

Original article

**Dermoscopic Features of Non-Pigmented Eccrine Poromas in
Association with their Histopathological Features**

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Bulleted statements

What's already known about this topic?: Non-pigmented eccrine poromas dermoscopically mimic a number of benign and malignant skin tumours, because they tend to have a polymorphous vascular pattern without any characteristic findings.

What does this study add?: We found that a vascular structure is a common dermoscopic feature of non-pigmented eccrine poromas. Further, the “honeycomb appearance”, globule/lacuna-like structures separated with mesh bands, is another unique feature. These features are strongly helpful in diagnosing non-pigmented eccrine poromas accurately.

Summary

Background: Non-pigmented eccrine poromas (EP) occasionally mimic numerous skin tumours, but their dermoscopic features have not been clarified.

Objective: To evaluate the dermoscopic features of non-pigmented EP in association with their histopathological features.

Methods: Retrospective analysis of the dermoscopic features of 10 histopathologically proven cases of non-pigmented EP at the Department of Dermatology, Shinshu University Hospital (Matsumoto, Japan).

Results: Specific features in vascular structures were observed in 5 of 10 non-pigmented EP. Three cases showed a polymorphous vascular pattern: 2 cases of a combination of hairpin and dotted vessels, and 1 case of a combination of hairpin, dotted and linearly irregular vessels. In addition, there were 2 cases of monomorphous vascular pattern: 1 case of linear-irregular vessels, and 1 case of hairpin vessels. We did not observe arborising, crown or comma vessels. Comedo-like openings, millia-like cysts, cerebriform pattern, and ulceration were observed in one case each. Furthermore, "honeycomb appearance" was detected in 9 of 10 cases, which were well-circumscribed reddish globule/lacuna-like structures with separation of mesh bands. The honeycomb appearance was explained by the histopathological features of

horizontal sections at a depth of 300 to 400 μm from the surface. Island-shaped oedematous stroma with numerous microvessels, which were surrounded by poroid cells in mesh-like forms, were seen.

Conclusions: Vascular structures and honeycomb appearance are unique features on dermoscopic examination of non-pigmented EP. Further studies are required to evaluate their diagnostic accuracy to differentiate non-pigmented EP from other tumours.

Introduction

Eccrine poroma (EP) is a benign adnexal tumour of the uppermost portion of the intra-epidermal eccrine ducts and the acrosyringium. It is often present as a solitary nodule, frequently seen on the sole of the foot in adult patients. However, it sometimes mimics a number of benign and malignant skin tumours, because the clinical features of EP are highly variable in colour, shape, and the presence or absence of hyperkeratosis. When EP presents as a flesh coloured nodule without pigmentation, differential diagnoses include seborrhoeic keratosis, pyogenic granuloma, non-pigmented basal cell carcinoma and amelanotic malignant melanoma. Recently, the dermoscopic features of non-pigmented EP were reported.¹⁻⁵ However, due to the small number of lesions examined, the characteristic findings of non-pigmented EP have yet to be clarified.

In this study, we examined 10 cases of non-pigmented EP by dermoscopy, and evaluated the frequency of dermoscopic structures. In addition, we evaluated the dermoscopic features in association with histopathological features on consecutive horizontal sections.

Materials and methods

This retrospective study included histopathologically proven cases of non-pigmented EP examined by dermoscopy at the Department of Dermatology, Shinshu University Hospital (Matsumoto, Japan) between January 2000 and February 2009. There were no cases diagnosed as hidracanthoma simplex, dermal duct tumour, or poroid hidradenoma (histopathological variants of poromas). All participants gave oral informed consent to participation in this study.

The lesions were examined by dermoscopy with large amounts of ultrasound gel and with application of slight pressure to the tumours. Dermoscopic images were recorded with a non-polarised dermoscope (Dermlite II Fluid; 3Gen, Dana Point, CA, USA), combined with a digital HD video camera recorder (HDR-HC3; Sony Co., Tokyo, Japan). Dermoscopic analysis was performed on a 24-inch Flat Panel Monitor (S2409W; Dell Inc., Austin, TX, USA). Each dermoscopic image was evaluated independently by two expert dermoscopists (AM and HK) for the presence of the following dermoscopic features: vascular patterns, features of melanocytic or nonmelanocytic disease, and additional features.⁶ When their initial findings did not agree, the two observers conferred to determine the presence of dermoscopic features. Due to the small number of

lesions included in this study, we performed only descriptive analysis of the frequency of each dermoscopic feature.

The diagnoses of all lesions were confirmed histopathologically. In addition, the tissue was cut into consecutive horizontal sections that were stained with haematoxylin and eosin (HE), periodic acid-Schiff (PAS), Alcian blue-PAS (AB-PAS), and for CD31, Elastica van Gieson (EVG), and carcinoembryonic antigen (CEA).

