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Epitrochlear Sentinel Lymph Nodes in Melanoma: Interval or Independent?

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Abstract

Most primary melanomas on the distal upper extremity metastasize to a sentinel lymph node (SLN) in the axillary basin, but occasionally a primary melanoma will drain to the epitrochlear basin. The relationship between tumor-draining axillary and epitrochlear SLNs is unclear. We hypothesize that the epitrochlear SLN functions in an interval manner with the axillary lymph node basin. We queried our melanoma database to identify patients who underwent SLN biopsy for a distal upper-extremity melanoma. Patient demographics, tumor characteristics, patterns of nodal drainage and incidence of SLN metastasis were analyzed. Of 255 patients identified, 38 (14.9%) had an epitrochlear SLN. Mean Breslow thickness was 2.26 mm. All patients with epitrochlear drainage had concurrent axillary drainage and underwent axillary and epitrochlear SLN biopsies. Of these 38 patients, two (5.2%) had epitrochlear and axillary SLN metastasis, four (10.5%) had epitrochlear metastasis only, four (10.5%) had axillary metastasis only, and the remaining 28 (73.7%) had tumor-free SLNs. The invariable association of epitrochlear and axillary drainage in this study suggests that epitrochlear nodes function in an interval role with the axillary lymph node basin. Therefore we recommend that all patients with a positive epitrochlear SLN undergo completion axillary dissection.

INTRODUCTION

The identification of lymph node metastasis remains one of the single most important prognostic indicators for melanoma. As first described by Morton and colleagues in 1992, the sentinel lymph node (SLN) is the first lymph node to receive direct lymphatic drainage from a primary tumor site.¹ The technique of SLN biopsy (SNB) is accepted as the method of staging regional lymph nodes in patients with melanoma. In the majority of cases the SLN is located in either the cervical, axillary, or inguinal basin.² However approximately 5% to 8% of melanomas drain initially to anomalous nodal basins such as the intermuscular triangle space of the back, the popliteal fossa, or the epitrochlear region.^{3–6} These additional nodes have been referred to as interval, in-transit, ectopic, or intercalated.^{3,7}

Melanomas of the distal upper extremity have the potential to metastasize to the epitrochlear basin.^{8–10} Literature regarding the management of epitrochlear SLNs in cutaneous melanomas is limited. Reported rates of epitrochlear involvement in patients with a melanoma of the distal upper extremity vary from 3% to 20%.^{7–9} In order to further clarify the management of epitrochlear SLNs, we determined the frequency of lymphatic drainage to epitrochlear SLNs, the rates of synchronous drainage to the axillary basin, clinical

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features of patients with an epitrochlear SLN, and patterns of nodal involvement in the epitrochlear and axillary basins.

METHODS

The melanoma database at the John Wayne Cancer Institute contains more than 15,000 records from 1971 to 2010. We queried this database to identify patients who underwent SNB for a primary melanoma on the upper extremity. We routinely perform SNB for cutaneous primary melanomas with high-risk characteristics.

Our lymphatic mapping technique uses blue dye and radiocolloid to identify SLNs¹; in addition, carbon dye may be used for histopathologic confirmation of SLN identity and to pinpoint the intranodal site most likely to contain tumor cells.¹¹ For preoperative lymphoscintigraphy,¹ 0.5 to 1.0 mCi of ultrafiltered technetium-99m (Tc 99m) sulfur colloid is injected intradermally at the primary site. A rectangular gamma camera equipped with a high-resolution collimator is used to perform immediate dynamic imaging to follow the course of the lymphatic collecting vessels. Static images are obtained after delays of 10 minutes and 2 hours. Delayed image acquisition is performed at both the epitrochlear and axillary basins in all melanomas of the distal upper extremity. We define SLNs as nodes directly receiving lymphatic channels and retaining tracer on delayed images. We also use the hand-held gamma probe to screen the epitrochlear and axillary basins intraoperatively. At the beginning of the surgical procedure, 1 to 2 ml of a mixture containing 1% isosulfan blue dye and carbon dye is injected intradermally in 4 quadrants at the site of the primary tumor.¹² SNB is performed before wide local excision of the primary site. All blue nodes and all nodes with a level of radioactivity higher than background are removed. The epitrochlear and axillary basins are treated as separate basins in regard to radioactivity counts.

For standard histologic evaluation, permanently fixed sections of each SLN are examined with hematoxylin and eosin staining and immunohistochemical staining for melanoma-specific markers. Complete nodal dissection is offered to any patient whose nodal basin contains a tumor-positive SLN. We recommend concurrent epitrochlear and axillary complete lymphadenectomy for patients who have dual-basin drainage and a positive epitrochlear SLN, regardless of axillary SLN status, unless all epitrochlear lymph nodes have been removed during epitrochlear SNB.

Data regarding patient demographics, primary tumor site, lymphoscintigraphic mapping, intraoperative findings, pathologic analysis, and additional surgery were retrieved for analysis. Patients were grouped by drainage basin for comparison. Student *t*-test or chi-square analysis was used to compare patient-related and primary tumor-related factors according to SLN site and tumor status. A *p* value of <0.05 was considered significant. The study was determined to be exempt from institutional board review.

RESULTS

During our study period, 255 patients underwent lymphoscintigraphy for a distal upper-extremity melanoma. Thirty-eight (15%) had drainage to the epitrochlear basin and underwent epitrochlear and axillary SNB procedures; 217 (85%) patients had no uptake in the epitrochlear basin and underwent axillary SNB only. There were no differences in age at diagnosis, male:female ratio, mean Breslow depth, Clark's level, or rate of ulceration between patients with axillary-only drainage and those with epitrochlear drainage (Table 1).

