Chirurgia (2016) 111: 87-89
No. 1, January - February

Pitfalls in Cutaneous Melanoma Lymphatic Drainage

Silviu Voinea[1], Angela Sandru[1], Mirela Gherghe[2]

[1]Department of Surgical Oncology, Carol Davila University of Medicine and Pharmacy, Alexandru Trestioreanu Oncologic Institute, Bucharest
[2]Department of Nuclear Medicine, Alexandru Trestioreanu Oncologic Institute, Bucharest, Romania

Rezumat

Capcanele drenajului limfatic multiplu în melanoamele cutanate

Biopsia ganglionului santinelă (GS) a devenit standard în stadializarea melanomului cutanat. Cum drenajul limfatic al pielii este complex, aprecierea empirică preoperatorie a localizării tuturor GS este practic imposibilă. De aceea pentru identificarea tuturor bazinelor limfatice regionale corespunzătoare unei anumite tumori primare este obligatorie realizarea limfoscintigrafiei preoperatorii. În cele ce urmează vom prezenta un caz clinic care subliniază importanța identificării, biopsiei și analizei histologice a tuturor GS în vederea realizării unei stadializări corecte a pacientului, urmată evident de un tratament adecvat stadiului clinic real al bolii.

Cuvinte cheie: melanom cutanat, ganglion santinelă, limfoscintigrafie, drenaj limfatic multiplu

Abstract

Sentinel node (SN) biopsy has become standard in staging of cutaneous melanoma. As skin lymphatic drainage is complex, preoperative empirical assessment of SN localization is virtually impossible. Therefore in order to identify all regional lymphatic basins corresponding to a specific primary tumor is mandatory to carry out preoperative lymphoscintigraphy. In this paper we present a clinical case that highlights the importance of identifying, biopsy and histological analysis of all SN in order to achieve a correct staging of the patient, followed by appropriate treatment according to the real clinical stage of the disease.

Key words: cutaneous melanoma, sentinel node, lymphoscintigraphy, multiple lymphatic basin drainage

Corresponding author: Angela Sandru MD, PhD
Department of Surgical Oncology
Alexandru Trestioreanu Oncologic Institute
Fundeni Street, No: 252, sector 2
Bucharest, 022338, Romania
E-mail: sandruangela@gmail.com

Introduction

Cutaneous melanoma (CM) is considered a neoplasia with lymphatic tropism because most often it develops metastases to regional lymph nodes, in up to 50% of cases in some reports, depending on primary tumor location (1). According to incubator theory supported by Morton et al. (2) malignant cells initially migrate via lymphatic pathway to a first node, called sentinel node (SN) and only afterwards metastasize to distant sites. If this theory is true, then identification and microscopic analysis of all SN is essential for correct staging of patients with melanoma and their subsequent treatment according to real clinical stage.

The widespread use of lymphoscintigraphy (LS) has demonstrated that lymphatic drainage of the skin is not nearly as simple as that described by Sappey. SN location in a particular lymph node basin may be clinically estimated with fairly high accuracy only for limb melanomas, although nor in this

situation, lymphatic drainage to a minor basin or an interval ganglion cannot be excluded. Instead lymphatic drainage of trunk melanomas is complex, in a significant percentage of cases unpredictable, to more than one lymphatic basin, and almost impossible to predict clinically. In these cases, dynamic lymphoscintigraphy is essential for both identification of all regional lymphatic basins and differentiation of SN from the second or third echelon lymph nodes situated on the same lymphatic path.

Case presentation

To illustrate the truthfulness of the above mentioned statements we report the history of a patient with a trunk CM. A 65 years old Caucasian male presented to our clinic with a pigmented skin tumor of 1.5/1 cm in the left interscapulovertebral region. In order to establish the definitive diagnosis, but at the same time not to jeopardize the accuracy of subsequent intervention, we practiced a narrow margin excisional biopsy (1-3 mm). The histological report confirmed the diagnosis of a nonulcerated superficial spreading melanoma, Clark IV, Breslow = 3 mm, mitotic index = 6 mitoses/mm^2, without lymphovascular or perineural invasion (pT3a).

CT scan of the brain, torax, abdomen and pelvis raised no suspicion of distant metastases. Considering the results we set the indication of SN biopsy (SNB). Because we intuitively appreciated that the tumor could have bilateral axillary drainage, the patient was subjected to an ultrasound of both axillary regions that revealed morphologically normal lymph nodes.

In Oncologic Institute of Bucharest in order to identify SN we use peritumoral (or pericicatricial) intradermal injection of Nanocoll with dynamic tracking of the radiotracer migration in the first 20 minutes, highlighting all afferent lymph vessels and the corresponding lymph nodes. The procedure continues with the acquisition of static images during the first 2 hours after injection, at 15-20 minutes intervals, and ends with marking the SN location on the overlying skin.

For patient under discussion, visualization of primary tumor lymphatic drainage has provided a real surprise. Since the first minute after radiotracer injection four distinct drainage directions have emerged: right and left axillary fossae, right supraclavicular fossa and left middle laterocervicale region.