Results

We collected 10 cases of non-pigmented EP in which the diagnosis was confirmed histopathologically. All of the subjects, 2 women and 8 men, were Japanese and their mean age was 56.3 years old (range 32–89). None of the patients had a previous history of melanoma or non-melanoma skin cancer, and one had a previous history of trauma at the site of the lesion. All of the patients visited our hospital specifically for the lesions. The lesions had developed over several years to several decades. Three patients complained of itching together with occasional bleeding of the lesions, two complained of occasional bleeding, and others were asymptomatic. On clinical examination, 5 of the 10 lesions were

located on the feet, 3 were on the lower legs, 1 was on the hand and 1 was on the back. The lesions appeared as well-circumscribed nodules, pink to red in colour, with a mean maximum diameter of 18.2 mm (range 3.0–38.0 mm).

Clinical differential diagnoses included seborrhoeic keratosis, pyogenic granuloma, non-pigmented basal cell carcinoma, and amelanotic malignant melanoma.

Dermoscopic structures of non-pigmented EP are shown in Table 1. The most frequent were vascular structures, which were observed in 5 of 10 cases.

Particularly, 3 cases showed a polymorphous vascular pattern, including at least 2 types of vessel: 2 cases with a combination of hairpin and dotted vessels, and one case with a combination of hairpin, dotted and linear-irregular vessels. In addition, there were 2 cases of monomorphous vascular pattern: 1 case of linear-irregular vessels and 1 case of hairpin vessels. Most vessels were elongated and irregularly shaped with telangiectasia (Fig. 1). None of the cases showed arborising, crown or comma vessels. Comedo-like openings, millia-like cysts, cerebriform pattern and ulceration were observed in one case each. The following dermoscopic structures were not observed: pigment network, dots/globules, streaks, blue pigmentation, finger-like structures, leaf-like

structures, spoke-wheel areas, blue-grey ovoid nests, blue-grey globules, red-blue lacunae, red-bluish homogeneous areas, delicate pigment network, scar-like patches, erythema, blue-whitish veil, regression structures, hypopigmented areas, blotchy or milky-red globules/areas.

Further, we noticed the characteristic “honeycomb appearance” in 9 of 10 cases, which showed pink to milky red, well-circumscribed globule/lacuna-like structures with separation of white to pink mesh bands. We took a histopathological approach to examine the honeycomb appearance. The histopathological features of the horizontal sections at a depth of 300 to 400 μm from the surface showed good correlations with the dermoscopic features. On the sections with HE staining, monomorphous poroid cells formed mesh-like structures together with cuticular cells (Fig. 2A and 2B). The mesh-like structure was positive for PAS (diastase labile) and AB-PAS (Fig. 2C–2E). In addition, cuticular cells with CEA signal formed lumens within the mesh-like structure (Fig. 2F). These were compatible with the features of tumour cells in EP. The mesh-like structure surrounded the oedematous stromata with an island-like appearance (Fig. 2A and 2B). Weak EVG staining suggested a severe oedematous state in the stromata (Fig. 2G), whereas CD31 expression indicated

the presence of numerous micro-vessels (Fig. 2H). Thus, the honeycomb appearance was attributable to the mesh-like tumour structure together with vessel-rich stromata.

Discussion

To our knowledge, the dermoscopic features of only 12 cases of non-pigmented EP have been reported to date.¹⁻⁵ Vascular structures (with halos in some cases) were observed in all 12 cases (Table 2), most of which had a polymorphous vascular pattern. In our series, while the frequency of vascular structures was rather lower than that in these previous cases, vascular structures were also prevalent. In addition, most of the vessels in our series were irregularly shaped with telangiectasia. Aydingoz also noted irregular vascular patterns in a case of EP, and described them as a “flower-like” and “leaf-like appearance”.⁵ Thus, an irregularly shaped vascular structure is one of the dermoscopic characteristics of non-pigmented EP.

Moreover, each vessel was packed into each pink to milky red, well-circumscribed globule/lacuna-like structure separated with white to pink mesh bands, which was noted in 9 of the 10 non-pigmented EP cases in our

series. Similar features were also described in previous reports.¹⁻⁴ Therefore, this dermoscopic feature seems to be common in non-pigmented EP. Here, we propose that this characteristic finding should be called the “honeycomb appearance”.

