CLINICAL REPORT

Microblotches on Dermoscopy of Melanocytic Lesions are Associated with Melanoma: A Cross-sectional Study

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This study evaluated 165 consecutive well-documented dermoscopic images, with the aim of illustrating the characteristics of a dermoscopic structure similar to blotches, but smaller (termed microblotches), and to evaluate their association with other dermoscopic structures. After evaluation by expert dermatoscopists, microblotches were defined as superficial millimetric structures with geographical borders, only visible under dermoscopy. The study also evaluated 241 consecutive naevi from the HAM10000 database, and found that microblotches were present in only 6.7% of naevi cases, compared with 38.7% of cases of melanoma in our cohort (odds ratio; OR 5.79). Moreover, microblotches were more frequently observed in invasive melanoma (OR 2.92), and their presence was associated with other dermoscopic criteria of poor prognosis. Histologically, they are correlated with hyperpigmented parakeratosis or consumption of the epidermis. In conclusion, microblotches are correlated with invasive pigmented melanomas.

SIGNIFICANCE

This study evaluated 165 consecutive well-documented dermoscopic images, with the aim of illustrating the characteristics of a dermoscopic structure similar to blotches, but smaller (termed microblotches), and to evaluate their association with other dermoscopic structures. After evaluation by expert dermatoscopists, microblotches were defined as superficial millimetric structures with geographical borders, only visible under dermoscopy. The study also evaluated 241 consecutive naevi from the HAM10000 database, and found that microblotches were present in only 6.7% of naevi cases, compared with 38.7% of cases of melanoma in our cohort (odds ratio; OR 5.79). Moreover, microblotches were more frequently observed in invasive melanoma (OR 2.92), and their presence was associated with other dermoscopic criteria of poor prognosis. Histologically, they are correlated with hyperpigmented parakeratosis or consumption of the epidermis. In conclusion, microblotches are correlated with invasive pigmented melanomas.

MATERIALS AND METHODS

A single-centre cross-sectional study on patients diagnosed with melanoma from January 2014 to June 2015 in the Melanoma Unit of Hospital Clinic, Barcelona. As inclusion criteria, only lesions with histopathological diagnosis of in situ melanoma or invasive melanoma were examined. Dermoscopy images were obtained with a DermLite Foto (3GEN, LLC, Dana Point, CA, USA), and clinical images using a Canon PowerShot G7 camera (Canon Inc., Japan). In all the tumours, patients’ clinical variables, such as age, sex, phototype, and location of the tumour, were recorded.

Assessment of lesions and definition of microblotches

A total of 165 well-documented dermoscopic images of melanoma cases were evaluated by 2 expert dermatoscopists (SPu, JM) and 2 dermatologists in training (SPo, NF). Evaluators were asked to indicate whether the new criterion of microblotches was present or absent, and whether 3 or more observers agreed that the presence...
of microblotches was recognized. Furthermore, the prevalence of this criterion was evaluated in 241 consecutive cases of naevus extracted from the HAM10000 database (9), in order to determine whether microblotches were present in normal naevi.

After evaluation of all images, microblotches were described as millimetric (usually less than 1 mm), well-defined structures with geographical borders, without visible dermoscopic structures in their interior. They may be different colours (black, light-brown, dark-brown, or display reddish tones), only visible with dermoscopy, and are seen more clearly with the application of immersion fluid. It was observed that microblotches are usually located in areas of higher pigmentation, and can be located both in the centre and the periphery of the tumour (Figs 1 and 2). Histopathological analysis revealed that they are correlated with 2 different conditions: epidermal thinning by the consumption of superficial layers of the epidermis; and/or presence of focal pigmented parakeratosis (Fig. 2). Interestingly, microblotches were not seen in amelanotic melanomas; however, there were only 9 (3.6%) of this subtype of melanoma in this series.

During evaluation of the images, similarities to other dermoscopic structures, such as clods (globules/dots) and follicular plugs, were observed; however, microblotches differ from these structures because of their smaller size, geographical morphology and well-demarcated borders (Fig. 3).

**Fig. 1.** (a, b, d, e) Dermoscopic examples and (c, f) diagrams of microblotches. Note the well-defined geographical aspect of their morphology and borders.

**Fig. 2.** Microblotches. Examples of (a, b) microblotches and histopathological correlation with areas of: (c) consumption of superficial layers of the epidermis or (d) hyperpigmented/haemorrhagic parakeratosis (c, d: magnification ×200).
Microblotches in melanoma are associated with melanoma

Statistical analysis

Pearson’s χ² test was used to evaluate the association between categorical variables. If the expected frequency was < 5, Fisher’s exact test was used (Table I). The 95% confidence intervals (CIs) were obtained by the exact binomial method, and the overall risk (OR) calculated with a 95% CI. Statistical analyses were performed using the computing environment R and RStudio (10, 11). p-values < 0.05 were considered significant.

