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Case Report

Reproducibility of Aberrant Lymphatic Drainage in a Melanoma Patient with Clinical History of Previous Axillary Lymph Node Dissection from a Breast Cancer: A Case Report

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Abstract

The reproducibility of pre-surgical lymphoscintigraphy for sentinel node mapping in melanoma is high and aberrant drainages may be predicted, especially when there are factors that alter migration of the radiopharmaceutical.

A 47 year-old patient with a clinic history of Li-Fraumeni syndrome, presence of multiple tumors and a previous right axillary lymph node dissection from a breast cancer was admitted in our centre. She presented a melanoma in her right flank and underwent a pre-operative lymphoscintigraphy in order to know the real lymphatic drainage. Lymphatic drainage was aberrant, with no drainage to right axilla not right groin. Keeping in mind these results, a surgery was planned and a second lymphoscintigraphy was performed showing a good concordance with the first one.

Keywords: Sentinel lymph node; Melanoma; Reproducibility; Lymphoscintigraphy

Case Presentation

We present a clinical case of a 47 year- old woman, with a family history concerning her mother with breast cancer at age of 43 years and osteosarcoma at 56 years. As for her personal history, she presented a congenital nevus excision in 2000, a diagnosis of choroidal melanoma in the right eye (T1aN0M0) in 2004, receiving ophthalmic brachytherapy (87.66Gy seed Iodine 125), presence of hepatic hemangiomas in 2008, and a breast cancer in 2011. This latter issue was located in right breast and biopsy showed a ductal infiltrated carcinoma (estrogen receptor 90%, progesterone receptor 10%, Ki 67 31% and HER2 Neu-positive). The patient underwent a total mastectomy with axillary lymph node dissection. Pathology evaluation of axillary lymph nodes showed macrometastasis (6 mm) in one out of 16 resected nodes. The patient received 6 cycles of chemotherapy plus 60Gy of radiotherapy and tamoxifen.

Genetic testing was performed showing hotspot mutation P53 and suggesting a Li-Fraumeni syndrome [1,2]. In 2014 bilateral oophorectomy was done due to her genetic risk.

In 2015 she consulted for a skin lesion in her right lateral trunk (flank). Skin biopsy demonstrated a superficial spreading melanoma (Breslow 1.11 mm, Clark level III, without ulceration, and 2 mitosis/mm2). Right axillary ultrasound did not show evidence of suspicious lymph nodes and a subsequent bone scan was performed without evidence of bone metastases.

The patient was admitted for wide local excision and sentinel lymph node biopsy. However, due to her previous axillary surgery, chemotherapy and radiotherapy, some concerns about the adequateness of this scheme arose. Thus, a previous lymphoscintigraphy was performed only to know the current drainage from this skin lesion.

Lymphoscintigraphy was performed after intradermally injection of 37 MBq of albumin nanocolloid (Nanocoll®, GE, Saluggia, Italy). The dose was splitted in 4 points surrounding the biopsy scar (Figure 1). Static and SPECT/CT images showed several hotspots which were depicted in central lumbar region, right paracostal area, ipsilateral costovertebral joints (D10-D12) and some other deposits in mediastinal and left supraclavicular regions (Figure 1). Interestingly, there were no evidence of nodes in right axillary or inguinal basins.

With this information, it was decided to plan the surgery and perform the sentinel node biopsy in those locations with easy access (namely, in-transit paracostal nodes) in order to avoid morbidity. A month later, a new lymphoscintigraphy (with the same schedule, but with an injection of 111 MBq the day before surgery) was performed (Figure 2).

The static and SPECT/CT images did not demonstrate differences between the first study and latter one (Figure 3). During surgery, a portable gamma camera and a hand-held gamma probe were used to better localise the hotspots corresponding to paracostal sentinel nodes. However, although there were no difficulties for searching and finding the paracostal hotspots, the macroscopic appearance of the specimen was fibroadipose tissue and pathologic study demonstrated no lymphatic node presence and no metastatic deposits in this tissue.

It was decided not to remove other potential sentinel nodes (paravertebral, supraclavicular) and follow-up with clinical and imaging tests was scheduled.

