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Dermatoscopic pitfalls in differentiating pigmented Spitz naevi from cutaneous melanomas

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Summary Epiluminescence microscopy (ELM, skin surface microscopy, dermoscopy, dermatoscopy) is a valuable method for improving the diagnostic accuracy in pigmented skin lesions. Specific ELM criteria are already recognized for differentiating pigmented Spitz naevi (PSN) from cutaneous melanomas (CM). Our purpose was to describe the ELM appearance of a series of PSN with emphasis on PSN and CM with overlapping features. Thirty-six consecutive patients with PSN, and three cases of CM (selected from a larger database) exhibiting ELM 'spitzoid' features, were evaluated clinically, dermatoscopically and histopathologically. Most PSN (27 of 36; 75%) displayed two typical ELM patterns, namely, the starburst (19 of 36; 53%) or the globular pattern (eight of 36; 22%), which were correlated to different histopathological findings. In nine of 36 (25%) PSN, atypical ELM features which are more commonly seen in CM were observed. These PSN with an atypical pattern were characterized by an uneven distribution of colours and structures, and an irregular diffuse pigmentation resembling blue–white veil or irregular extensions (black blotches). These atypical lesions mostly occurred in children and showed no history of growth. In contrast, in three examples of CM, the typical ELM criteria of malignancy were less recognizable and either the characteristic starburst or globular pattern usually seen in PSN was present. These three lesions occurred in adults and had a recent history of change in colour, shape or size. The overlap in ELM features of some PSN and CM represents a major diagnostic pitfall when ELM examination is considered alone. In these atypical cases, clinical history including the age of the patient may be the only clue to enable a correct diagnosis.

Key words: clinical diagnosis, dermatoscopy, epiluminescence microscopy, melanoma, pigmented Spitz naevi, skin surface microscopy

Epiluminescence microscopy (ELM, skin surface microscopy, dermoscopy, dermatoscopy, magnified oil immersion diascopy) is an *in vivo*, non-invasive technique that has disclosed a new dimension of clinical morphology in pigmented skin lesions. Different incident light magnification systems with an oil immersion technique have been used for performing this investigation.[1] Previous studies have demonstrated that use of ELM improves the clinical accuracy in diagnosing pigmented skin lesions.[2–5] Specific ELM criteria have been described for differentiating pigmented Spitz naevi (PSN) from cutaneous melanomas (CM).[2,3,6] PSN can be easily identified by a prominent symmetrical starburst or globular pattern, with a central, bizarre or reticular depigmentation, and a rim of brown globules at the periphery, which in some instances may mimic pseudopods. In contrast, CM are asymmetrical and irregularly pigmented with variable combinations of broadened pigment network, blue–white veil, irregular black dots or brown globules, peripheral depigmentation, irregular extensions (black blotches) as well as 'true' pseudopods and radial streaming at the edge of the lesion.[7,8] The purpose of this study was to describe the ELM

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appearance of a series of PSN in correlation with their histopathological findings and to focus on PSN and CM with overlapping features.

Subjects and methods

In this study, 36 consecutive patients (15 men and 21 women aged 5–43 years, mean 21·3) with PSN, and three patients with CM, were included. These CM were selected from a larger database of lesions (122 CM which underwent a complete clinical, dermatoscopic and histopathological examination) because they exhibited 'spitzoid' ELM features.[6] All these lesions underwent careful clinical evaluation, and all were also examined with a stereomicroscope (Wild M650, Heerbrugg AG, Switzerland) using immersion oil and a glass slide (to render the epidermis translucent). All lesions were photographed using either Dermaphot equipment (Heine Optotechnik, Herrsching, Germany), at a fixed magnification of × 10, or a Nikon F3 camera mounted on the stereomicroscope, with six- to 40-fold magnification.

