Extraordinary Lymph Drainage in Cutaneous Malignant Melanoma and the Value of Hybrid Imaging: A Case Report

Lindsay Brammen · Jakob Nedomansky ·
Werner Haslik · Anton Staudenherz

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Abstract In melanoma patients, preoperative lymphoscintigraphy has become a gold standard. The role of single-photon emission computed tomography (SPECT) or its combination with computed tomography (SPECT-CT) as part of the standard sentinel scintigraphy protocol has yet to be determined. A 46-year-old female patient with melanoma of the trunk received preoperative lymphoscintigraphy and subsequent surgical excision. Planar imaging displayed two hot spots in the region of the primary lesion. No other lymphatic flow pathways could be appreciated. Two focal hot spots, one dorsal to the primary lesion near the left latissimus dorsi muscle and one just lateral to the primary lesion in the subcutaneous tissue, were appreciated with SPECT-CT imaging. The primary melanoma lesion, as well as the two additional lesions, which were detected by SPECT-CT, were excised and sent for histopathological examination. While the primary lesion was a superficial spreading melanoma, the lesions appreciated in SPECT-CT revealed four sentinel lymph nodes, each of which was negative for tumor cells. Melanomas, especially of the trunk, can demonstrate multiple lymphatic drain basins in a large percentage of patients. Given that without the detailed anatomical information provided by SPECT-CT it would be very difficult to locate the diverse lymphatic drain basins and their lymph nodes, we would suggest routinely implementing SPECT-CT in the standard planar sentinel imaging protocol.

Keywords Melanoma · Sentinel lymph node · Lymphoscintigraphy · SPECT-CT

Introduction

Preoperative lymphoscintigraphy has become a gold standard in melanoma. However, the routine use of single-photon emission computed tomography (SPECT) or even its combination with computed tomography (SPECT-CT) as part of the standard sentinel scintigraphy protocol has not yet been established.

This case report describes a patient with malignant cutaneous melanoma with extraordinary lymph drainage to the back. A combination of preoperative lymphoscintigraphy with SPECT-CT providing precise anatomical information could enable the surgeon to locate the sentinel lymph nodes.

Case Report

A 46-year-old female patient with melanoma of the trunk was scheduled for wide excision and sentinel node removal. After signing an informed consent form, the patient received preoperative lymphoscintigraphy with intracutaneous injection of 30 MBq technetium-99m microcolloidal albumin (Nanocoll© Co. BSM). Planar imaging displayed two hot spots in the region of the primary lesion. No inguinal or axillary lymphatic flow could be appreciated. Subsequent SPECT-CT imaging confirmed two focal hot spots, one dorsal to the primary lesion approximately 3 cm below the skin level near the left latissimus dorsi muscle; the second hot spot was appreciated just lateral to the primary lesion in the subcutaneous tissue approximately 2.5 cm deep

L. Brammen (✉) · A. Staudenherz
Department of Biomedical Imaging and Image-guided Therapy,
Division of Nuclear Medicine, Medical University of Vienna,
Währinger Gürtel 18-20, A-1090 Vienna, Austria
e-mail: lindsay.brammen@meduniwien.ac.at

J. Nedomansky · W. Haslik
Department of Surgery, Division of Plastic and Reconstructive
Surgery, Medical University of Vienna, Währinger Gürtel 18-20,
A-1090 Vienna, Austria

(Fig. 1a–c). The melanoma, as well as the two hot lesions, one by the left 12th rib under the latissimus dorsi muscle as well as a further lateral lesion in the subcutaneous tissue above the abdominal muscles, detected with the aid of an intraoperative gamma probe, were surgically excised and sent for histopathological examination (Fig. 1d).

Histological examination of the primary lesion showed a superficial spreading melanoma, Clark level IV, Breslow 1.5 mm, excised in toto. Analysis of the lesions appreciated in SPECT-CT revealed four sentinel lymph nodes, each of which was inspected with hematoxylin and eosin (H&E) staining and serial sections, as well as immunohistochemical testing. All sentinel lymph nodes were negative for tumor cells.

Discussion

Studies have shown that SPECT-CT can supplement clinically relevant data in 50 % of patients as well as visualize additional sentinel lymph nodes in patients with multiple lymphatic drain basins in approximately 23 % of cases, resulting in a change in surgical approach in up to 35 % [1, 2]. Our patient not only belonged to the roughly 23 % of cases that demonstrate various lymphat-

ic drainage basins, but also her surgeon also altered his surgical approach to remove the sentinel nodes, which without the additional use of SPECT-CT would never have been accurately identified. The importance of SPECT-CT lies in its ability to allow for detailed anatomical information not only on the area where the SLN is located, including the number and size of the nodes, but also the relationship between the SLN and its surrounding structures [3]. The effective radiation dose to the patient during the planar images is approximately 0.1 mSv. While SPECT imaging does not expose the patient to further radiation, a low-dose CT emits approximately 2.8 ± 1.5 mSv [4]. However, a combination of SPECT-CT and planar imaging allows for identification of the sentinel lymph node with precise anatomical localization, resulting in increased surgeon confidence, especially in difficult surgical cases, as well as improved preoperative planning and possibly staging [1, 5]. Therefore, we believe that the additional radiation exposure and longer acquisition time are justified.

Given that melanomas, especially of the trunk, can present with multiple lymphatic drainage basins in a large percentage of patients, which cannot be precisely located without SPECT-CT, we would suggest routinely implementing SPECT-CT in the standard planar sentinel imaging protocol.

Fig. 1 **a** Planar (flood) image; primary lesion (red arrow), two focal hot spots (green and blue arrows). **b** SPECT-CT transaxial slice with primary (red arrow) and dorsal drainage (green arrow). **c** SPECT-CT transaxial slice with lateral drainage (blue arrow). **d** Primary lesion of the trunk with sentinel node excision

Disclosure

Conflict of Interest Lindsay Brammen, Jakob Nedomansky, Werner Haslik and Anton Staudenherz declare that they have no conflict of interest.

Informed Consent All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from the patient for being included in the study. Additional informed consent was obtained from the patient whose identifying information is included in this case report.

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