Case Report

Delayed lymphoscintigraphy for sentinel node mapping following wide local excision in primary melanoma

Amitabh Thacoor, FRCS (Plast)[1a], Pennylouise Hever, MRCS[1], Allan Ponniah, FRCS (Plast)[1]

[1] Department of Plastic and Reconstructive Surgery, Royal Free Hospital, London, England, UK

Keywords: delayed, lymphoscintigram, melanoma, sentinel

Dermatology Online Journal

Vol. 32, Issue 1, 2026

Abstract

Sentinel lymph node biopsy (SLNB) is used in the staging of melanoma and is generally performed at the time of wide local excision (WLE) of the primary lesion, the location of which guides preoperative and intraoperative lymphatic mapping. However, the role of delayed lymphatic mapping following prior WLE remains unclear. We report the case of a patient who underwent lymphoscintigraphy before and after WLE for melanoma, compare the findings, and review the published literature. A 32-year-old woman was scheduled for WLE and SLNB of a 2.0-mm Breslow thickness melanoma on the upper arm. After her preoperative lymphoscintigram, an unplanned pregnancy was diagnosed, and she elected to proceed with WLE alone. She later requested delayed SLNB and underwent a second lymphoscintigram 2 months later. Comparison of the pre- and post-WLE lymphoscintigrams demonstrated variation in the location and number of sentinel lymph nodes, raising important questions about the accuracy of delayed lymphatic mapping and SLNB in melanoma. This report adds to the understanding of lymphatic channel behavior following WLE and may help inform decision-making for patients and clinicians.

Introduction

An estimated 325 000 cases of melanoma were diagnosed in 2020, with the global burden projected to increase to 510 000 new cases and 96 000 deaths by 2040.[1] Regional lymph node status is a significant prognostic factor, with localized disease carrying a better prognosis than nodal involvement.[2] Sentinel lymph node biopsy (SLNB) is a minimally invasive procedure used for staging melanoma by identifying the first node(s) in a clinically negative regional basin draining the primary site. It is generally performed at the time of wide local excision (WLE) of the primary melanoma, with the lesion location guiding pre- and intraoperative lymphatic mapping. However, the role of delayed lymphatic mapping following previous WLE remains unclear. We report the case of a patient who underwent lymphoscintigraphy both before and after WLE for melanoma and compare the findings.

Case Synopsis

A 32-year-old woman was referred to our tertiary center with a diagnosis of a 2.0 mm Breslow thickness, completely excised, non-ulcerated superficial spreading melanoma of her right upper arm. Lymphoscintigraphy was performed on the morning of her planned WLE and SLNB according to standard departmental protocol: 42 MBq of technetium-99m nanocolloid was injected in 4 divided doses around the right upper arm scar, followed by dynamic and static imaging. A single lymphatic tract draining into the right axilla was identified, and a solitary right axillary lymph node was marked as the sentinel node (**Figure 1**).

On the day of surgery, routine preoperative pregnancy testing returned positive, indicating an unplanned pregnancy estimated at 4 weeks' gestation. The patient opted to undergo WLE only under local anesthesia; her primary melanoma scar was excised with a 2 cm margin, and the resultant defect was closed primarily. Histopathology confirmed negative margins. Following voluntary termination of pregnancy, the patient was scheduled for delayed SLNB, 59 days after her initial WLE. Repeat lymphoscintigraphy was performed on the morning of surgery using the same protocol. Findings differed from the initial scan, identifying 1 faint axillary lymph node in addition to 2 further nodes (**Figure 2**). SLNB was performed under general anesthesia using both a gamma probe and Patent Blue V dye (Laboratoire Guerbert, Aulnay-Sous-Bois, France), and all 3 identified nodes were sampled. Histopathology confirmed the nodes

a Corresponding Author: Amitabh Thacoor, FRCS (Plast), Department of Plastic and Reconstructive Surgery, Royal Free Hospital, Pond Street, London NW32QG, Email: amitabh.thacoor@doctors.org.uk