Each lesion was carefully examined for the evaluation of the standard ELM criteria, most of which were listed in the guidelines of the Consensus Meeting held in Hamburg in 1989.[7,8] The evaluation of ELM criteria was carried out with the consensus of at least two of three investigators (G.A., M.S., B.B.). Following clinical and dermatoscopic examination, all lesions were excised and diagnosed histopathologically. All slides were evaluated by two pathologists (G.D.R., S.S.) using a double-headed light microscope and the final diagnosis was the result of their complete agreement.

Results

By ELM examination, the PSN could be divided into three groups.

Group 1

Nineteen of 36 (53%) cases of PSN showed a typical starburst pattern with symmetrical, prominent, grey–blue to black pigmentation, and central, bizarre or reticular hypopigmentation. Most of these lesions exhibited a characteristic rim of grey–brown to black globules regularly distributed at the periphery, mimicking pseudopods or radial streaming (Fig. 1). In addition, seven cases showed a regular and prominent pigment network, whereas in three cases, only the prominent black–blue pigmentation, with no pseudopods at the periphery, was observed. Because of their characteristic dermatoscopic appearance, all these lesions were correctly classified as PSN. On clinical examination by naked eye, however, only 12 of 19 lesions were diagnosed as PSN, whereas seven of 19 lesions were considered clinically atypical.

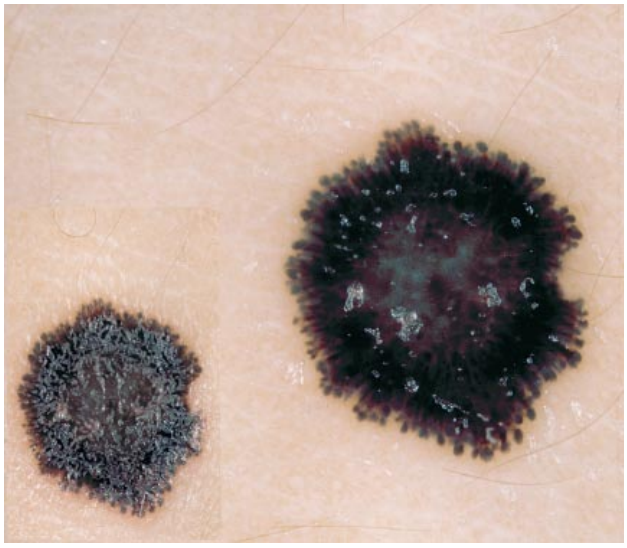

Figure 1. Starburst pattern of a pigmented spindle-cell naevus (Reed naevus) (original magnification × 16). Insert: clinical appearance

Histopathologically, most of the lesions of this first group of cases exhibited the morphological findings of pigmented spindle-cell naevus (Reed naevus), namely, symmetrical and well-circumscribed proliferations of spindle-shaped melanocytes involving the epidermis and/or papillary dermis.[9–11] The spindle-shaped melanocytes were arranged in fascicles closely packed along the dermoepidermal junction. In addition, large amounts

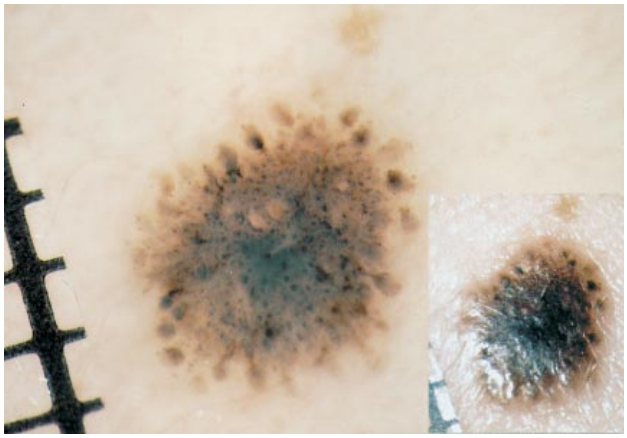

Figure 2. Globular pattern of a spindle- and/or epithelioid-cell naevus (Spitz naevus) (original magnification ×16).