To analyse the honeycomb appearance in more detail, we performed histopathological studies on horizontal sections. The dermoscopic structure of pink to reddish, well-circumscribed globule/lacuna-like structures reflected the stromata composed of highly vascular and oedematous connective tissue. Histopathologically, the stroma in EP was described as “granulation tissue-like”⁷ or “usually richly vascular with some telangiectatic vessels”.⁸ The characteristics of the stroma may also be related to the frequency of vascular structures in non-pigmented EP by dermoscopy. On the other hand, white to pink mesh bands corresponded to tumour cells of EP. The “honeycomb appearance” on dermoscopy is helpful in diagnosis.

The absence of arborising vessels in our series was helpful to distinguish non-pigmented EP from basal cell carcinomas. Arborising vessels are characteristic vascular structures frequently seen in basal cell carcinomas.⁹⁻¹¹ Particularly, 83.7% of non-pigmented basal cell carcinomas show arborising

vessels.¹² With regard to the differentiation of pyogenic granuloma, 85% of pyogenic granulomas appeared as red-whitish homogeneous areas surrounded by a white collarette,¹³ which were larger than the pink to reddish globule/lacuna-like structures in non-pigmented EP. In amelanotic/hypomelanotic malignant melanomas, milky-red areas/globules are the predictive dermoscopic finding,^{9,14-15} which are defined as globules and/or larger areas of fuzzy or unfocused milky-red colour. In contrast, pink to reddish globule/lacuna-like structures of non-pigmented EP can be distinguished because they are well-circumscribed and have a regular arrangement. In seborrhoeic keratosis, a number of comedo-like openings or millia-like cysts are seen, especially in plaque or papular/nodular lesions (comedo-like openings 91%, millia-like cysts 86%).¹⁶ In addition, hairpin vessels were observed in 51.2% to 63% of cases of seborrhoeic keratosis,¹⁶ most of which were found at the borders or in the periphery of the lesions surrounded by a whitish halo.¹⁰

In conclusion, a vascular structure is a common dermoscopic feature of non-pigmented EP. The “honeycomb appearance”, described as well-circumscribed, globule/lacuna-like structures separated with mesh bands, is another characteristic on dermoscopic analysis. Further studies are required to

evaluate their diagnostic accuracy to differentiate non-pigmented EP from other skin tumours.

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Figure legends

Figure 1. Dermoscopic features of non-pigmented eccrine poromas. Pink to reddish, well-circumscribed, globule/lacuna-like structures are separated with white to pink mesh bands, *i.e.*, the “honeycomb appearance”. (A) Case 1. A pink-coloured nodule, 21×16 mm in size, on the sole of the foot of 34-year-old man. Hairpin vessels were observed within pink to reddish, well-circumscribed, globule/lacuna-like structures. (B) Case 3. A pink-coloured nodule, 3×1 mm in size, on the sole of the foot of a 32-year-old man. “Honeycomb appearance” was observed throughout the lesion. (C) Case 5. A pink-coloured nodule, 27×24 mm in size, on the foot of a 70-year-old man. Typical “honeycomb appearance” was observed without vascular structures. (D) Case 8. A pink to reddish-coloured plaque, 27×23 mm in size, on the lower leg of a 43-year-old man. Polymorphous vessels (including hairpin and dotted vessels) and comedo-like openings were observed.

Figure 2 Histopathological findings of non-pigmented eccrine poroma of case 5.

(A) Vertical section. Columnar to bulbous aggregations consisting of monomorphous poroid cells extended continuously together with cuticular cells

into the dermis. The stroma was composed of oedematous connective tissue with telangiectatic microvessels. (B to H) Consecutive horizontal sections at a depth of 300 to 400 μm from the surface of the tumour. (B) Tumour cells formed a mesh-like structure. Stromata were surrounded by the mesh-like structure with an island-like appearance. (C to E) The tumour cells were positive for periodic acid-Schiff (PAS) with diastase labile and Alcian blue-PAS (AB-PAS). (F) The cuticles in the aggregations of tumour cells were positive for carcinoembryonic antigen (CEA). (G) The stromata were negative for Elastica van Gieson (EVG). (H) The basal membrane of the ductal structures in the stroma was positive for CD31. (A and B) HE staining; (C) PAS staining; (D) PAS staining with diastase; (E) AB-PAS staining; (F) CEA; (G) EVG staining; (H) CD31. Original magnification (A) $\times 12.5$; (B) $\times 20$; (C to E, G and H) $\times 40$; (F) $\times 100$.

