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Is pelvic sentinel node biopsy necessary for lower extremity and trunk melanomas?

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ABSTRACT

Objective: There is currently no consensus regarding how to address pelvic sentinel lymph nodes (PSLNs) in melanoma. Thus, our objectives were to identify the incidence and clinical impact of PSLNs.
Methods: Retrospective review of a prospectively collected multi-institutional melanoma database.
Results: Of 2476 cases of lower extremity and trunk melanomas, 227 (9%) drained to PSLNs (181 to both PSLNs and superficial (inguinal or femoral) sentinel lymph nodes (SSLN) and 46 to PSLNs alone). Seventeen (7.5%) of 227 PSLN cases were positive for nodal metastasis, 8 of which drained to PSLNs only while 9 drained to both PSLNs and SSLNs. Complication rates between PSLN and SSLN biopsy were similar (15% vs. 14% respectively). In 181 cases with drainage to both SSLNs and PSLNs, PSLN biopsy upstaged one patient (0.6%), and completion dissection based on a positive PSLN did not upstage any.
Conclusions: PSLN biopsy is safe, however in the setting of negative SSLNs there is minimal clinical impact. We therefore recommend PSLN biopsy when the SSLNs are positive or when the tumor drains to PSLNs alone.

1. Introduction

Sentinel lymph node biopsy (SLNB) remains central to the accurate staging of cutaneous melanoma. The current National Comprehensive Cancer Network guidelines recommend sentinel node biopsy for all melanomas greater than 1 mm thick and consideration of sentinel lymph node biopsy for thin melanomas with high-risk features.[1] The status of the sentinel lymph node (SLN), defined as the node that receives direct drainage from the primary tumor,[2] is widely accepted as the single most important prognostic factor for patients with cutaneous melanoma.[3] The current standard for localization of the sentinel node is the "dual dye technique" using a combination of preoperative lymphoscintigraphy/intraoperative gamma probe and intraoperative peritumoral blue dye injection.

In the case of lower extremity and truncal melanomas, drainage to pelvic sentinel lymph nodes (iliac/obturator) (PSLN) is not uncommon. The exact incidence is unclear, however it has been reported as being observed in 8–23% of cases.[4,5] The traditional teaching is that the skin of the lower extremity drains to inguinofemoral nodes (superficial sentinel lymph nodes or SSLNs) first and then to the pelvic nodes, while truncal lesions theoretically could drain to the pelvic nodes first via inferior epigastric lymphatic channels. However, this notion has been challenged, with reports of lower extremity afferent lymphatics leading directly to pelvic nodes.[6,7]

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Among clinicians there is no consensus regarding how to address pelvic sentinel nodes for cutaneous melanomas of the lower extremity and trunk. There is a reluctance to perform PSLN biopsy for melanoma given it's technically challenging nature, potential for complications, and uncertainty as to whether the results will alter management. The incidence of pelvic nodal metastases in the setting of macro or micrometastasis to the inguinofemoral nodes has been thoroughly examined,[8–11] however in clinically node negative patients with drainage to PSLNs on lymphoscintigraphy the data is limited. Thus the objectives of this study were to identify the incidence of PSLNs, define the correlation between SSLNs and PSLNs, and in doing so, determine the clinical impact of PSLNs based on upstaging of disease.

2. Methods

We performed a retrospective review of a prospectively collected, IRB approved, multi-institutional melanoma database (Sentinel Lymph Node Working Group; SLNWG). All clinically node negative patients undergoing SLNB for primary cutaneous melanoma of the lower extremity or trunk from 1993 to 2016 were reviewed. Of the 12 SLNWG institutions, only 7 contributed data regarding pelvic sentinel lymph nodes. Thus, the numbers we present are from these 7 contributing institutions only.

During this time period, 2,476 patients were treated for lower extremity or trunk primary melanoma. One thousand three hundred thirty trunk and 14 cases of lower extremity melanoma did not drain to either PSLNs or SSLNs. Accordingly, these patients were included in order to determine the incidence of PSLN drainage, however they were not useful in further analysis due to lack of SSLN or PSLN drainage.

All sentinel nodes were identified using radiocolloid, blue dye, or a combination of both. The sentinel node was defined as that receiving direct drainage from the tumor and the 10% rule was used to ensure complete removal of sentinel nodes.[2,12] R statistics package version 3.0.2 (R Foundation for Statistical Computing, Vienna, Austria) was used to perform all statistical analysis.[13] Pearson's chi-square test was used to compare categorical variables while Student's t-test or Wilcoxon rank-sum test were used to compare continuous variables. Multivariable logistic regression analysis was performed to determine predictors of PSLN drainage. For cases with drainage to both SSLNs and PSLNs, sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) were calculated to determine the ability of the SSLN status to predict the outcome of PSLN biopsy.

