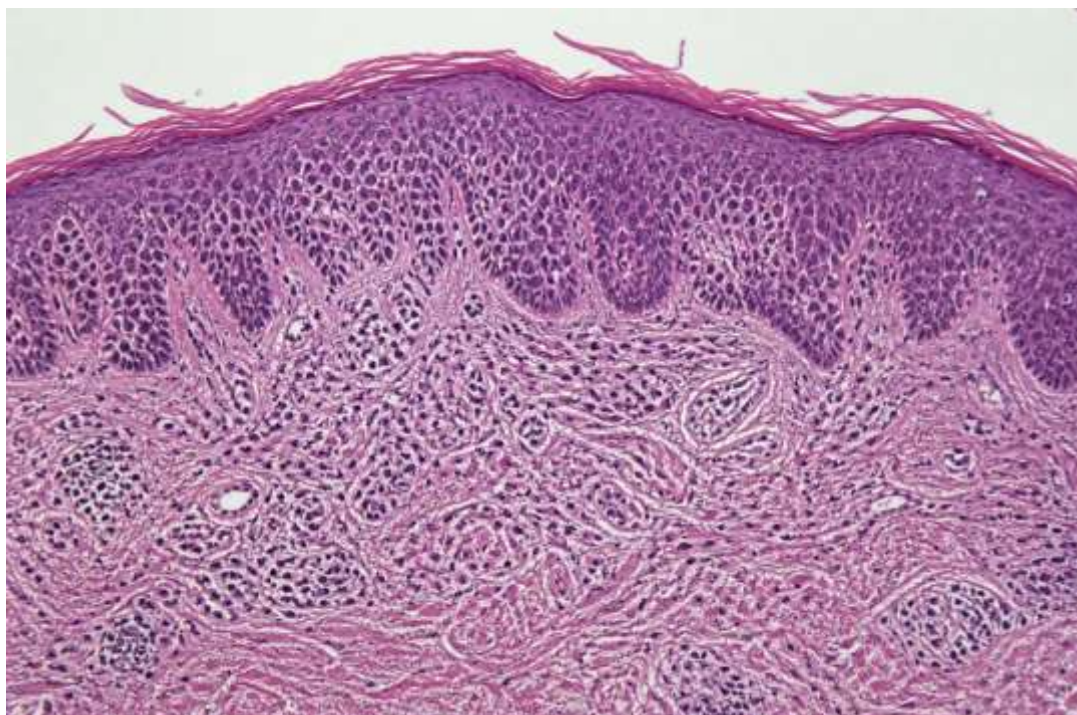


Image 2: Histopathological image.

The patient underwent wide local excision with 2 cm margins and sentinel lymph node biopsy using a combined technique

(8,10). The resulting defect measured approximately 6 × 5 cm.

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Immediate reconstruction was performed using a local V-Y advancement flap, given the adequate surrounding tissue laxity. The flap was elevated preserving vascular supply and

advanced without tension, achieving complete coverage of the defect. The postoperative course was uneventful.



Image 3: Immediate postoperative image.

Final histopathology confirmed negative margins and a negative sentinel lymph node. Follow-up demonstrated satisfactory healing without evidence of recurrence.

DISCUSSION
Melanoma prognosis is strongly associated with Breslow thickness and ulceration, both present in this case (1,3). Surgical management with wide local excision remains the cornerstone of treatment, with margins determined according to tumor thickness. These recommendations are summarized in Table 1

Table 1. Recommended Surgical Margins According to Breslow Thickness

Breslow Thickness	Recommended Margins
In situ	0.5 cm
≤1 mm	1 cm
1–2 mm	1–2 cm
>2 mm	2 cm

Sentinel lymph node biopsy is essential for staging and prognostic evaluation, particularly in intermediate- and high-risk melanomas. Indications for this procedure are outlined in Table 2.

Table 2. Indications for Sentinel Lymph Node Biopsy

Criteria	Indication
Breslow >0.8 mm	Yes
Ulceration	Yes
High mitotic rate	Consider
Melanoma in situ	No
<0.8 mm without risk factors	No

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The main prognostic factors influencing survival and recurrence are summarized in Table 3.

Table 3. Prognostic Factors in Cutaneous Melanoma

Factor	Prognostic Impact
Breslow thickness	Most important prognostic factor
Ulceration	Decreased survival
Mitotic rate	Increased aggressiveness
Sentinel node positivity	Worse prognosis
Lymphovascular invasion	Higher metastatic risk

From a reconstructive standpoint, the selection of technique depends on defect size and location. Available options are summarized in Table 4.

Table 4. Reconstructive Options Based on Defect Size

Defect Size	Reconstruction
Small	Primary closure
Medium	Local flaps
Large	Regional/free flaps
Superficial	Skin graft

Local flaps, such as the V-Y advancement flap used in this case, provide superior outcomes compared to other techniques, as shown in Table 5.

Table 5. Comparison of Reconstructive Techniques

Technique	Advantages	Disadvantages
Primary closure	Simple	Limited by tension
Skin graft	Covers large defects	Poor aesthetics
Local flap	Best match	More complex
Free flap	Large defects	High complexity

Although the procedure was successful, potential complications must always be considered. These are summarized in Table 6.

Table 6. Complications of Local Flaps

Complication	Description
Necrosis	Vascular compromise
Infection	Bacterial contamination
Dehiscence	Excess tension
Seroma	Fluid accumulation
Poor scar	Suboptimal aesthetic result

Immediate reconstruction following oncologic resection is safe when adequate margins are achieved and improves patient outcomes (14,15).

CONCLUSIONS

Cutaneous melanoma requires early diagnosis and appropriate surgical management due to its aggressive biological behavior and metastatic potential. Wide local excision with adequate margins, determined by Breslow thickness, remains the cornerstone of treatment and is essential to achieve optimal local disease control while minimizing morbidity.

Sentinel lymph node biopsy plays a critical role in staging and prognostic assessment, particularly in intermediate- and high-risk melanomas. In the present case, the absence of nodal

involvement was associated with a favorable prognosis and avoided the need for more extensive surgical intervention.

From a reconstructive perspective, careful preoperative planning is fundamental to ensure both oncologic safety and optimal functional and aesthetic outcomes. Local flaps, such as the V-Y advancement flap, represent a reliable and versatile option for trunk defects, offering adequate vascularity, minimal donor site morbidity, and superior tissue match compared to alternative techniques.

Immediate reconstruction following oncologic resection is safe when tumor-free margins are achieved and contributes to reducing the number of surgical procedures, accelerating

patient recovery, and improving overall quality of life. However, reconstructive decisions must always be individualized based on tumor characteristics, defect size, anatomical location, and patient factors.

Finally, the management of cutaneous melanoma should be approached in a multidisciplinary manner, integrating dermatology, surgical oncology, and plastic surgery. This comprehensive strategy allows for improved oncologic outcomes, reduced complication rates, and enhanced aesthetic and functional results, ultimately optimizing patient care.

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