Human Pathology (2015) **46**, 304–312

ELSEVIER

Human PATHOLOGY

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Original contribution

# Microvessel density, lymphovascular density, and lymphovascular invasion in primary cutaneous melanoma—correlation with histopathologic prognosticators and *BRAF* status☆

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Received 11 September 2014; revised 10 November 2014; accepted 12 November 2014

**Keywords:**
Primary cutaneous melanoma;
Microvessel density;
Lymphovascular density;
Lymphovascular invasion;
Histopathologic prognosticators;
*BRAF*

**Summary** The relationship between microvessel density (MVD), lymphovascular density (LVD), and lymphovascular invasion (LVI) in primary cutaneous melanoma (PCM) remains unclear. Given this, a total of 102 PCMs were assessed for MVD (vascular endothelial growth factor receptor 2 and Endocan), LVD (D2-40), and LVI (immunostaining with D2-40/S-100 and hematoxylin and eosin); tumoral S-100A13, vascular endothelial growth factor receptor 2, and Endocan; and *BRAF* status. LVD was associated with MVD ($P = .01$). MVD was higher in PCMs with depth greater than or equal to 2 mm and ulceration ($P = .04, .05$), whereas LVD was higher in PCMs with depth greater than or equal to 2 mm and mitoses ($P = .03, .02$). After adjusting for MVD and LVD, only ulceration was associated with LVI ($P < .02$). A *BRAF* mutation was seen in 30.4% cases, and when present, both LVD and host response ($P = .0008$ and .04, respectively) were significantly associated with MVD. Immunostaining with S-100A13 was noted in 99% of cases and a significant association noted only with ulceration ($P = .05$). Immunostaining increased LVI positivity (46.5% versus 4.9% by hematoxylin and eosin, $P < .0001$). MVD and LVD are not associated with LVI, appear to be closely related with each other, and are associated with select markers of poor prognostic value. The association between a host response and LVD and MVD in PCMs with a *BRAF* mutation suggests that they exhibit potential for strategizing immunotherapies.


☆ Disclosures: None to disclose.

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http://dx.doi.org/10.1016/j.humpath.2014.11.006
0046-8177/