Table 1 Clinical data, dermatoscopic findings, and preoperative and histopathological diagnoses of pigmented Spitz naevi (PSN) with atypical epiluminescence microscopy (ELM) patterns

Patient no.	Sex/age (years)	Location	Clinical history	ELM features	Overall preoperative diagnosis[a]	Histopathology
1	F/11	Upper limb	No change	Uneven distribution of colours and structures and blue–white veil (Fig. 3)	PSN	Reed naevus
2	F/8	Lower limb	No change	Blue–white veil and irregular black blotches (Fig. 4)	PSN	Spitz naevus[b]
3	F/6	Lower limb	No change	Asymmetry of colours and structures, blue–white veil and irregular black dots	PSN	Spitz naevus
4	M/12	Back	No change	Blue–white veil, irregular prominent pigment network and depigmented areas	PSN	Reed naevus
5	F/13	Upper limb	No change	Uneven distribution of colours and structures and radial streaming	PSN	Spitz naevus[b]
6	M/29	Lower limb	No change	Blue–white veil and irregular black dots (Fig. 5)	PSN vs. melanoma	Reed naevus
7	M/43	Back	No change	Irregular pigment network and grey–blue areas	Atypical naevus vs. melanoma	Spitz naevus
8	F/37	Buttock	Colour change	Irregular black blotches and radial streaming	Melanoma	Reed naevus
9	F/32	Lower limb	Change in size	Blue–white veil and irregular brown globules	Melanoma	Reed naevus

[a] Independently of the preoperative diagnosis, all these lesions were excised because of the atypical ELM appearance. [b] Case with atypical histopathological features.

of melanin and numerous melanophages were present in the papillary dermis.

Group 2

A second group of PSN (eight of 36; 22%) had ELM features of a symmetrical, basically globular pattern with regular, discrete, brown to grey–blue pigmentation in the centre, and a characteristic rim of large brown globules at the periphery. In contrast to the starburst pattern, the globules at the periphery did not exhibit a radial (or stellate) appearance. Brown to grey–blue globules and dots often extended throughout the entire surface of the lesion (Fig. 2). In two less pigmented lesions a dotted vascular pattern was also detectable. By means of clinical examination these lesions were classified as PSN (four of eight) or Clark naevus (four of eight), whereas on ELM examination all these lesions were correctly diagnosed as PSN.

The histopathological correlates of this second group of lesions were again similar, mostly revealing typical

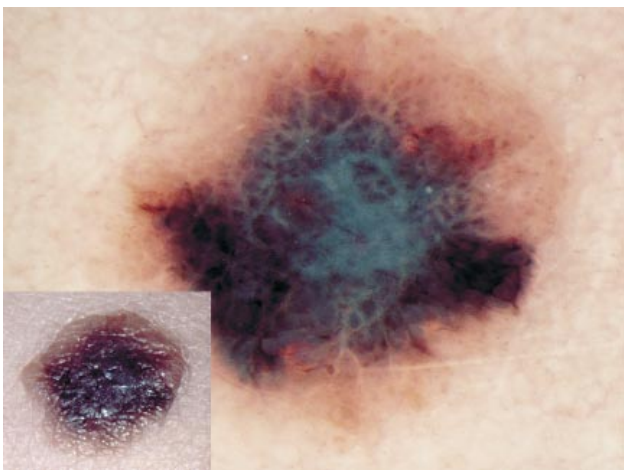

Figure 3. Atypical epiluminescence microscopy features with an uneven distribution of colours and structures, blue–white veil, and dotted vascular pattern. The histopathological examination revealed a Reed naevus (original magnification ×16).

