Tattoo Pigment Interpreted as Lymph Node Metastasis in a Case of Subungual Melanoma

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Abstract We present a patient with subungual melanoma of the thumb who, during radioisotope-guided selective sentinel lymphadenectomy, was found to have black, hard lymph nodes at multiple axillary node levels. This finding was interpreted intraoperatively as clinical evidence of metastasis and a formal axillary dissection was carried out. Pathological examination of excised nodes failed to demonstrate metastasis but instead showed collections of tattoo pigment.

Keywords Melanoma · Tattoo · Pigment · Sentinel node

Introduction

Longitudinal nail pigmentation (melanonychia) is a common abnormality that can be associated with either benign

or malignant conditions [5]. Concern in dealing with these lesions relates to the consequences of missing a rare but potentially life or limb threatening subungual malignant melanoma.

Prognosis in malignant melanoma in general depends on gender and tumor thickness, size, depth of invasion, location, ulceration, and metastasis. Specifically, with subungual malignant melanoma, a review of 93 cases demonstrated that metastasis, histological depth of invasion, race, and ulceration have prognostic value in predicting survival [14].

Detection of lymph node metastasis in malignant melanoma is accomplished initially by clinical exam, and, when indicated, by operative evaluation for occult metastasis by the utilization of sentinel node biopsy [8, 12]. If, during performance of sentinel lymph node biopsy, gross disease is encountered, complete lymph node dissection of the involved basin is indicated [7]. Confusion in gross evaluation of pigmented nodes can occur in the presence of tattoos in the area drained by the nodes in question when it is the tattoo not the tumor that is responsible for node color. Several previous reports of such a clinical error have occurred in the dermatology and plastic surgery literature [1, 2, 6, 9, 13, 15, 16]. We now present an additional case as a cautionary note in the hand surgery literature.

Case Report

A 48-year-old man was referred to hand clinic following biopsy of subungual pigmentation that proved to be an invasive Clark's Level IV melanoma. Clinical examination showed multiple longitudinal melanonychia and extension of pigmentation into the pulp of the involved left thumb (Fig. 1). An incidental finding was multiple faded and

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Figure 1 a Striae present in subungual area of thumb. b Pigmentation extending into pulp of thumb tip.

indistinct amateur tattoos on the upper extremity. A chest radiograph was negative for metastasis and liver function tests were within normal limits. Amputation with sentinel lymph node biopsy was recommended.

Figure 2 Darkly pigmented nodes present in ipsilateral axilla.

Figure 3 Follow-up demonstrating level of amputation and adequate opposition.

Prior to surgery sentinel node localization was accomplished with ^{99m}Tc Technecium-labeled sulfur colloid injection around the tumor site followed by lymphoscintigraphy-guided skin marking. Intraoperatively, the mark was then confirmed by a hand-held gamma counter and the node isolated. The identified sentinel node, as well as additional surrounding nodes, were found to be uniformly black, and hard (Fig. 2). The blackened sentinel node was transported to the pathology lab where the on-duty pathologist felt that, without histocytochemistry, metastasis could not be definitively ruled out. The pathologist also expressed concern that the nonmelanotic pigment present was so dense that it might not be possible even with a more complete examination to completely rule out micrometastasis. Based on this information the decision was made to perform an axillary lymph node dissection including levels I, II, and III. Following completion of the axillary dissection, the

Figure 4 Histopathology demonstrating the density of ink pigment present within the nodes.

thumb was amputated at the level of the distal proximal phalanx (Fig. 3).

Final complete pathological examination failed to demonstrate macro- or micrometastasis in the excised nodes. Node discoloration was attributed to ink particles within the node (Fig. 4). The tumor was confirmed to be a Clark's Level IV melanoma. The patient was presented to the institutional multidisciplinary oncology board and no adjuvant chemotherapy was recommended. Three-month follow-up demonstrated no lymph edema in the involved extremity.

Discussion

The importance of node status in melanoma is evident in the new melanoma staging system of the American Joint Committee for Cancer (AJCC) that takes into account the number of metastatic lymph nodes as well as whether there are macro- or micrometastases in the evaluated lymph node [3]. The AJCC's evaluation of prognostic factors based on 17,600 melanoma patients showed that regional nodal status is the most powerful indicator of prognosis and exceeds any other tumor feature [3, 4].

Lymph node sampling in melanoma has evolved from elective node dissection of known drainage basins to selective sentinel node lymphadenectomy [8, 11]. The sentinel lymph node is defined as the first lymph node or nodes that receive metastasis from the primary tumor. Sentinel node biopsy is performed to determine whether micrometastases are present in the absence of gross disease. Micrometastasis to the node may be sequential, with early intracapsular involvement followed by seeding of deeper regions [10]. Both levels of invasion appear to carry the same indication for complete dissection of the involved lymph node basin.

Labeling of the sentinel node may be with radioisotope, blue dye, or both. This technique for lymph node evaluation is now well-established in evaluation of patients with melanoma as well as breast cancer and is the accepted standard for lymph node evaluation. However, when clinically evident gross disease is present, a complete dissection of the affected basin is still recommended [7].

The appearance of a lymph node affected by metastatic melanoma may initially demonstrate no visual abnormalities; however, with growth the node demonstrates a progression to readily visible small black nodularities. With further advancement the node may be completely overtaken by melanoma cells and appear uniformly dark, firm, and enlarged. Lymph nodes stained by pigment from decorative tattoos should be more normal in size and texture and should never demonstrate the stage of discrete small black nodules seen with early melanoma metastasis.

Histologically the pigmentation present with melanoma should be susceptible to bleaching agents while pigment from tattoos is resistant to bleaching. If the node is not overwhelmed by tattoo pigment to the point where normal histology is hard to visualize, then tattoo pigment should be associated with histiocytes instead of distinct atypical melanocytes with high mitotic activity.

Interestingly, the first report of tattoo pigment mimicking nodal metastasis in melanoma also involved an invasive malignant melanoma of the left thumb where a pigmented axillary node was later attributed to tattoos on the involved extremity [2]. This was followed 10 years later by an additional report of this potential source of clinical error [1]. In 2001 the first report of a sentinel node being clinically interpreted as evidence of metastasis occurred [13]. Four additional reports involving five patients have followed these initial cases. In all cases the nodal basin involved was the axilla; the primary tumor location was unknown in two cases, on the trunk in two cases and on the upper extremity in the remaining four cases.

The hand surgeon often serves as a referral resource for cutaneous tumors of the upper extremity. If he is involved in the treatment of melanoma, sentinel node biopsy may come within the scope of his practice. This patient and the eight previously reported patients support a call for caution when dealing with lymph node sampling in upper extremity patients with tattoos on the involved limb, or in other areas drained by the same nodal basin.

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