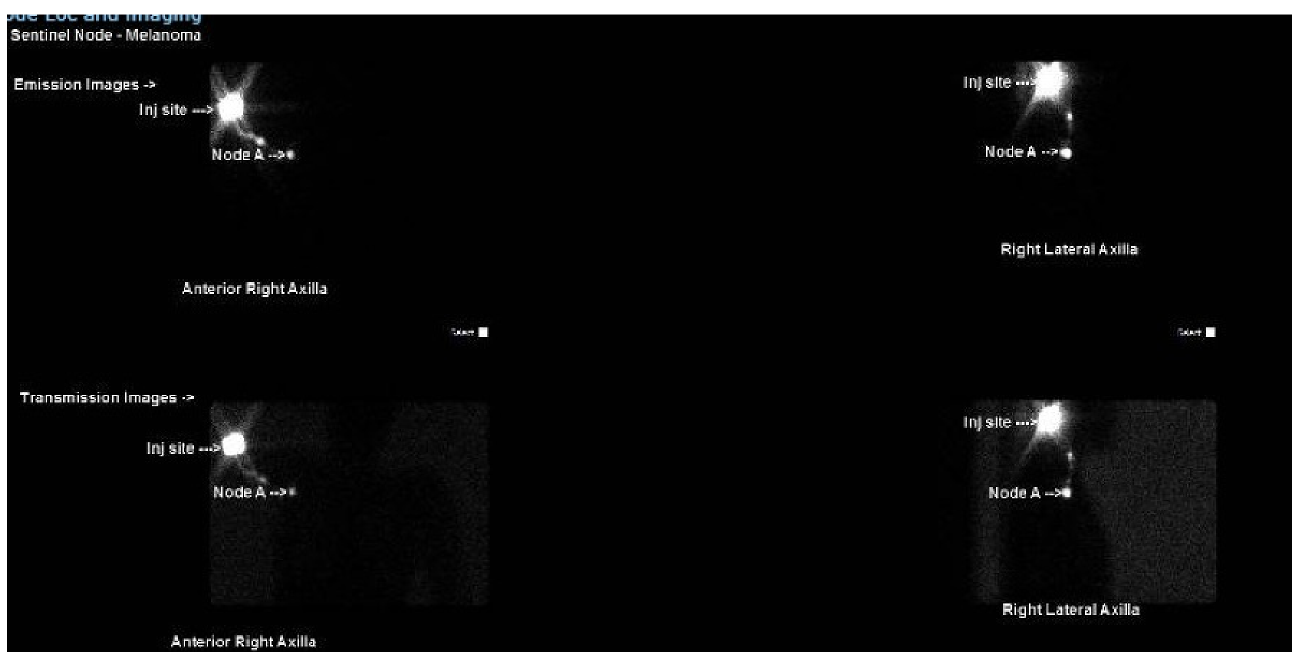

Figure 1. *Pre–wide local excision lymphoscintigram demonstrating a single axillary sentinel lymph node.*

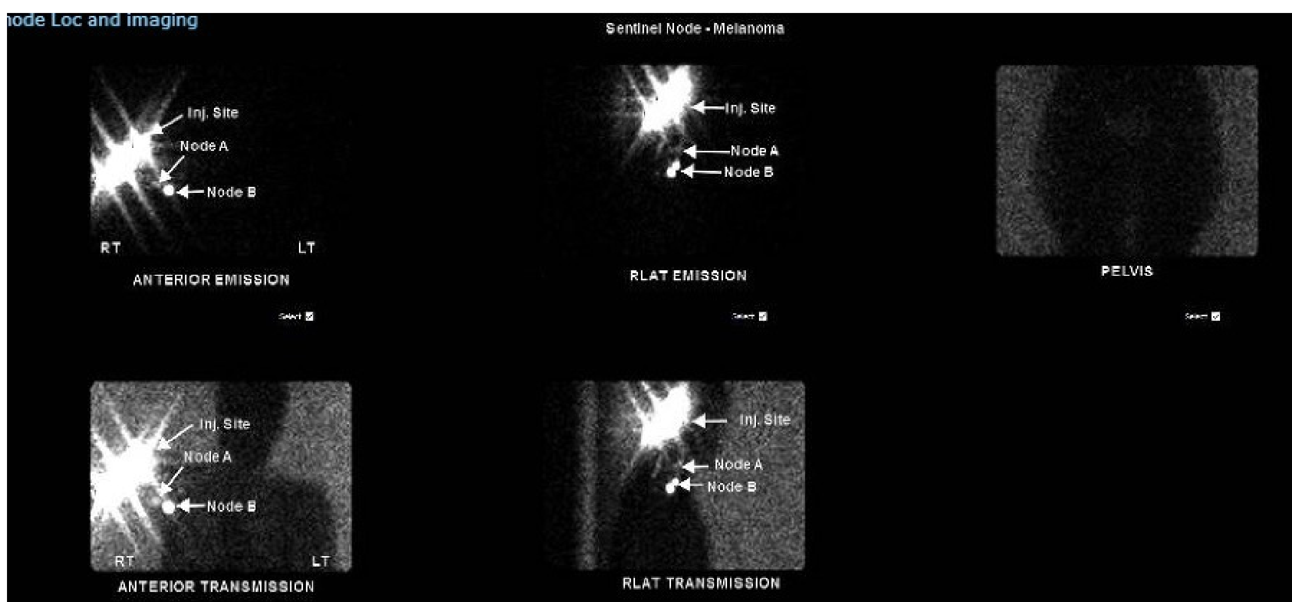

Figure 2. *Post–wide local excision lymphoscintigram demonstrating 3 axillary sentinel lymph nodes.*

were negative for melanoma. Ongoing clinical surveillance, 26 months post-procedure, revealed no evidence of melanoma recurrence.