The pathological examination of the sentinel nodes was performed at each center using some modification of the Augsburg Consensus,[14] including serial sectioning, H&E examination, and immunohistochemistry staining.

3. Results

From 1993 to 2016 there were 2476 cases of primary lower extremity and trunk cutaneous melanomas. One thousand eighty-six had drainage to superficial (inguinal or femoral) sentinel lymph nodes (SSLN) and 227 (9%) drained to PSLNs (181 to both PSLNs and SSLNs and 46 to PSLNs alone) (Fig. 1).

On univariable analysis, older age (52.4 vs 55.9, $p = 0.005$) and tumor subtype ($p < 0.001$) were found to be significantly associated with identification of PSLNs (Table 1). On multivariable logistic regression analysis, older age (OR 1.01 for each 1-year increase, $p = 0.011$), nodular melanoma subtype (OR 2.76, $p = 0.004$), and other melanoma subtype (OR 2.40 $p = 0.003$) were found to be predictive of drainage to pelvic sentinel nodes. Interestingly, primary tumor location and Breslow thickness were not found to be predictive of pelvic drainage (Table 2).

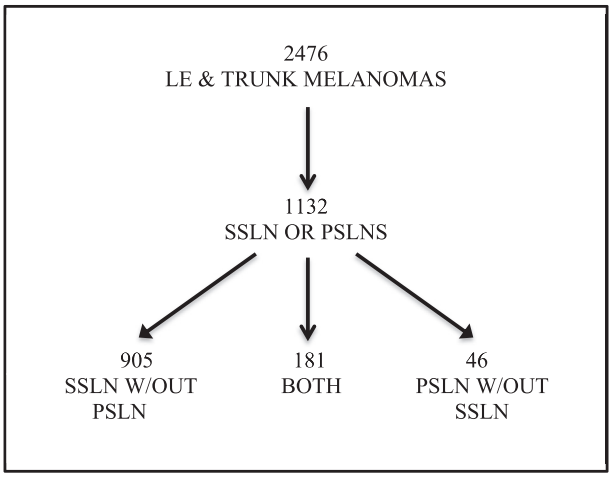

Fig. 1. Stylistic representation of nodal drainage.

Of the 227 cases with PSLN biopsy, 17 (7.5%) were positive for nodal metastasis; 8 patients had drainage to PSLNs only. The remaining 9 cases with a positive PSLN biopsy also had a SSLN biopsy with 8 out of the 9 cases having positive SSLNs. Eight of the 17 positive PSLN cases had completion pelvic node dissection, 2 (25%) having disease in non-sentinel nodes, both of which also had positive non-sentinel inguinofemoral nodes. On analysis of patient and tumor features in these 227 cases with PSLN biopsy, male sex, tumor thickness, and melanoma subtype were significantly

Table 1
Tumor features and demographics of patients undergoing SLNB by pelvic SLN status.

Characteristics	No pelvic SLN (N = 905)	Pelvic SLN (N = 227)	*p*-Value
Age	52.4 ± 16.9	55.9 ± 16.2	0.005[a]
Gender			
Male	357 (39%)	91 (40%)	0.920[b]
Female	548 (61%)	136 (60%)	
Tumor location			
LE	744 (82%)	186 (82%)	1[b]
Trunk	161 (18%)	41 (18%)	
Breslow Thickness (mm)			
Average	1.6 (1.1–2.6)	1.6 (1–2.7)	0.591[c]
Ulceration			
Yes	525 (72%)	129 (68%)	0.272[b]
No	205 (28%)	62 (32%)	
Mitotic rate			
$<1/mm^2$	81 (16%)	25 (23%)	0.145[b]
$\geq 1/mm^2$	415 (84%)	85 (77%)	
Regression			
Yes	67 (16%)	13 (12%)	0.464[b]
No	360 (84%)	93 (88%)	
LVI			
Yes	76 (16%)	12 (12%)	0.359[b]
No	405 (84%)	91 (88%)	
Tumor subtype			
SS	197 (28%)	27 (14%)	<0.001[b]
Nodular	71 (10%)	22 (11%)	
AL	86 (12%)	23 (12%)	
Other	343 (49%)	121 (63%)	

x ± x indicates mean ± standard deviation; x.x (x.x – x.x) indicates median and inter-quartile range.
LE: lower extremity; LVI: lymphovascular invasion; SS: superficial spreading; AL: acral lentiginous.
Unknown values not represented in table and excluded from statistical analysis.
[a] Student's t-test (two-sided).
[b] Pearson's chi-squared test.
[c] Wilcoxon rank-sum test with continuity correction.