4 hours post-injection, the patient was brought to the operating room where, using a gamma probe, we checked the presence of radioactivity in the areas pointed out by lymphoscintigraphy. As recorded signal in all above mentioned regions has exceeded several hundred units, we decided to biopsy SN from all the 4 basins. We identified and excised eight SN: four SN were removed from the left axilla, one SN from the left laterocervical region, another two SN were withdrawn from the right supraclavicular fossa and one SN from the right axilla. Pathological report highlighted once again the importance of assessing all SN, because neoplastic cell have been found in just a single lymph node, the left laterocervical one. Metastatic focus size was less than 0.1 mm.

Discussion

Considering the final results of MSLT1 (3), there is no longer any doubt regarding the usefulness of SNB not only for staging cutaneous melanoma but also for planning subsequent therapeutic strategy. The superiority of this concept compared to the classic technique of elective lymphadenectomy is the fact that it allows the surgeon to visualize in real time the primary tumor lymphatic drainage towards the regional lymph nodes basins, with identification of the first lymph node (one or more) situated along the afferent vessel, followed by its excision and analysis (4).

In our clinic, SNB is routine practice for all melanoma patients with Breslow index higher than 1mm, as well as for those with thin melanomas but with negative prognostic

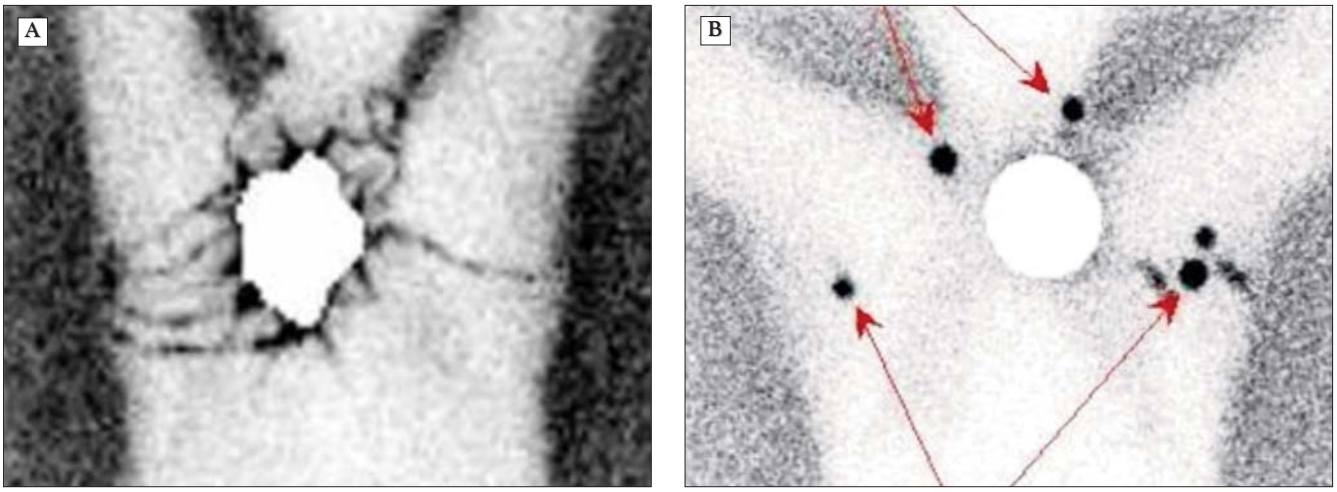

Figure 1. *(**A**) Posterior image 2 minutes after radiotracer injection with visualization of multiple lymphatic channels in various directions; (**B**) Anterior image 5 minute after injection: the arrows point out the SN from the four lymphatic basins*

factors, as long as paraclinical investigations rule out the presence of regional and distant metastasis.

In most patients lymphoscintigraphy identifies a single regional lymph node basin, in which there may be one or more SN depending on the number of afferent lymphatic vessels that leave from the primary tumor and their trajectory.

In literature, multiple lymphatic basin drainage (MLBD) is found in varying percentages, between 11% (5) and 36% (6), depending on several factors: the proportion of CM located in the trunk or head and neck region, the type of radiotracer used and the injection method. In the patient presented above, the length of postoperative scar was 5 cm and therefore we preferred intradermal injection in 4 separate points: at the ends of the scar and in the middle of it, on one side and the other.

In the group of melanoma patients treated in our clinic, lymphoscintigraphy showed lymphatic drainage in at least two different lymphatic basins in 16% of patients (7). This percentage increases significantly if we take into account only CM localized on the trunk, reaching around 30%. Both in our statistics, as well as in literature, the maximum number of regional lymph node basins identified was 4.

Given that in 70-90% of patients with metastatic SN, no other invaded regional nodes are found after achieving complete lymphadenectomy (8, 9), the question of whether lymphadenectomy is not an excessive maneuver in case of a SN with micro metastases raises. If the metastatic focus found in a SN measures less than 0.1 mm, the likelihood that other lymph nodes from the same basin to be invaded is small enough, around 2%, to spare the patient from a new surgery (10).