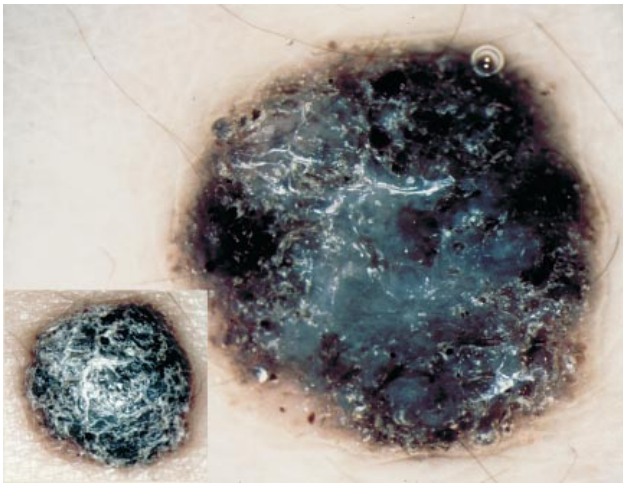

Figure 4. Atypical epiluminescence microscopy features characterized by blue–white veil and irregular black blotches. The histopathological examination revealed a Spitz naevus (original magnification ×10).

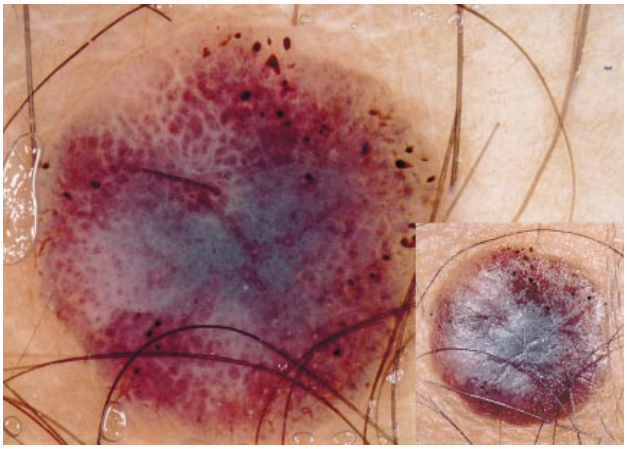

Figure 5. Reed naevus showing irregular black dots at the periphery and a blue–white veil (original magnification ×10).

Spitz naevus (spindle- and/or epithelioid-cell naevus). These tumours displayed a symmetrical silhouette and sharp circumscription, with striking nests of spindle and/or large epithelioid cells involving the epidermis and/or the papillary and reticular dermis. Maturation of melanocytes (gradual diminution of nuclear and cellular sizes) with progressive descent into the dermis was a constant finding, whereas necrotic cells and mitotic figures were only found occasionally.

Group 3

A third group of PSN (nine of 36; 25%; Table 1) exhibited an atypical ELM appearance characterized by an asymmetrical silhouette formed by an uneven distribution of colours and structures, and an irregular diffuse pigmentation caused by irregular extensions (black blotches) and a blue–white veil. Pigment network, brown globules, black dots and depigmented areas were irregularly distributed throughout the lesions, with pseudopods and radial streaming at the periphery. Occasionally, a dotted vascular pattern was observed (Figs 3–5). All these lesions were clinically atypical. Patient histories showed that seven of these nine atypical PSN had not changed in colour, size or shape. Moreover, five of the nine patients were under 14 years of age (Table 1). Histopathological examination revealed five cases of pigmented spindle-cell naevus (Reed naevus) and four cases of spindle- and/or epithelioid-cell naevus. Two of these lesions (patients 2 and 5, Table 1) showed atypical architectural and cytomorphological features, i.e. a pagetoid spread of single melanocytes, nests of melanocytes varying in size and shape, a tendency of nests to become confluent, and a dense lymphocytic infiltrate intermingled with melanophages. In addition, pronounced nuclear atypia, necrotic cells and mitotic figures were present. However, these lesions were identified as PSN because of symmetry, sharp circumscription and maturation of melanocytes with progressive descent into the dermis.

Cutaneous melanoma

Three patients with CM that exhibited dermatoscopic criteria in favour of Spitz naevi were observed and are briefly summarized below.