Of the 217 patients with primary melanomas draining only to the axillary basin, 168 (77.4%) had primaries on the forearm, 25 (11.5%) on the hand or fingers, and 24 (11.1%) under the

nail. Of the 38 patients with primary melanomas draining to the epitrochlear basin, 23 (60.5%) had primaries on the forearm, 4 (10.5%) on the wrist, 6 (16%) on the hand or fingers, and 5 (13%) under the nail (Figure 1). As shown in Table 1, most patients with either axillary-only drainage or epitrochlear drainage had primary melanomas on the dorsal surfaces of the distal upper extremity.

The average number of epitrochlear SLNs in the 38 patients was 1 (range 1–2). The average number of axillary SLNs in all 255 patients was 2 (range 1–7). Of the 38 patients who underwent epitrochlear SNB, 6 (16%) had evidence of metastatic disease in the epitrochlear SLN (Figure 2). Of the 217 patients who underwent axillary-only SNB, 49 (18%) had axillary metastases. Of the 6 patients with positive epitrochlear SLNs, 2 (33%) also had positive axillary SLNs (Figure 2, Table 2). Of the 32 patients with negative epitrochlear SLNs, 4 (13%) had axillary metastases.

If epitrochlear SNB had not removed all nodes in the epitrochlear basin, patients with a positive epitrochlear SLN were advised to undergo complete axillary and epitrochlear lymph node dissection, regardless of axillary SLN status; one patient declined. Positive nonsentinel epitrochlear nodes were identified in two of the three patients undergoing concurrent epitrochlear-axillary lymphadenectomy (Table 2).

All patients with a negative epitrochlear SLN but a positive axillary SLN were advised to undergo complete axillary lymphadenectomy; one patient declined. No additional positive axillary nodes were identified in the remaining three patients (Table 2).

Overall, there was a 25% incidence (2 of 8 patients) of axillary involvement among patients with epitrochlear SLN metastasis.

DISCUSSION

Previous reports regarding the incidence of epitrochlear lymph node metastasis for patients with cutaneous melanoma of the distal upper extremity have varied.^{8,9,13} Hunt et al. from the Sydney Melanoma Unit reported that the epitrochlear node was the sentinel node in only 3.7% of patients with melanomas below the elbow.⁸ The incidence in our series was 14.9%, higher than that reported by other groups. We believe that this difference reflects the importance of preoperative lymphoscintigraphy to rule out epitrochlear drainage in patients with distal upper-extremity melanoma.

The epitrochlear basin is contained within the space defined by the medial head of the triceps, the short head of the biceps, and the medial epicondyle with its overlying musculature. There are usually only one or two epitrochlear nodes. The lymphatic channels of the forearm anastomose extensively, enabling epitrochlear nodes to receive drainage from the hand, forearm, and elbow regions.¹⁰ The location of the primary melanoma on the distal upper extremity cannot be used to predict whether there will be epitrochlear drainage. Similar primary locations were seen in our series for melanomas draining to the axilla alone and those that also drained to the epitrochlear basin.

SNB allows accurate staging of melanoma. The prognostic significance of a positive SLN is not affected by whether this node is found in a major lymphatic basin or discovered as an interval, in-transit, ectopic or intercalated node.^{7,14} In our series, 15.8% of epitrochlear drainage basins contained SLN metastases. This supports the idea that interval SLNs contain metastatic disease at nearly the same frequency as seen in other major lymphatic basins.

In this study, all patients with an epitrochlear SLN also had axillary SLNs. This concurrent drainage suggests that the epitrochlear nodes function in an interval role with the axillary

lymph node basin. We therefore recommend that all patients with a positive epitrochlear SLN undergo completion axillary dissection, plus complete epitrochlear dissection if not performed during SNB. Until the results of the second Multicenter Selective Lymphadenectomy Trial (MSLT-II) are available, completion lymph node dissection is recommended in any basin that contains a tumor-positive SLN.^{15,16}

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Figure 1.
The location of the primary melanomas with drainage to the epitrochlear lymph node basin.
Closed circle indicated a negative SLN and an open circle indicates a positive SLN.

Figure 2.
Outline of study findings for primary melanomas of the distal upper extremity.

Table 1

Demographic and primary tumor characteristics for patients with axillary-only drainage versus epitrochlear +axillary drainage.

	Axillary Only (N = 217)	Epitrochlear and Axillary (N = 38)	p-value
Mean Age at Diagnosis	56.2 years (12 – 90)	57.7 years (6 – 81)	NS
Male Sex	128 (59.0%)	20 (52.6%)	NS
Location of primary on upper extremity			
Dorsal Surface	177 (82%)	30 (79%)	NS
Ventral Surface	40 (18%)	8 (21%)	NS
Mean Breslow Depth	2.04 mm (0.10 – 12.0)	2.23 mm (0.25 – 10.0)	NS
Presence of Ulceration	48 (22.1%)	9 (23.7%)	NS
Clark's Level			NS
I	5	0	
II	30	4	
III	53	12	
IV	99	16	
V	24	5	
Unknown	6	1	

Table 2

Information on patients undergoing complete epitrochlear and/or axillary dissection for positive SLNs.

Patient	Epitrochlear SLN	Axillary SLN	+ Epitrochlear Dissection	+ Axillary Dissection
1	Positive	Negative	1/2	0/16
2	Positive	Negative	declined	declined
3	Positive	Negative	1/2	0/18
4	Positive	Negative	0/0	0/22
5	Positive	Positive	1/2 *	7/23
6	Positive	Positive	1/2 *	6/15
7	Negative	Positive	n/a	0/34
8	Negative	Positive	n/a	0/19
9	Negative	Positive	n/a	0/19
10	Negative	Positive	n/a	declined

* Complete lymphadenectomy was performed at the time of SNB.