Considering these data, as well as the complexity of neck lymphadenectomy and its associated morbidity, multidisciplinary team has decided that the patient may be exempt from this intervention and will be monitored every 3 months by ultrasound of the involved lymphatic basins.

What is the impact of primary tumor multiple lymphatic basins drainage for patient evolution? Does MLBD involve an additional risk for the patient? Should patients be worried that instead of one incision, they will have 2, 3 or even 4 cuts? We address these questions because some of our patients are concerned about the MLBD presence and find it quite difficult to understand the concept behind the method. And we cannot fully clarify this issue for them, as literature data is conflicting.

MLBD impact on survival of melanoma patients is a highly debated topic. Some authors consider that the existence of several lymphatic channels to the same lymphatic basin or towards different ones is a risk factor for relapse and metastasis, because the presence of more afferent vessels could facilitate the dissemination process (11, 12). But previous statement is contradicted by other studies that claim that identification of several SN in several distinct lymph basins does not influence either overall survival or disease free survival (13, 14). Our experience doesn't allow us to have an opinion on this matter yet.

Conclusions

We believe that this clinical case is illustrative for the importance of dynamic lymphoscintigraphy in investigation of patients with localized cutaneous melanoma. It also highlights the need to biopsy all identified SN, no matter how unexpected is their location, because the pathological status of a SN reflects only the condition of the lymphatic basin to which it belongs, and cannot be extrapolated to other regional basins.

References

1. Zbytek B, Carlson JA, Granese J, Ross J, Mihm MC Jr, Slominski A. Current concepts of metastasis in melanoma. Expert Rev Dermatol. 2008 Oct;3(5):569-585.
2. Morton DL, Cochran AJ. The case for lymphatic mapping and sentinel lymphadenectomy in the management of primary melanoma. Br J Dermatol. 2004 Aug;151(2):308-19.
3. Morton DL, Thompson JF, Cochran AJ, Mozzillo N, Nieweg OE, Roses DF. et al. Final trial report of sentinel-node biopsy versus nodal observation in melanoma. N Engl J Med. 2014 Feb 13;370(7):599-609
4. Sandru A, Bordea CI, Voinea SC, Gherghe M, Albert P, Condrea I, Blidaru A. [Latest approaches in the surgical treatment of cutaneous malignant melanoma]. Chirurgia (Bucur). 2011;106(3): 301-8.
5. Kroon HM, Lowe L, Wong S, Fullen D, Su L, Cimmino V, et al. What is a sentinel node? Re-evaluating the 10% rule for sentinel lymph node biopsy in melanoma. J Surg Oncol. 2007;95(8):623-8.
6. Uren RF, Howman-Giles R, Thompson JF. Patterns of lymphatic drainage from the skin in patients with melanoma. J Nucl Med. 2003;44(4):570-82.
7. Voinea S, Sandru A, Gherghe M, Blidaru A. Peculiarities of lymphatic drainage in cutaneous malignant melanoma: clinical experience in 75 cases. Chirurgia (Bucur). 2014;109(1):26-33
8. Sabel MS, Griffith K, Sondak VK, Lowe L, Schwartz JL, Cimmino VM, et al. Predictors of nonsentinel lymph node positivity in patients with a positive sentinel node for melanoma. J Am Coll Surg. 2005;201(1):37-47.
9. Cascinelli N, Bombardieri E, Bufalino R, Camerini T, Carbone A, Clemente C, et al. Sentinel and nonsentinel node status in stage IB and II melanoma patients: two-step prognostic indicators of survival. J Clin Oncol. 2006;24(27):4464-71.
10. van Akkooi AC, de Wilt JH, Verhoef C, Schmitz PI, van Geel AN, Eggermont AM, et al. Clinical relevance of melanoma micrometastases (<0.1 mm) in sentinel nodes: are these nodes to be considered negative? Ann Oncol. 2006;17(10):1578-85. Epub 2006 Sep 12.
11. Jacobs IA, Chang CK, Salti GI. Significance of dual-basin drainage in patients with truncal melanoma undergoing sentinel lymph node biopsy. J Am Acad Dermatol. 2003;49(4):615-9.
12. Wall JK, Florero M, Accortt NA, Allen R, Kashani-Sabet M, Morita E, et al. Impact of multiple lymphatic channel drainage to a single nodal basin on outcomes in melanoma. Arch Surg. 2007;142(8):753-7.
13. Porter GA, Ross MI, Berman RS, Lee JE, Mansfield PF, Gershenwald JE. Significance of multiple nodal basin drainage in truncal melanoma patients undergoing sentinel lymph node biopsy. Ann Surg Oncol. 2000;7(4):256-61.
14. Jimenez RE, Panageas K, Busam KJ, Brady MS. Prognostic implications of multiple lymphatic basin drainage in patients with truncal melanoma. J Clin Oncol. 2005;23(3):518-24.