Case Discussion

This represents the only reported case of a patient undergoing lymphoscintigraphy both pre- and post-WLE for melanoma. Comparison of the 2 lymphoscintigram results showed variation in sentinel node localization and lymphatic drainage patterns, raising important questions regarding the accuracy of delayed lymph node mapping and SLNB in melanoma.

Since its introduction in 1992 by Morton,[3] SLNB has significantly impacted the management and prognosis of cutaneous melanoma, reducing the number of patients undergoing elective lymph node dissection. The success of SLNB relies on accurate identification of the first lymph node(s) in a regional basin draining the primary melanoma site. When performed at the time of WLE, sentinel lymph node identification approaches 99% accuracy when combining preoperative lymphoscintigraphy with visual identification using injected dye.[4] In most cases, WLE and SLNB are performed in a single operation. Concomitant WLE and SLNB allow accurate lymphatic mapping relative to the primary site, minimize the

patient's total number of procedures, and optimize hospital resource use. However, some patients may be referred for delayed SLNB following prior WLE.

Delayed lymphoscintigraphy following WLE poses several challenges. First, radiolabeled colloid cannot be injected precisely into the primary site or recent biopsy scar. Injection into a scar after a WLE with 1–2 cm margins may instead identify a sentinel lymph node draining skin distant from the original tumor, potentially producing inaccurate results. Second, previous WLE may disrupt existing lymphatic channels, resulting in ambiguous drainage patterns and misidentified sentinel nodes.[5] Lymphatic drainage patterns in the extremities to axillary and femoral nodes are relatively predictable,[6] though Leong et al[7] found at least 1 sentinel node outside the predicted basin in 14% of upper extremity and 5% of lower extremity lesions, compared with 37% and 25% in head, neck, and trunk lesions, respectively. In our case, sentinel nodes draining the upper-arm melanoma were consistently identified in the predicted axillary basin. Wells et al[8] noted that lymphatic mapping after WLE increased the number of sentinel nodes per patient, though this difference was not statistically significant. This was reflected in our patient, in whom 3 nodes were identified on the second lymphoscintigram compared with 1 on initial mapping.

Leong et al[7] also reported that delayed SLNB after extremity WLE may provide valuable staging information. The absence of nodal recurrences in their delayed SLNB cohort suggests that the true sentinel nodes had likely been sampled. However, they caution against delayed SLNB in head and neck melanomas owing to unpredictable drainage patterns. McCready et al[9] reviewed 100 patients undergoing delayed SLNB after WLE and identified 2 false-negative SLNBs from truncal primaries, both involving rotational flap closure. Concerns about prior flap closure or excision margins greater than 2 cm in areas with ambiguous drainage, such as the head, neck, or trunk, have also been reported by other authors.[10-12] In our patient, the 2 cm WLE margin may have contributed to variation in mapping, although direct closure of the defect may have mitigated further variation.

Inter-physician variability may also have contributed. Although our institution uses a standardized lymphoscintigraphy protocol, the pre- and post-WLE scans were performed by 2 different nuclear medicine physicians. Vidal et al[13] demonstrated that standardized protocols provide excellent reproducibility even across different teams, though slight variation can occur, especially for lesions on the trunk or head and neck. SLNB in pregnancy presents additional considerations, including gestational age, blue dye use, radiation exposure, and general anesthesia. SLNB is generally considered safe after the first trimester using technetium-99m while avoiding blue dye owing to potential teratogenicity and risk of anaphylaxis.[14,15] Fetal radiation exposure is minimal, with an estimated dose of 5 mGy, which is well below the 50 mGy threshold associated with malformations.[16,17] General anesthesia is safest in the second trimester.[18,19] As our patient was in her first trimester, we prioritized WLE only under local anesthesia.

Conclusion

This is the first reported case comparing lymphoscintigrams in a patient both pre- and post-WLE for melanoma, demonstrating variation in sentinel node number and localization. As a single case, it does not provide sufficient evidence to guide recommendations on the role of delayed lymphoscintigraphy in melanoma. Nevertheless, in the absence, and likely impracticality, of larger prospective studies, it provides valuable insight into lymphatic channel behavior following WLE for melanoma.

Potential conflicts of interest

The authors declare no conflicts of interest.

