Factors that most influence Metastasis of Cutaneous Melanoma to the Sentinel Lymph Nodes

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INTRODUCTION

- Sentinel lymph node biopsies (SLNB) are the current gold standard for detecting metastatic cutaneous melanoma
- Current National Comprehensive Cancer Network guidelines do not recommend SLNBs for any Breslow depth (BD) < 0.75mm and do not offer concrete recommendations for any BD > 0.75mm.
- European Society for Medical Oncology 2020 guidelines recommend SLNB for melanoma with a BD 0.8mm – 1.0mm and evidence of ulceration, deep margin involvement, and mitotic figures.
- American Academy of Dermatology recommends SLNB for a BD < 0.76mm for younger patients with evidence of of ulceration, mitotic figures, deep margin involvement, angiolymphatic involvement.
- American Society of Clinical Oncology 2018 guidelines and Society of Surgical Oncology recommend SLNB for BD between 0.8 – 1.0mm or < 0.8mm with ulceration.
- There is still much debate on what factors are most influential in causing metastasis and when to proceed with SLNB, making the current guidelines unclear.

OBJECTIVE

- The aim of this study is to assess what factors contribute most to sentinel lymph node metastasis in order to give clearer recommendations for SLNB.

METHODS

- This single center retrospective cohort study included 318 patients with primary cutaneous melanoma who underwent Wide Local Excision (WLE) and SLNB at UCH between 2010 and 2021
- Patients with non-cutaneous melanoma and WLE or SLNB performed at another hospital were excluded
- Patient age, gender, BD, biopsy type, Clark level, the presence of metastasis, ulceration, mitoses, microsatellites and involvement of deep margins, lateral margins, and lymphovasculature were collected using EPIC and REDCAP
- Data was subsequently analyzed using univariate analysis
- A t-test was performed for continuous data and odds ratios were calculated for categorical data. A p value < 0.05 was considered statistically significant

	SLN Positive N (21%)	SLN Negative N (79%)	P Value
Average Age at Diagnosis	53.12 ± 15.28	58.44 ± 14.94	0.01
Average Breslow Depth (mm)	2.54 ± 1.57	1.69 ± 1.26	0.0001
Average Mitosis per high power field (mm2)	6.08 ± 5.15	3.66 ± 4.52	0.0008

Table 1: Analysis of patient age, Breslow depth (BD) and mitotic figures in our cohort

	SLN Positive N (21%)	SLN Negative N (79%)	Odds Ratio (95% CI)	P Value
Number of Males	39	128	1.34 (0.78 - 2.31)	0.29
Number of Females	27	96	1.09 (0.63 - 1.89)	0.76
Gender not Disclosed	1	27	0.13 (0.02 - 0.94)	0.04
Number of Excisional Biopsies	9	33	1.03 (0.46 - 2.26)	0.95
Number of Punch Biopsies	6	24	0.93 (0.36 - 2.38)	0.88
Number of Shave Biopsies	52	172	1.59 (0.85 - 3.00)	0.15
Biopsy method not recorded	0	22	0.08 (0.005 - 1.26)	0.07
Number of Positive Ulceration	36	72	2.89 (1.66 - 5.02)	0.0002
Clark Level II	0	2	0.74 (0.04 - 15.58)	0.85
Clark Level III	5	7	2.81 (0.86 - 9.16)	0.09
Clark Level IV	12	69	0.58 (0.29 - 1.14)	0.11
Clark Level V	0	6	0.28 (0.02 - 5.03)	0.39
Clark Level Unknown	50	166	1.51 (0.82 - 2.77)	0.19
Positive Microsatellitosis	5	4	4.98 (1.30 - 19.09)	0.02
Positive Deep Margins	43	126	1.78 (1.02 - 3.10)	0.04
Positive Lateral Margins	47	148	1.64 (0.92 - 2.92)	0.1
Positive LVI	6	5	4.84 (1.43 - 16.38)	0.01

Table 2: Analysis of patient gender, biopsy method, ulceration, Clark level, microsatellites, deep margins, lateral margins, and lymph vascular involvement in our cohort

RESULTS

- Of our 318 patients, 67 (21%) had SLN metastasis and 251 (79%) did not.
- Patients with SLN metastasis were 53.12yo on average compared to an average of 58.44yo in patients without metastases
- Average BD in patients with SLN metastasis was 2.54mm compared to a 1.69mm in patients without metastasis
- Patients with SLN metastasis had an average of 6.08 mitotic figures per high powered field compared to a 3.66 mitotic figures in patients without metastasis
- Patients with evidence of ulceration were 2.89 times more likely to get SLN metastasis than patients without ulceration
- Patients with evidence of microsatellites on pathology were 4.98 times more likely to get SLN metastasis than patients without microsatellitosis
- Patients with involvement of the deep margin were 1.78 times more likely to get SLN metastasis than patients without positive deep margins
- Patients with lymphovascular involvement were 4.84 times more likely to get SLN metastasis than patients without positive LVI

DISCUSSION

- Age, Breslow depth, mitoses, ulceration, microsatellitosis, deep margins, and lymphovascular involvement had statistically significant correlation with metastasis to the SLNs.
- Microsatellitosis showed the strongest relationship, followed by lymphovascular involvement, then ulceration, and finally deep margins.
- Gender, biopsy method, and lateral margins had no significant bearing on metastasis.
- Clark Level was not routinely measured at our center, so there was not enough data present for us to comment on the correlation in our cohort

CONCLUSION

- Younger age, deeper Breslow depth, presence of ulceration, presence of mitosis, involvement of the deep margins, and lymphovascular involvement are independently and strongly correlated with SLN metastasis. Thus, they should be factors to consider when recommending SLNB.

LIMITATIONS

- Small sample size of 318 weakens the power of these analyses
- Inconsistent records for Clark levels, a strong correlative factor with SLN metastases, is a confounding factor for our results.

CONFLICT OF INTEREST

- We have no financial support or incentives from any corporation. We do not have any conflict of interests with this study.

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