Journal of Dermatological Science xxx (2016) xxx–xxx

Contents lists available at ScienceDirect

Journal of Dermatological Science

journal homepage: www.jdsjournal.com

# Dermoscopic features predicting the presence of mitoses in thin melanoma

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ARTICLE INFO

*Article history:*
Received 16 December 2016
Received in revised form 20 January 2017
Accepted 30 January 2017

*Keyword:*
Dermoscopy
Mitosis
Melanoma

ABSTRACT

*Background:* The latest AJCC classification has included the number of mitoses as a factor for upstaging thin melanomas. Meanwhile, while dermoscopy has often been used to predict melanoma thickness, its value in predicting number of mitoses remains unknown.
*Objective:* Our aim is to evaluate the correlation between dermoscopic features and the presence of mitoses in a consecutive cohort of thin melanomas.
*Methods:* A case control study has been performed to identify specific dermoscopic parameters that could differentiate thin melanomas with 1 or more mitoses per mm2 from those without mitoses.
*Results:* Of 177 melanomas equal to or thinner than 1 mm, 131 (74%) lesions had no mitoses and 46 (36%) lesions had at least 1 mitosis × mm2. Dermoscopic features associated with the presence of 1 or more mitoses were the following: peripheral streaks (OR 4.11; 95% CI 1.94–8.71) and black colour (OR 4.70; 95% CI; 2.28–9.68). In contrast, atypical pigment network (OR (0.30; 95% CI 0.15–0.61)) and brown colour (OR 0.36; 95% CI 0.18–0.75) were associated to melanomas without mitoses. The same variables were also associated to the increasing number of mitoses at linear regression.
*Conclusion:* Black colour and peripheral streaks can predict the presence of mitoses in thin melanoma, while atypical pigment network and brown colour are associated to thin melanoma without mitoses.


## 1. Introduction

Dermoscopy is a pivotal imaging tool that is currently regarded as gold standard for the preoperative diagnosis of melanoma [1]. In addition, dermoscopy provides a relatively good preoperative assessment of melanoma thickness [2,3]. More specifically, the presence of an irregular pigment network has been significantly associated to thin melanomas (with a Breslow thickness of less than 0.75 mm), while the present of blue-white veil and atypical vascular patterns have been associated to thicker melanomas (Breslow > 0.75 mm) [2]. Another study assessing the value of dermoscopy to predict sentinel lymph node (SLN) positivity [3] demonstrated that the presence of ulceration and blotches and the absence of pigment network were more likely associated to SLN positivity.

Since the 7th AJCC classification for melanoma introduced the number of mitoses as an additional important prognostic factor for upstaging thin melanoma [4], other studies have analysed their prognostic role in melanoma patients [5]. Yet no studies have been performed to evaluate a possible correlation between certain morphologic features of thin melanoma and the presence of mitoses as measured on histopathology.

The purpose of the current study is to evaluate the correlation between dermoscopic features and the presence of mitoses in a consecutive cohort of thin melanomas.

## 2. Materials and methods

We conducted a retrospective analysis of clinical, dermoscopic and histopathological characteristics of thin melanomas (equal or less than 1 mm in Breslow thickness) consecutively excised at a

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http://dx.doi.org/10.1016/j.jdermsci.2017.01.013
0923-1811/

**Table 1**
Clinical features of melanomas according to presence of mitoses.

| | | Mitoses = 0 (n = 131) | Mitoses ≥ 1 (n = 46) | *p* value |
|---|---|---|---|---|
| GENDER | F | 41 (31%) | 17 (37%) | n.s |
| | M | 90 (69%) | 29 (63%) | |
| BODY SITE | Head&Neck | 17 (13%) | 7 (15%) | <0.001 |
| | Trunk | 81 (62%) | 14 (30%) | |
| | Upper limbs | 19 (14%) | 9 (20%) | |
| | Lower limbs | 14 (11%) | 16 (35%) | |
| AGE | | 56.5 +/− 15.58 | 60.28 +/− 16.26 | n.s |

referral pigmented lesion clinic from 2011 to 2014. Recorded clinical features of the patients included age, sex, date of diagnosis, and body site location of the primary tumour. Two dermatologists (SR and CL) jointly assessed all polarized dermoscopic images in blind for the presence/absence of dermal mitosis. Dermoscopic features included in the analysis were: presence of black, red and brown colour, atypical pigment network, atypical dots globules, blotches, peripheral streaks(considered positive when present in 25% of the pigmented lesion), blue-white veil, regression, shiny white lines, dotted vessels, polymorphous vessels, and ulceration [6,7]. Any disagreement was settled by consensus, including a third dermatologist (GA).