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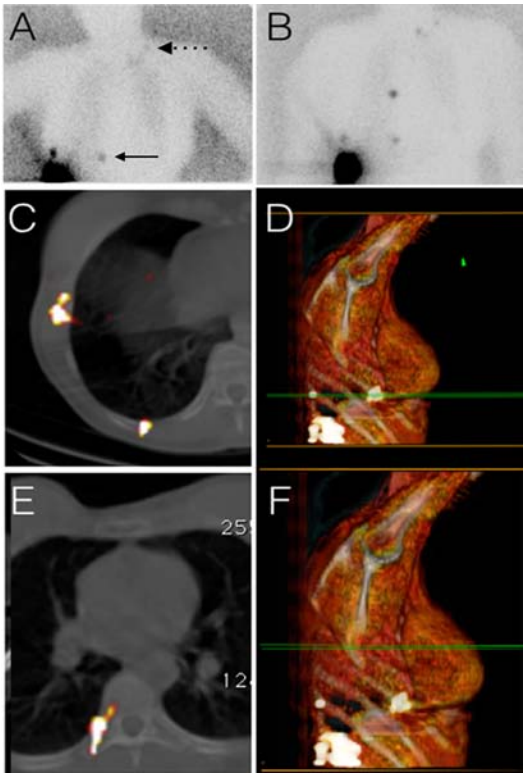

Figure 1: Lymphoscintigraphic planar image corresponding to the anterior thoracic area. The image depicts a high-intensity hot spot located upper to the injection site and another, less intense, hot spot medially (arrow). In left supraclavicular area there is another faint hot spot (dotted arrow) (A). The anterior view performed at 120 min after injection showed some more hot-spots, especially in medial area (mediastinum) (B). Axial slice of SPECT/CT fused image showing two hot spots in right paracostal area (C). Volume rendering reconstruction showing the location of these nodes (D). Axial slice of SPECT/CT fused images in an upper level showing uptake near costovertebral area (E). Volume rendering image that shows the level of the previous commented slice.(F).

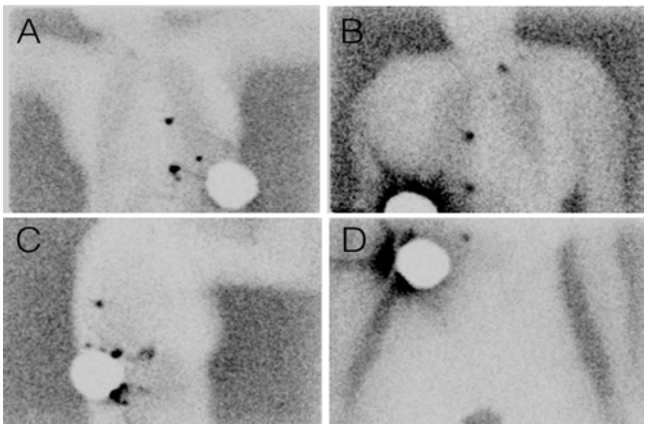

Figure 2: Presurgical lymphoscintigraphy. Posterior view showing three different hot spots in paracostal and paravertebral area (A). Anterior view with several hot-spots in a distribution similar to Figure 1B (B). Right lateral view (C). Anterior view of abdominal/inguinal area showing no uptake in groin basins (D).

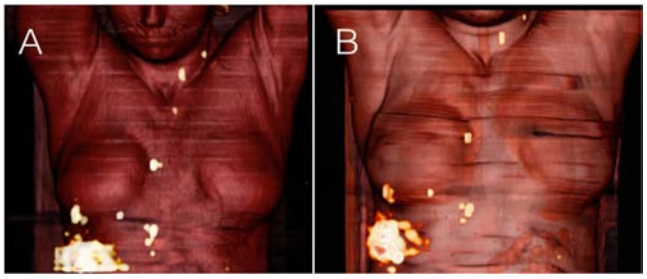

Figure 3: Volume rendering reconstruction of both different studies in the same patient showing the reproducibility of lymphatic mapping. Basal study (A) and preoperative study (B).