Interobserver analysis

A tutorial was prepared with the definition and examples of dermoscopic images of microblotches, in which 26 images were included (15 positives for these structures). In order to calculate the inter-rater reliability, a validity set of 30 images was assembled and given to the 3 independent observers (AB, CC, MC). Fleiss’ kappa method was used to evaluate the kappa index, since there were more than 2 independent observers. Interobserver analysis showed a kappa value of 0.794, which indicates substantial agreement between observers.

RESULTS

Of the 165 patients, 81 were male (49.1%) and 84 female (50.9%), with a mean age of 66 years, interquartile range 54–80. Baseline characteristics of the patients with melanoma included in the study are summarized in Table I. Microblotches were present in 46 melanomas, and were more frequent in invasive melanoma (39%, n = 31/80) than in in situ melanoma (18%, n = 15/85). The presence of microblotches was correlated with a 2.92-fold (95% CI 1.44–6.14; p = 0.003) increased risk of invasive melanoma compared with in situ melanomas.

Furthermore, 241 consecutive cases from the HAM10000 database were analysed, and a prevalence of 6.7% of microblotches was found, which were mainly present in more atypical dermoscopic lesions. Moreover, the presence of microblotches was associated with an odds ratio (OR) of 5.79 (95% CI 3.11–10.82) of having a melanoma compared with the naevus database.

As for dermoscopic global patterns of melanomas that presented microblotches, the most frequent were the multicomponent pattern in 38 cases (82.6%) and the reticular pattern in 30 (65.2%). Furthermore, microblotches were significantly associated with the presence of other dermoscopic features: in 43.5% of the cases with shiny white streaks (OR 3.45), 54.3% with blue-white veil (OR 7.67), 60.9% with regression (OR 2.73), 63% with atypical network (OR 3.12), 76.1% with atypical dots/globules (OR 5.53) and 23.9% of the cases with pseudopods (OR 3.89) (Table II).

DISCUSSION

These results indicate that the presence of microblotches is highly indicative of malignancy, and is more common in invasive melanoma than in in situ melanoma. Furthermore, the presence of microblotches is associated with other dermoscopic criteria of poor prognosis, such as shiny white streaks, blue-white veil, regression, atypical network, atypical dots and globules, and pseudopods. Shiny white streaks, well-described structures associated with invasive melanomas and thicker tumours, appear to be due to changes in the dermal collagen (12), while microblotches provide information about epidermal changes, and both provide complementary biological prognostic information.

Table I. Baseline characteristics of melanoma cases (n = 165)

| Characteristics                      | Age, years, median (interquartile range) | Sex, n (%) | Phototype, n (%) | Location, n (%) | Subtype, n (%) |
|--------------------------------------|-----------------------------------------|------------|-----------------|----------------|---------------|
| Age, years, median (interquartile range) | 66.00 (54.00, 79.00)                   | Female     | 81 (49.1)       | 37 (22.8)       | 69 (41.8)     |
|                                      |                                         | Male       | 84 (50.9)       | 37 (22.8)       | 39 (23.6)     |
|                                      |                                         | I          | 30 (18.5)       | 39 (23.6)       | 17 (10.3)     |
|                                      |                                         | II         | 95 (58.6)       | 39 (23.6)       | 17 (10.3)     |
|                                      |                                         | III        | 37 (22.8)       | 39 (23.6)       | 17 (10.3)     |
|                                      |                                         | Missing values, n | 3                |                |               |
|                                      |                                         | Location, n (%) |                  |                |               |
|                                      |                                         | Trunk      | 69 (41.8)       | 69 (41.8)       | 85 (51.5)     |
|                                      |                                         | Lower limb | 39 (23.6)       | 39 (23.6)       | 59 (35.8)     |
|                                      |                                         | Head and neck | 39 (23.6)      | 39 (23.6)       | 59 (35.8)     |
|                                      |                                         | Upper limb | 17 (10.3)       | 17 (10.3)       | 59 (35.8)     |
|                                      |                                         | Acral      | 1 (0.6)         | 1 (0.6)         | 8 (4.8)       |
|                                      |                                         | Subtype, n (%) |                  |                |               |
|                                      |                                         | In-situ    | 85 (51.5)       | 85 (51.5)       | 85 (51.5)     |
|                                      |                                         | Superficial spreading | 59 (35.8)     | 59 (35.8)       | 59 (35.8)     |
|                                      |                                         | Lentigo maligna | 9 (5.5)         | 9 (5.5)         | 9 (5.5)       |
|                                      |                                         | Acral lentiginous | 8 (4.8)         | 8 (4.8)         | 8 (4.8)       |
|                                      |                                         | Nodular    | 4 (2.4)         | 4 (2.4)         | 4 (2.4)       |
The literature contains several confusing dermoscopic terms (13); therefore, we suggest using the term “microblotches”, because it does not presuppose the diagnosis of the lesion (superficial basal cell carcinoma for microerosions) and does not use histopathological terminology (such as pigmented parakeratosis). The term can be used independently of the nature of the lesion. Furthermore, we believe that the presence of this structure could help dermatologists to suspect early invasive melanomas. The idea of microblotches arises from clinical observations in our centre, and with the aim of improving the everyday clinical practice of general dermatologists: a prospective study. Br J Dermatol 2010; 162: 563–567.

