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The prevailing dermoscopic vascular pattern in melanoma is influenced by tumour thickness and pigmentation type

Dear Editor, In nonpigmented skin tumours the diagnosis is based mainly on the evaluation of the vascular morphology and vessels' distribution dermoscopically.[1–4] However, to date, no study has formally correlated the prevailing vascular morphology with the Breslow thickness of the melanoma and the amount of pigmentation.

We retrospectively reviewed the image databases from two dermatology centres (Graz, Austria and Reggio Emilia, Italy) for clinical and dermoscopic images of histopathologically proven melanoma. In total 400 contact polarized dermoscopic images were reviewed by two experts (T.D. and I.Z.) on a computer screen; from those, 189 melanomas were judged to show recognizable vessels by dermoscopy. Additional data on the excluded tumours were not provided. Subsequently, the aforementioned experts reviewed and analysed the 189 included clinical and dermoscopic images from 189 patients (including 97 men, 51·3%). The assessors were blinded and recorded the tumour data according to the criteria proposed by Menzies *et al.*[1] The analytical results of the dermoscopic evaluation are depicted in Table 1. The mean age of the patients was 60·1 years (range 1–99) and the median tumour thickness was 1·3 mm (range 0·1–20·0).

On dermoscopic analysis, 70 (37·0%) melanomas were judged pigmented, 57 (30·2%) slightly pigmented, 35 (18·5%) hypopigmented and 27 (14·3%) truly amelanotic. Overall 35 (38%) nodular lesions were judged as hypopigmented and amelanotic. The mean tumour thickness in pigmented lesions was 3·04 mm, in slightly pigmented tumours 2·31 mm and in hypopigmented and amelanotic lesions 2·5 mm and 3·03 mm, respectively.

Multivariate statistical analyses were performed using data frequency comparisons with the χ^2-test using the latest SPSS software (version 23; IBM, Armonk, NY, U.S.A.). In a first step of data analyses, we correlated tumour thickness as a continuous variable with the presence or absence of a certain vessels type, demonstrating significant relationships for monomorphous vs. polymorphous vessels ($r = 0{\cdot}133$; $P < 0{\cdot}070$) and for clods present or not ($r = 0{\cdot}142$; $P < 0{\cdot}051$). However, to reach greater clarity and to illustrate the various relationships between vessel type and tumour thickness in more detail we additionally used a median split of tumour thickness (median 1·3 mm) for the following comparisons.

Firstly, polymorphous vessels were significantly associated with melanomas > 1·3 mm, as 55% of all melanomas showing polymorphous vessels had a tumour thickness > 1·3 mm (71 of 129; $P < 0{\cdot}012$). Among different types of vascular pattern, clod-like and serpentine vessels were significantly correlated with tumour thickness > 1·3 mm. Ten (71%) of 14 melanomas showing clods and 37 (64%) of 58 melanomas with serpentine vessels had Breslow thickness > 1·3 mm ($P < 0{\cdot}092$ and $P < 0{\cdot}010$, respectively). With regard to the pigmentation type, we found that looped vessels were

Table 1 Frequencies of different vascular patterns in relation to median tumour thickness and prevailing pigmentation type

Vascular morphology	Number of cases (%)	Median tumour thickness (mm)	Prevailing pigmentation type
Red dots	69 (36·5)	1·75	Slightly pigmented (29/69; 42%)
Red clods	14 (7·4)	3·60	Slightly pigmented (7/14; 50%)
Linear straight	99 (52·4)	1·33	Pigmented (39/99; 39%)
Linear serpentine	58 (30·7)	2·15	Pigmented (22/58; 38%)
Linear curved	41 (21·7)	1·80	Pigmented (18/41; 44%)
Linear looped	31 (16·4)	1·30	Slightly pigmented (11/31; 35%) and amelanotic (11/31; 35%)
Linear coiled	35 (18·5)	1·50	Pigmented (13/35; 37%)
Linear helical	41 (21·7)	1·30	Pigmented (14/41; 34%)
Polymorphous	129 (68·3)	1·80	Pigmented (46/129; 36%)

significantly associated with amelanotic melanomas, as 85% (11 of 13) of all lesions showing looped vessels were amelanotic ($P < 0{\cdot}001$).

Furthermore, significant co-occurrences among different types of vessels were observed, regardless of tumour thickness or the amount of pigmentation. In detail, dotted vessels were significantly associated with linear straight ($P < 0{\cdot}001$), serpentine ($P < 0{\cdot}007$) and helical ($P < 0{\cdot}001$) vessels, while linear straight vessels were significantly associated with curved ($P < 0{\cdot}026$) and serpentine ($P < 0{\cdot}046$) vessels.

We focused on the morphological vascular pattern in correlation to melanoma thickness and the amount of pigmentation. Although the majority of melanomas in our study revealed a polymorphic pattern, we found that some types of vessels more commonly co-occur. The co-occurrence of dotted and linear straight vessels as an indicator for melanoma of intermediate thickness is very well established, and our results again confirm this observation.[1–8] A clue to differentiate between benign and malignant tumours showing dotted vessels lies particularly in the arrangement, as, for example, dots in melanocytic skin lesions commonly appear regularly distributed. Moreover, we found that the prevailing vascular pattern in melanomas > 1·3 mm in thickness is a clod and serpentine pattern, whereas looped vessels were significantly associated with amelanotic and/or hypomelanotic melanomas.

It is well known that diagnosis of hypopigmented and amelanotic lesions may be challenging due to the lack of pigment and the paucity of distinct dermoscopic patterns.[2] In a study focusing on hypopigmented and amelanotic lesions, a polymorphous vascular pattern was frequently observed dermoscopically. The predominant vascular types were linear irregular and hairpin (linear looped) vessels, which is thus in line with our observations.[8]

Our study has some limitations. Firstly, we did not have a control group and therefore the abovementioned findings cannot be applied to differentiate melanoma from other entities based on vessel morphology. Consequently, our data cannot be used to assess the diagnostic value of vessels in the diagnosis of melanoma. Secondly, the density of vessels was not precisely quantified, and vessels were judged as being present or absent for inclusion. Thirdly, we did not provide data about the excluded tumours and therefore cannot compare these melanomas with the included ones showing a vascular pattern.

Based on the current literature and our aforementioned results, distinct vascular pattern, as well as various combinations of different vessel types, may be helpful clues for tumour thickness in melanoma as these features differ in melanomas of various tumour thicknesses.

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The real protection of facial sunscreens

Dear Editor, The harmful effects of solar radiation exposure on human skin are well known.[1] Both ultraviolet (UV)B and UVA radiation induce DNA damage, leading the formation of molecules, such as pyrimidine dimers and 6–4 photoproducts, which play a key role in the development of skin cancer.[2] Despite the increasing awareness of the harmful effects of the sun and use of sun protection, 70–90% of basal cell carcinomas develop in the sun-exposed head and neck region, and 5–10% of all skin cancers occur on the eyelids.[3]

Consumers must be aware of the necessity of broad-spectrum sun protection that covers both UVA (320–400 nm) and UVB (290–320 nm) radiation.[1] Several published studies have shown that consumers apply the incorrect amount of sun protection products.[4,5] The amount of sunscreen applied by users is 0·39–1·3 mg cm^{-2}.[6]