Table 1 Dermoscopic structures of 10 non-pigmented eccrine poromas

Patients (sex/age)	Location	Hairpin vessels	Dotted vessels	Linear-Irregular vessels	Milia-like cysts	Comedo-like openings	Cerebriform pattern	Ulceration
1(M/34)	Foot	+	-	-	-	-	-	-
2(M/39)	Foot	-	-	-	-	-	-	-
3(M/32)	Foot	-	-	-	-	-	-	-
4(M/69)	Foot	+	+	-	-	-	-	-
5(M/70)	Foot	-	-	-	-	-	-	-
6(F/89)	Lower leg	-	-	+	+	-	-	-
7(F/39)	Lower leg	+	+	+	-	-	-	-
8(M/43)	Lower leg	+	+	-	-	+	-	-
9(M/75)	Hand	-	-	-	-	-	+	-
10(M/73)	Back	-	-	-	-	-	-	+
Lesions, n (%)		4/10 (40)	3/10 (30)	2/10 (20)	1/10 (10)	1/10 (10)	1/10 (10)	1/10 (10)

Table 2 Summary of vascular structures in the previously reported cases of 12 non-pigmented eccrine poromas					
Author	Hairpin vessels	Dotted vessels	Linear-Irregular vessels	Glomerular vessels	
Altarura et al. ¹	+	+	+	-	
Nicolono et al. ⁴	-	-	+	+	
Avilés-Izquierdo et al. ²	+	-	+	+	
	+	-	+	+	
Ferrari et al. ³	-	-	-	+	
	-	-	-	+	
	+	-	+	+	
	+	-	-	-	
	+	-	+	+	
	+	-	-	-	
	+	-	+	+	
Aydingoz ⁵	-	-	-	-	*flowe-like, leaf-like vascular pattern
Lesions, n (%)	8/12 (67)	1/12 (8)	7/12 (58)	8/12 (67)	

Figure 1

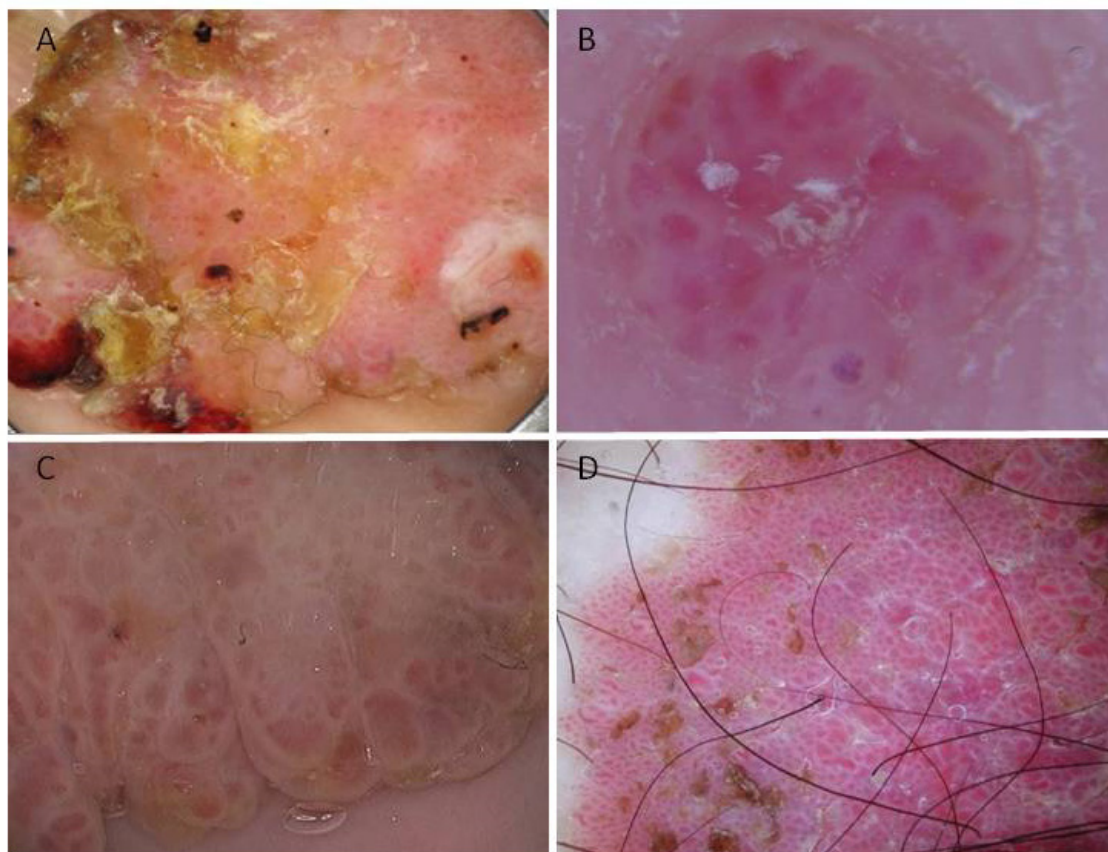


Figure 2