Figure 6 shows a rapidly enlarging 12-mm plaque of 1 year duration located on the left leg of a 39-year-old woman. ELM examination revealed an asymmetrical distribution of colours and structures in one axis,

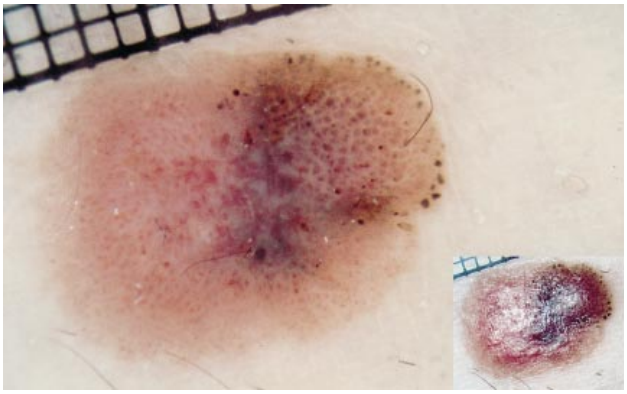

Figure 6. Cutaneous melanoma with epiluminescence microscopy findings reminiscent of Spitz naevus (original magnification ×6).

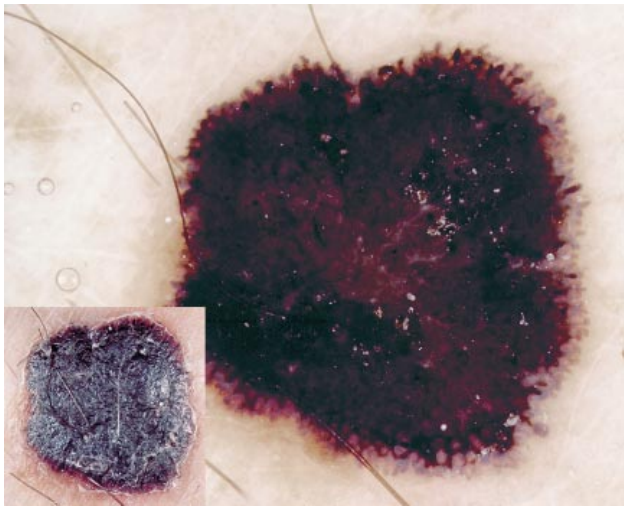

Figure 7. Cutaneous melanoma showing the typical starburst pattern of a Reed naevus (see also Fig. 1) (original magnification ×10).

Figure 8. Cutaneous melanoma with epiluminescence microscopy features suggesting a Spitz naevus (original magnification ×10).

several brown globules partially disposed at the periphery, and a larger amelanotic portion with a globular vascular pattern filling the 'holes' of a reticular depigmentation. A few black dots and discrete grey–blue areas were also detectable. Despite the presence of some ELM criteria suggestive of Spitz naevus, the clinical features and the clinical data suggested the final diagnosis of melanoma. Histopathological examination revealed an asymmetrical melanocytic proliferation of large, atypical spindle and epithelioid cells and a prominent vascular and desmoplastic stroma. The thinned epidermis was characterized by slight hyperkeratosis, hypergranulosis and a minimal pagetoid spread of melanocytes. Absence of maturation, nuclear pleomorphism and mitotic figures were observed. The Breslow thickness was 1·1 mm (Clark level III).

Figure 7 shows a slowly growing 8-mm flat plaque of 1 year duration on the right thigh of a 46-year-old man. The clinical diagnosis favoured melanoma. ELM examination revealed a symmetrical starburst pattern with prominent pigmentation, and central, bizarre hypopigmentation. In addition, there was a rim of grey–brown to black globules regularly distributed at the periphery mimicking pseudopods. Because of its characteristic appearance, this lesion was dermatoscopically classified as PSN. Histopathological examination showed a hyperpigmented, partially asymmetrical proliferation of confluent junctional nests of melanocytes varying in size and shape. There was also a focal pagetoid spread of melanocytes within the upper layers of the epidermis. The melanocytes were atypical, mostly spindled at the dermoepidermal junction and epithelioid in the dermis. There was a low mitotic activity. However, no maturation of melanocytes was observed. The Breslow thickness was 0·7 mm (Clark level III).