Histologically, the presence of mitosis has been described in accordance with Attis and Vollmer [8]. Mitotic figures were counted in a systematic manner by first choosing the area with the thickest dermal tumour mass, and then scanning the tumour from one edge to the other along one or more tracts parallel to the skin surface. All pathological melanoma slices have been systematically revised (SP).

### 2.1. Statistics

For basic statistical analysis, the absolute and relative frequencies of each clinical, dermoscopic and histological criterion were calculated. Significant differences in any clinical, dermoscopic or histological feature between melanomas with and without mitoses were evaluated by means of the Chi2-test, the Fisher test and the Spearman correlation coefficient.

Logistic regression was used to look at the association between dermoscopic features and the mitoses status. Linear regression was used to look at the association between dermoscopic features and the linear number of mitoses. All statistical tests were two sided and p values $\leq 0.05$ were considered significant. The analyses were performed in STATA 12 (StatCorp LP, College Station, TX, USA).

## 3. Results

Dermoscopic images from 177 histopathologically proven melanomas with Breslow thickness <= 1 mm in 177 patients (119; 67% men) were analysed. Clinical and dermoscopic characteristics of the lesions are listed in Tables 1 and 2, respectively. The majority of lesions (131; 74%) had no mitosis at the histopathological examination, while 46 (36%) had at least 1 mitosis per mm2 (range, 0–11 mitoses). The average Breslow thickness was 0.57 +/− 0.22 (range 0.2–1 mm). Distribution of mitoses according to Breslow thickness is reported in Table 3. No differences were observed according to sex and age between melanomas with and without mitosis.

At logistic regression analysis, peripheral streaks (OR 4.11; 95% CI 1.94–8.71) and black colour (OR 4.70; 95% CI; 2.28–9.68) were significantly associated to the presence of 1 or more mitoses, while atypical pigment network (0.30; 95% CI 0.15–0.61) and brown colour (OR 0.36; 95%CI 0.18–0.75) were associated to melanomas

**Table 2**
Dermoscopic features of melanomas according to mitoses, (OR adjusted for Breslow thickness and age).

| | | Mitoses = 0 (n = 131) | Mitoses ≥ 1 (n = 46) | OR(95% CI) | P value |
|---|---|---|---|---|---|
| shiny white lines | N | 86 (66%) | 29 (63%) | | n.s. |
| | Y | 45 (34%) | 17 (37%) | | |
| Blue-white veil | N | 91 (69%) | 24 (52%) | | n.s |
| | Y | 40 (31%) | 22 (48%) | | |
| Regression | N | 62 (47%) | 26 (57%) | | n.s. |
| | Y | 69 (53%) | 20 (43%) | | |
| Dotted vessels | N | 116 (89%) | 35 (76%) | | n.s. |
| | Y | 15 (11%) | 11 (24%) | | |
| Polymorphous vessels | N | 112 (85%) | 38 (83%) | | n.s |
| | Y | 19 (15%) | 8 (17%) | | |
| Dermoscopic ulceration | N | 129 (98%) | 44 (96%) | | n.s. |
| | Y | 2 (2%) | 2 (4%) | | |
| Atypical pigment network | N | 30 (23%) | 23 (50%) | 0.30 (0.15–0.61) | 0.001 |
| | Y | 101(77%) | 23 (50%) | | |
| Atypical dots globules | N | 87 (66%) | 26 (57%) | | n.s |
| | Y | 44 (34%) | 20(43%) | | |
| blotches | N | 90 (69%) | 28 (61%) | | n.s |
| | Y | 41 (31%) | 18 (39%) | | |
| Peripheral streaks | N | 110 (84%) | 26(57%) | 4.11 (1.94–8.71) | <0.001 |
| | Y | 21 (16%) | 20(43%) | | |
| Black colour | N | 91 (69%) | 15 (33%) | 4.70 (2.28–9.68) | <0.001 |
| | Y | 40(31%) | 31 (77%) | | |
| Brown colour | N | 30 (23%) | 22 (48%) | 0.36 (0.18–0.75) | 0.006 |
| | Y | 101(77%) | 24(52%) | | |
| Red colour | N | 102 (78%) | 31 (67%) | | n.s. |
| | Y | 29 (22%) | 15 (33%) | | |

Please cite this article in press as: S. Ribero, et al., Dermoscopic features predicting the presence of mitoses in thin melanoma, J Dermatol Sci (2017), http://dx.doi.org/10.1016/j.jdermsci.2017.01.013