CASE REPORT

Sentinel lymph node biopsy following a rotational flap

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SUMMARY

Sentinel lymph node biopsy (SLNB) is a critical component of melanoma management. Extensive prior surgery at the site of a primary melanoma is considered a relative contraindication for SLNB. While evidence suggests that SLNB may be performed accurately even in those patients who have undergone prior wide local excision, it is less clear whether patients who have undergone more extensive surgical procedures, particularly flap reconstructions, can benefit from this procedure. We report a case of a patient who had undergone surgical removal of a primary melanoma and subsequent reconstruction with a rotational flap in whom a SLNB was performed successfully, which revealed nodal metastasis, suggesting that SLNB may remain an appropriate option in carefully selected patients who have previously undergone extensive surgery at site of primary disease.

BACKGROUND

Sentinel lymph node biopsy (SLNB) has been used for more than 20 years as a minimally invasive means to evaluate melanoma patients for occult nodal metastasis, the most important prognostic factor associated with melanomas of a given thickness.^{1 2} Wide local excision (WLE) at the site of a primary melanoma—theorised to have an impact on the lymphatic drainage pattern of a tissue resulting in false-negative results—was once considered a contraindication for subsequent SLNB. However, more recent studies have shown that SLNB can still be performed with accuracy in patients who have already undergone wide local excision.^{3–5} In these studies, false negatives were attributed to extensive tissue disruption, particularly surgical flaps, which therefore remain a contraindication to sentinel lymph node biopsy and are frequently excluded from studies of SLNB following therapeutic wide excision.⁶

We are aware of no published reports specifically describing the performance of SLNB in patients who have previously undergone flap reconstruction to the primary site. It remains possible that proceeding with SLNB for nodal staging in appropriately selected patients who have undergone extensive surgery is not only feasible, but may also provide important information that can have a meaningful impact on management. We report a case of a patient who had undergone surgical removal of a primary melanoma and subsequent reconstruction with a rotational flap in whom a SLNB was performed successfully, revealing nodal metastasis. This case indicates that SLNB is feasible

and may provide important staging information in carefully selected patients who have previously undergone extensive surgery at site of primary disease.

CASE PRESENTATION

A 74-year-old woman with a significant history of sun exposure, with 12 superficial basal cell carcinomas and 1 superficial squamous cell carcinoma previously removed from the face and back, presented to the dermatology clinic in January 2014 with a suspicious lesion on the right heel, which had developed over the preceding 5 months. A biopsy showed malignant melanoma, of an acral lentiginous type, with Clark level II, 0.34 mm depth of invasion and approximately 1×1 cm in size. The patient was referred to a dermatologist and underwent wide excision with Mohs surgery in February 2014. Pathological examination of the excised tissue revealed invasive melanoma with Breslow thickness 2.4 mm, Clark level IV, with 5 mitotic figures/mm² and without ulceration, regression or lymphovascular invasion ([figure 1A, B](#)).

The defect left by Mohs surgery was approximately 4×4 cm in size, and reconstruction was performed the following day by a plastic surgeon using a foot instep fasciocutaneous transposition flap based off the medial plantar artery. The donor site was covered with an 8×3 cm full thickness skin graft harvested from the ipsilateral inguinal crease. Recovery was complicated by a localised infection at the site of the skin graft on the foot, for which the patient was treated with a course of antibiotics.

Given the more advanced T stage of the melanoma, discovered after therapeutic excision, than was seen on the initial biopsy, the patient was subsequently referred to surgical oncology (PJM) for discussion of SLNB. At that time, pathological nodal staging with SLNB was discussed, given that the substantial risk of occult nodal micrometastasis was approximately 15%.⁷ However, it was acknowledged that, given the patient's previous surgeries with the presence of a rotational flap at the primary site, as well as a skin graft donor site at the ipsilateral inguinal crease, the procedure could be less sensitive than is typically observed.

