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# Patterns of failure and predictors of outcome in cutaneous malignant melanoma of the scalp

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**Background:** Patients with melanoma of the scalp may have higher failure (recurrence) rates than melanoma of other body sites.

**Objective:** We sought to characterize survival and patterns of failure for patients with scalp melanoma.

**Methods:** Between 1998 and 2010, 250 nonmetastatic patients underwent wide local excision of a primary scalp melanoma. Kaplan-Meier analyses were performed to evaluate overall survival, scalp control, regional neck control, distant metastases-free survival, and disease-free survival.

**Results:** Five-year overall survival was 86%, 57%, and 45% for stages I, II, and III, respectively, and 5-year scalp control rates were 92%, 75%, and 63%, respectively. Five-year distant metastases-free survival for these stages were 92%, 65%, and 45%, respectively. Of the 74 patients who recurred, the site of first recurrence included distant disease in 47%, although 31% recurred in the scalp alone.

**Limitations:** This is a retrospective review.

**Conclusion:** Distant metastases-free survival and overall survival for stage II and III patients with scalp melanoma are poor, and stage III patients experience relatively high rates of scalp failure suggesting that these patients may benefit from additional adjuvant systemic and local therapy. Further research is needed to characterize the environmental, microenvironmental, and genetic causes of the increased aggressiveness of scalp melanoma and to identify more effective treatment and surveillance methods. (*J Am Acad Dermatol* 2014;70:435-42.)

**Key words:** melanoma; patterns of failure; recurrence; scalp; survival.

In 2012, there were 76,250 new cases of melanoma and 9180 attributable deaths.<sup>1</sup> Cutaneous head and neck melanoma (CHNM) accounts for less than 20% of cases.<sup>2,3</sup> Several studies have demonstrated that CHNM is associated with a worse prognosis than melanomas of other body sites<sup>4,5</sup>

whereas others have not confirmed these findings.<sup>2,6</sup> A difference in the proportion of scalp melanoma cases contained in the CHNM category could account for this discrepancy. Scalp melanoma comprises a small subset of CHNM and may be associated with a higher mortality than other CHNM.<sup>3,4,7-9</sup> Similarly,

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certain subtypes of melanoma, such as acral lentiginous and mucosal melanoma, have been identified as having an aggressive biology relative to superficial spreading melanomas. The origin of these and other differences among melanoma subtypes is unclear, although genetic, epigenetic, environmental, and microenvironmental influences have been hypothesized.<sup>10,11</sup>

Most single-institution evaluations of CHNM contain a small percentage of scalp melanoma cases and little to no information on patterns of failure (recurrence). Many of these reports combine scalp and neck melanomas, and it has been difficult to ascertain outcomes for only those patients with scalp melanoma. Given the paucity of literature specific to scalp melanoma, we reviewed our experience to better characterize survival and patterns of failure and to determine whether scalp melanoma represents another subcategory of melanoma deserving of special clinical consideration.

## METHODS

### Patient selection

Joint institutional review board approval was obtained from the University of Utah in Salt Lake City, and from Intermountain Medical Center in Murray, UT. Patients were eligible if they had undergone wide local excision (WLE) for a primary, nondistant metastatic scalp melanoma between 1998 and 2010.

### Data collection

Demographic and surgery-related information was collected. Pathologic data included surgical margin status, lymph node (LN) status, Breslow depth, Clark level, histology, mitotic count, along with presence of ulceration, lymphovascular invasion (LVI), perineural invasion (PNI), and satellitosis. Anatomic location on the scalp was determined from documentation in medical records but not from a pictorial analysis. All patients were pathologically staged according to the American Joint Committee on Cancer (AJCC) 7th (2010) edition. Information regarding use of systemic therapy and radiotherapy (RT) was collected.

Overall survival (OS) was defined from the time of the primary surgery (WLE ± sentinel LN biopsy [SLNB]) until the time of death. Disease-free survival (DFS) was defined as the time from WLE until the time of confirmation (radiographic or histologic) of

recurrent disease. Given the retrospective nature of this study, it was not possible to reliably distinguish between local failures and in-transit/satellite lesions (IT/S). Therefore, freedom from any of these types of recurrence was defined as scalp control. Freedom from regional neck recurrences was defined as neck control, and freedom from distant failure was noted as distant metastases-free survival (DMFS).

## CAPSULE SUMMARY

- Scalp melanoma may be associated with higher failure rates than melanomas of other sites.
- High distant and local scalp failure rates are seen in patients with stage II and III melanoma.
- Scalp melanoma is an aggressive malignancy and may represent a subcategory of melanoma deserving special clinical consideration.

### Statistical analysis

Univariate Cox models were fit to survival data and corresponding Wald tests were performed. The number of events given the sample size was not sufficient to warrant a multivariate analysis. Estimates of OS, scalp control, neck control, DMFS, and DFS were performed using Kaplan-Meier survival estimates. All statistical analysis

was performed using “R” statistical computing software, Version 2.8.0 (R Development Core Team 2010, The R Foundation for Statistical Computing, Vienna, Austria).

## RESULTS

### Patient, tumor, and pathologic characteristics

Patient and tumor characteristics of the 250 patients are outlined in Table I. Median age at diagnosis was 67 years. Of patients with LN involvement, 31 had neck nodal disease alone, 13 had IT/S alone, and 8 had LN involvement and IT/S (N1a = 13, N1b = 1, N2a = 8, N2b = 1, N2c = 13, N3 = 16). Five patients had persistent positive margins after WLE and did not undergo further surgery because of patient refusal (n = 2), concern for treatment-related morbidity (n = 2), and presence of medical comorbidities (n = 1). One patient had melanoma in situ at the margin and was treated with imiquimod.

### Disease recurrence

At the time of analysis, 183 (73%) patients were alive with a median time since diagnosis of 38 months (range, 11-152 months). Five-year scalp control rates for stage I, II, and III patients were 92%, 75%, and 63%, respectively (Fig 1), and 5-year rates of neck control were 95%, 81%, and 72%, respectively. Five-year DMFS for these stages were 92%, 65%, and 45%, respectively, and DFS was 61%, 54%, and 25%, respectively. In all, 74 (30%) patients developed recurrent disease, and the site of first failure was isolated to the scalp in 23, the neck in

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