Discussion

The reproducibility of lymphoscintigraphy is quite high and previous studies have shown a reproducibility rate in the range of 80%-85% [3,4]. A lack of reproducibility increases the risk of melanoma recurrence and false negative results [5,6]. Many factors may influence the concordancy, such a body hydratation, physical activity, intradermal injection precision, a previous chemotherapy, and surgery in the site of potential drainage.

This case is an example of the good reproducibility of lymphoscintigraphy for lymphatic mapping, even in complex cases. This issue was formerly described by Jansen et al, Rettembacher et al. and Vidal et al, with a concordance rate between two series of lymphoscintigraphies of 86%, 84% and 96%, respectively [5-7]. In this case, the previous right axillary lymph node dissection and subsequent chemotherapy possibly precluded an adequate drainage to the axilla and aberrant drainage was depicted.

In cutaneous melanoma predictability of lymphatic drainage depends on the anatomical location of primary lesions. The findings of lymphoscintigraphy modify the concept of Sappey about lymphatic watersheds and ambiguous skin drainage at either side of the midline of the trunk (for right-left drainage), and/or the line between a point 2 cm above the umbilicus and the level of the second lumbar vertebra on the back (for cranial or caudal drainage). In the trunk, melanomas of the flank may drain to the groin and/or to the axilla. For melanomas of the trunk the variability in drainage is higher than for the extremities and can reach a 60% rate for the dorsal locations [8].

It is well-known that the skin of the torso is one of the zones with more unpredictable lymphatic drainage and lymphoscintigraphy is mandatory for an accurate lymphatic mapping [9,10]. Exceptions to the expected patterns of lymphatic drainage were demonstrated, for this reason the lymphoscintigraphy should be performed before wide local excision.

Thus, the majority of the thorax area drains to the axilla as well as to supraclavicular, upper parasternal, diaphragmatic, and mediastinal nodes. These figures are in concordance with the studies done by Reynolds et al, based on the database of Melanoma Institute Australia [11]. On the other hand, some multiple metaanalysis suggest that sentinel node identification rates can be more than 90% and false-negative results less than 12% in sentinel node biopsies after neoadjuvant chemotherapy [12,13].

Neoadjuvant chemotherapy causes many challenges to the sentinel node biopsy, the drainage may be distorted by fibrosis,

tumor characteristics, and other different factors, and provide an important prognostic information and are feasible in 80% or more of the patients. However there are several limitations associated with non–randomized studies, and the combination of different imaging techniques can be useful [14-16].

Each neoadjuvant chemotherapy patient must be evaluated individually as to whether a lymphoscintigraphy procedure is appropriate and, if so, when it should be performed. The aberrant drainage showed this clinical case is not rare.

On the other hand, there is experience in breast cancer that previous surgery implies a higher risk for the development of tissue changes that cause alterations in vessels organization and function, produce fibrosis, and dermal congestion. All that changes depend of the radiation dose, volume of irradiated tissue, the tissue disruption extent of lymphadenectomy. Thus, the appliance of these therapeutic approaches is a factor of lymphatic distortion [20].

Our patient showed a very aberrant lymphatic drainage, with paracostal interval hotspots and nodes in mediastinum and paravertebral areas. Interval sentinel nodes are present in approximately 10% of melanoma patients and about 20% of them may be metastatic sentinel nodes in recognised node fields. If a positive interval sentinel node is found, completion of lymphadenectomy of the recognised lymph node field is only recommended if a sentinel node in this field is also positive [11].

In summary, although this patient presented a complex drainage from her melanoma, enhanced by the fact of previous surgery, chemotherapy and radiotherapy, the use of preoperative lymphoscintigraphy defined the potential lymphatic spread with excellent concordance between two studies performed at different time dates.

Conclusion

Lymphoscintigraphy is a highly reproducible and accurate method to identify the location of sentinel nodes in patients with factors that can distort lymphatic drainage, mainly when primary lesions are located on the trunk, like this case. This confirms that the pre-operatory lymphoscintigraphy is useful for planning surgery, supporting the accuracy of the procedure in clinical routine practice.

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