Figure 8 shows a 5-mm flat plaque located on the left thigh of a 45-year-old man, with a history of a recent change in colour. Dermatoscopic examination revealed a relatively symmetrical distribution of colours and structures with a rim of brown globules at the periphery and discrete grey pigmentation in the centre. Both the clinical and dermatoscopic diagnoses were in favour of melanocytic naevus but the lesion was biopsied because of the clinical history. Histopathological examination revealed the morphological features of a typical malignant melanoma with a Breslow thickness of 0·5 mm (Clark level II).

Discussion

PSN are well-known simulators of CM from a clinical, dermatoscopic and histopathological point of view. Clinically, PSN may be larger than 'common' naevi, may have an irregular outline, a scaly, crusted or eroded surface, and may show variegated colours.[12,13] Because these clinical features are also characteristic of CM, PSN are often difficult to differentiate from CM by clinical criteria alone.

ELM is a valuable method for improving the diagnostic accuracy in pigmented skin lesions, and in the case of PSN an increase in diagnostic accuracy from 56% to 93% has been reported previously.[6] However, in the present study, 25% of PSN revealed atypical ELM features that did not allow a correct differentiation from CM. Nachbar *et al.*[14] have reported the possibility of misclassification of PSN due to an asymmetrical silhouette and an uneven distribution of colours and structures by means of the ABCD rule of dermatoscopy. In addition, most of our atypical cases displayed an irregular, diffuse, grey–blue pigmentation resembling blue–white veil. This is usually felt to represent a specific ELM criterion for the diagnosis of melanoma.[7,15] As in melanoma, the grey–blue pigmentation could be histopathologically correlated to clusters of melanophages within the mid-reticular dermis.[16–18] Despite the atypical ELM pattern of these PSN, the preoperative diagnosis in most cases favoured a benign lesion because of the clinical situation, namely, a pigmented skin lesion occurring in children and showing no history of growth (Table 1).

The potential for confusion between Spitz naevi and melanomas exists even at a histopathological level. In this study, two of the dermatoscopically atypical PSN

were extremely difficult to differentiate from melanoma because these lesions also displayed histopathological findings in common with melanoma. However, PSN can be usually recognized histopathologically by architectural features that often have an ELM counterpart. PSN are usually dermatoscopically and histopathologically symmetrical, and characterized by one of two different ELM patterns, the first typified by a prominent, black to blue diffuse pigmentation and radial streaks (pseudopods) distributed regularly at the periphery in a stellate or radiate pattern (starburst pattern), and the second revealing a discrete, brown to grey–blue pigmentation and a peripheral rim of large brown globules which often extend throughout the entire lesion (globular pattern). These two distinct ELM patterns were found to be predominantly associated with the pigmented spindle-cell naevus (Reed naevus—starburst pattern) and with the spindle- and/or epithelioid-cell naevus (Spitz naevus—globular pattern), respectively. The heavily pigmented nests of melanocytes closely packed along the dermoepidermal junction presumably represent the histopathological correlate of the starburst pattern commonly seen in Reed naevi. In contrast, the large nests of melanocytes within the epidermis and/or papillary dermis may be the histopathological correlate of the globular pattern frequently seen in spindle- and/or epithelioid-cell naevi.

Remarkably, we also observed three of 122 CM showing very few or even no ELM features suggestive of malignancy and exhibiting either the globular (Figs 6 and 8) or the starburst pattern (Fig. 7) mostly seen in PSN. Previous studies reported ELM pitfalls in diagnosing CM in heavily pigmented lesions that do not reveal the criteria necessary for ELM pattern analysis,[4] and in hypomelanotic or 'featureless' CM lacking specific ELM criteria of malignancy.[19] Our cases demonstrate the possibility of missing CM due to the presence of ELM features typical for PSN. Thus, surgical excision and subsequent histopathological examination should be performed for pigmented skin lesions in adult patients or showing a history of recent change in colour, shape or size, even if they have the characteristic ELM features of Spitz naevi.

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