The patient opted to proceed with SLNB, which was delayed until her prior surgical sites were completely healed and free of infection. In May 2014, the patient underwent SLNB of the right groin with the removal of five nodes. Pathological examination showed five lymph nodes, three of which exhibited histopathological evidence of metastatic melanoma ([figure 2A, B](#)). Subsequent staging with

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Figure 1 (A) (H&E, $\times 2$ objective): the right heel primary site wide excision specimen exhibits acral skin with a compound proliferation of severely atypical melanocytes extending to a depth of 2.4 mm, Clark level IV. No ulceration is identified. (B) (H&E, $\times 4$ objective): on higher power, the epithelioid melanocytes demonstrate pleomorphism, prominent nucleoli and increased proliferation with 5 mitotic figures/mm² seen.

a total body positron emission tomography CT (PET/CT) scan showed no evidence of distant metastatic disease. A completion inguofemoral lymph node dissection performed was notable for 10 additional nodes, none of which were found to have evidence of melanoma (0/10; final count of positive nodes 3/15).

OUTCOME AND FOLLOW-UP

The patient tolerated these procedures with the sequela of mild right lower extremity oedema, which has been well controlled with standard lymphoedema management. All surgical incisions healed well, and there has been no evidence of recurrence to date.

DISCUSSION

Previous studies have demonstrated that SLNB can be performed with high fidelity in patients who have previously undergone WLE at the site of a primary melanoma.^{3–6} While these studies identify extensive flaps as factors that may negatively impact the accuracy of SLNB, there is no evidence basis guiding the application of SLNB in this patient population. Presumably because it has been considered a contraindication to accurate SLNB, studies have typically excluded patients who have undergone such procedures.⁸

Many melanoma patients, up to 60% in some institutions, have already undergone WLE prior to evaluation by a surgical

Figure 2 (A) (H&E, $\times 4$ objective): one of the sentinel lymph nodes found to be positive for metastatic melanoma shows a subtle, subcapsular collection of atypical melanocytes. (B) (Mart-1/HMB-45 combination immunohistochemical stain, $\times 4$ objective): The nodal metastasis, measuring 3.0 mm in greatest dimension, is highlighted by a melanocytic immunohistochemical stain.

oncologist and consideration for SLNB.³ Often, the presence of melanoma in surgically sensitive sites, such as the heel in this patient, necessitates surgical reconstruction that may involve the use of flaps or skin grafts. Our case demonstrates the feasibility of SLNB in patients having undergone extensive surgery at the primary site including flap reconstruction and an adjacent skin graft harvested from the proximal, ipsilateral thigh.

A previous report showed the use of SLNB from the location of a skin graft.⁹ However, although that study demonstrated the feasibility of SLNB, it did not address the question of sensitivity in cases of extensive prior surgery as the SLNB was negative for tumour involvement. In the current case, the sensitivity of SLNB may be inferred not only from the fact that three of five sentinel nodes identified in this patient were positive, but also from the subsequent completion lymph node dissection, which yielded 10 nodes harbouring no evidence of disease. These findings indicate that lymphatic mapping and SLNB can accurately detect that pattern of lymphatic drainage despite prior rotational flap.

Multiple aspects of this case highlight the importance of multidisciplinary discussion regarding melanoma management prior to proceeding with definitive surgical treatment. However, in those cases, when extensive tissue disruption has already occurred, SLNB may still be feasible and accurate, thus providing important information to guide management and potentially improve outcomes. Nevertheless, surgeons should maintain

caution that there may be a higher likelihood of false positive or inaccurate results and, as such, should select patients carefully. Consequently, while the case presented suggests that SLNB may have utility after a rotational flap, further work is needed to more thoroughly evaluate its accuracy and predictive value in this patient population.

Learning points

- ▶ Prior wide local excision at the site of a primary melanoma is not considered a contraindication to subsequent sentinel lymph node biopsy.
- ▶ The impact of more extensive surgery, particularly rotational flaps commonly used to reconstruct the primary site following excision, on sentinel lymph node biopsy, is unknown.
- ▶ Our case suggests that despite potential disruptions in lymphatic drainage and architecture, sentinel lymph node biopsy may remain a viable option even in patients with melanoma who have had more extensive prior surgery at the site of a primary tumour.

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