Values in bold have a significant association with microblotches. NC: not calculable.

The main limitation of this study is the difficulty of performing a histopathological correlation, due to the small size of the structure, which can easily be missed in some histopathological evaluations. With increasing use of artificial intelligence (AI) for image recognition, better criteria to identify suspicious lesions will probably be developed. Nevertheless, until new algorithms are fully developed and widely available for the dermatology community, it is important to continue working on clinical dermoscopy criteria that can be used by all dermatologists.

Further studies are needed to determine whether microblotches constitute a prognostic factor or influence the survival of patients.

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The authors have no conflicts of interest to declare.

REFERENCES

1. van der Ree JI, Bergman W, Kukutsch NA. The impact of dermoscopy on the management of pigmented lesions in everyday clinical practice of general dermatologists: a prospective study. Br J Dermatol 2010; 162: 563–567.

2. Vestergaard ME, Macaskill P, Holt PE, Menzies SW. Dermoscopy compared with naked eye examination for the diagnosis of primary melanoma: a meta-analysis of studies performed in a clinical setting. Br J Dermatol 2008; 159: 669–676.

3. Carli P, de Giorgi V, Chiarugi A, Nardini P, Weinstock MA, Crocetti E, et al. Addition of dermoscopy to conventional naked-eye examination in melanoma screening: a randomized study. J Am Acad Dermatol 2004; 50: 683–689.

4. González-Álvarez T, Carrera C, Benassar A, Vilalta A, Rull R, Alós L, et al. Dermoscopic features predicting the presence of mitoses in thin melanoma. J Dermatol Sci 2017; 86: 158–161.

5. Ribeiro S, Argenziano G, Lallas A, Moscarella E, Benati E, Raucci M, et al. Dermoscopic features predicting the presence of mitoses in thin melanoma. J Dermatol Sci 2017; 86: 158–161.

6. Deinlein T, Arzberger E, Zalaudek I, Massone C, Garcias-Ladaria J, Oliveira A, et al. Dermoscopic characteristics of melanoma according to the criteria “ulceration” and “mitotic rate” of the AJCC 2009 staging system for melanoma. PLoS One 2017; 12: e0174871.

7. Shitara D, Nascimento M, Ishioka P, Carrera C, Alós L, Malvehy J, et al. Dermoscopy of naevus-associated melanomas. Acta Derm Venereol 2015; 105: 1269–1277.

8. Shitara D, Nascimento M, Ishioka P, Carrera C, Alós L, Malvehy J, et al. Dermoscopy of naevus-associated melanomas. Acta Derm Venereol 2015; 105: 1269–1277.

9. Tschandl P, Rosendahl C, Kittler H. The HAM10000 dataset, a completely annotated study comparing de novo melanoma with nevus-associated melanoma. Int J Dermatol 2018; 57: 692–702.

10. Tschandl P, Rosendahl C, Kittler H. The HAM10000 dataset, a completely annotated study comparing de novo melanoma with nevus-associated melanoma. Int J Dermatol 2018; 57: 692–702.

11. Shitara D, Ishioka P, Alonso-Pinedo Y, Palacios-Bejarano L, Carrera C, Malvehy J, et al. Shiny white streaks: a sign of malignancy at dermoscopy of pigmented skin lesions. Sci Data 2018; 5: 180161.

12. R Studio Team. RStudio: integrated development environment for R. 2018.

13. R Studio Team. RStudio: integrated development environment for R. 2018.

14. R Studio Team. RStudio: integrated development environment for R. 2018.