References

1. Arnold M, Singh D, Laversanne M, et al. Global Burden of Cutaneous Melanoma in 2020 and Projections to 2040. *JAMA Dermatol*. 2022;158(5):495-503. doi:10.1001/jamadermatol.2022.0160. PMID:35353115

2. Thacoor A, Odili J. A perioperative protocol for the management of patent blue V dye-induced hypersensitivity reaction during sentinel lymph node biopsy for cutaneous melanoma. *J Plast Reconstr Aesthet Surg*. 2023;79:55-57. doi:10.1016/j.bjps.2023.01.023. PMID:36868172

3. Morton DL, Wen DR, Wong JH, et al. Technical details of intraoperative lymphatic mapping for early stage melanoma. *Arch Surg*. 1992;127(4):392-399. doi:10.1001/archsurg.1992.01420040034005. PMID:1558490

4. Perenyei M, Barber ZE, Gibson J, Hemington-Gorse S, Dobbs TD. Anaphylactic Reaction Rates to Blue Dyes Used for Sentinel Lymph Node Mapping: Systematic Review and Meta-analysis. *Ann Surg*. 2021;273(6):1087-1093. doi:10.1097/SLA.0000000000004061. PMID:33055586

5. Leong SP, Thelmo MC, Kim RP, et al. Delayed harvesting of sentinel lymph nodes after previous wide local excision of extremity melanoma. *Ann Surg Oncol*. 2003;10(2):196-200. doi:10.1245/aso.2003.08.002. PMID:12620917

6. Balch C. The role of elective lymph node dissection in melanoma: rationale, results, and controversies. *J Clin Oncol*. 1998;6:163-172. doi:10.1200/JCO.1988.6.1.163. PMID:3275746

7. Leong SP, Achtem TA, Habib FA, et al. Discordancy between clinical predictions versus lymphoscintigraphic and intraoperative mapping of sentinel lymph node drainage of primary melanoma. *Arch Dermatol*. 1999;135:1472-1476. doi:10.1001/archderm.135.12.1472. PMID:10606052

8. Wells KE, Joseph E, Ross M. Lymphatic Mapping for Melanoma Before and After Wide Local Excision: 4th World Conference on Melanoma. In: Melanoma Research; 1997:S105.

9. McCready DR, Ghazarian DM, Hershkop MS, Walker JA, Ambus U, Quirt IC. Sentinel lymph-node biopsy after previous wide local excision for melanoma. *Can J Surg*. 2001;44(6):432-434. PMID:11764876

10. Karakousis CP, Grigoropoulos P. Sentinel node biopsy before and after wide excision of the primary melanoma. *Ann Surg Oncol*. 1999;6(8):785-789. doi:10.1007/s10434-999-0785-x. PMID:10622508

11. Kelemen PR, Essner R, Foshag LJ, Morton DL. Lymphatic mapping and sentinel lymphadenectomy after wide local excision of primary melanoma. *J Am Coll Surg*. 1999;189:247-252. doi:10.1016/s1072-7515(99)00144-1. PMID:10472924

12. Evans HL, Krag DN, Teates CD, et al. Lymphoscintigraphy and sentinel node biopsy accurately stage melanoma in patients presenting after wide local excision. *Ann Surg Oncol*. 2003;10:416-425. doi:10.1245/aso.2003.05.009. PMID:12734091

13. Vidal M, Vidal-Sicart S, Torrents A, et al. Accuracy and reproducibility of lymphoscintigraphy for sentinel node detection in patients with cutaneous melanoma. *J Nucl Med*. 2012;53(8):1193-1199. doi:10.2967/jnumed.112.104463. PMID:22738926

14. Still R, Brennecke S. Melanoma in pregnancy. *Obstet Med*. 2017;10(3):107-112. doi:10.1177/1753495X17695001. PMID:29051777

15. Cragan JD. Teratogen update: methylene blue? *Teratology*. 1999;60(1):42-48. doi:10.1002/(SICI)1096-9926(199907)60:1. PMID:10413340

16. El-sayed Y, Heine RP, Wharton KR. Committee Opinion No. 723. *Obstet Gynecol*. 2018;132(3):786. doi:10.1097/AOG.0000000000002858

17. Schwartz JL, Mozurkewich EL, Johnson TM. Current management of patients with melanoma who are pregnant, want to get pregnant, or do not want to get pregnant. *Cancer*. 2003;97(9):2130-2133. doi:10.1002/cncr.11342. PMID:12712462

18. Broer N, Buonocore S, Goldberg C, et al. A proposal for the timing of management of patients with melanoma presenting during pregnancy. *J Surg Oncol*. 2012;106(1):36-40. doi:10.1002/jso.23035. PMID:22331751

19. Garbe C, Amaral T, Peris K, et al. European consensus-based interdisciplinary guideline for melanoma. Part 1: Diagnostics – Update 2019. *Eur J Cancer*. 2020;126:141-158. doi:10.1016/j.ejca.2024.115152. PMID:39700658