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Reflectance Confocal Microscopy Combined with Dermoscopy and Histology in the Diagnostic Setting of Pigmented Eccrine Poroma: A Retrospective Study

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ABSTRACT

Introduction: Pigmented eccrine poroma (PEP) is a unique variant of a benign adnexal tumor known as eccrine poroma. Distinguishing PEPs from other pigmented lesions can be challenging due to overlapping clinical and dermoscopic features.

Objectives: To provide a comprehensive analysis of the dermoscopic, confocal (RCM), and histological features of PEPs.

Methods: We undertook a retrospective study of the clinical, dermoscopic, RCM and histopathological features of PEPs that were surgically excised and histopathologically recognized. Data on epidemiological, clinical, dermoscopic, RCM and histopathological features were collected from the databases of the Skin Cancer Unit, IRCCS Policlinico di Sant'Orsola, between January 2021 and May 2023.

Results: The study population consisted of 61 patients, including 34 females (55.7%) and 27 males (44.3%). Dermoscopic examination of 61 PEPs revealed the presence of irregular borders (55.7%), milia-like cysts (50.8%), brown pseudo-network (41%), cerebriform pattern (34.4%), comedo-like openings (29.5%), atypical vessels (26.2%), glomerular vessels (18%), fingerprint-like perifollicular structures (8.2%), dots (4.9%) and dotted vessels (4.9%). RCM imaging was collected from 11 cases and showed mostly well-defined tumor nests with small cells in 100% of cases, bright structures in the upper dermis representing melanocytes and melanophages (63.6%), dark round spaces within the tumor nests (54.5%), well-demarcated borders of the nest (45.5%) and dilated and prominent vessels in upper dermis (27.3%). Histopathological pattern analysis revealed PEP sensu stricto (PEPss) as the most frequent (54.1%).

Conclusions: The distinctive dermoscopic patterns, along with the confocal features aid in the differentiation from other pigmented lesions.

Introduction

Eccrine poroma (EP) is a benign adnexal tumor, originating from the sweat glands. It primary affects the acral regions, such as the palms and soles, given the higher concentration of eccrine sweat glands [1]. EP typically appears as an asymptomatic solid, flesh-colored, nodular-like lesion between 4th and 6th decades of life, with no significant sex predominance [2]. The exact cause of this condition is not known, but it may be associated with injuries, exposure to radiation, or scars [3]. Generally, EPs lack pigmentation, although there are occasional cases where a pigmented variation can be observed (pigmented eccrine poroma [PEP]); this particular variant is more frequent among individuals with darker skin tones and, differently from the non-pigmented EP, is typically located on the trunk [4].

Objectives

Our study provides a comprehensive analysis of the dermoscopic, confocal, and histological features of PEPs based on the evaluation of 61 cases collected from January 2021 to May 2023 at the Skin Cancer Unit, IRCCS Policlinico di Sant'Orsola, Bologna, Italy. The study, conducted by a group of experts in dermoscopy, reflectance confocal microscopy (RCM) and histopathology enhances our knowledge of this rare entity to improve its differentiation from other pigmented skin lesions.

Methods

We undertook a retrospective study of the clinical, dermoscopic, RCM and histopathological features of PEPs that were surgically excised and histopathologically recognized. Data on epidemiological, clinical, dermoscopic, RCM and histopathological features were collected from the databases of the Skin Cancer Unit, IRCCS Policlinico di Sant'Orsola, Bologna, Italy between January 2021 and May 2023. This study was approved by the Institutional Review Board. The inclusion criterion was the availability of the data of histopathologically diagnosed PEPs. Patients without relevant medical records were excluded. All lesions were re-examined by two dermatopathologists specialized in the field. Dermoscopic images were collected through a digital video camera system (Medicam 800; FotoFinder Systems GmbH; original magnifications ×20–×40). Each dermoscopic image was then reviewed by 5 dermatologists (SC, MM, AA, ED, FV). Concordance between dermatologists was considered when 4 out of 5 agreed on the dermoscopic structure. While all the cases underwent dermoscopic and histologic examination, 11 cases were analyzed with RCM. RCM images were acquired through VivaScope®, Lucid Inc.. Each RCM image was then reviewed by 2 experts in RCM (ED, FV). Concordance between the above-mentioned experts was considered when 2 out of 2 agreed on the RCM feature. Lastly, the histopathological patterns were associated by our 2 dermopathologists to 4 different histological variants of PEPs: PEP sensu stricto (PEPss), Pigmented Poroid Hidroadenoma (PPH), Pigmented Hidroacanthoma Simplex (PHS) and Pigmented Dermal Duct Tumour (PDDT) [5]. The dermoscopic patterns, confocal features, and histological characteristics were assessed for each case to identify specific features and aid in accurate diagnosis.

Results

The study population consisted of 61 patients with a histologically confirmed diagnosis of PEP, including 34 females (55.7%) and 27 males (44.3%). Age at presentation ranged from 36 to 75 years (mean 66.5 years, median 64 years).

Mean age was 62.3 years for females and 67.6 years for males, respectively. Anatomical site was as follows: trunk (44.3%), lower extremities/soles (27.9%), upper extremities/palms (22.9%) and head and neck/scalp (4.9%).

Dermoscopic examination of 61 PEPs revealed the presence of irregular borders (55.7%), milia-like cysts (50.8%), brown pseudo-network (41%), cerebriform pattern (34.4%), comedo-like openings (29.5%), atypical vessels (26.2%), glomerular vessels (18%), fingerprint-like perifollicular structures (8.2%), dots (4.9%) and dotted vessels (4.9%).

RCM imaging was collected from 11 cases since the technique was recently introduced and images weren't available for all cases. It showed mostly well-defined tumor nests with small cells in 100% of cases, bright structures in the upper dermis representing melanocytes and melanophages (63.6%), dark round spaces within the tumor nests (54.5%), well-demarcated borders of the nest (45.5%) and dilated and prominent vessels in upper dermis (27.3%). Histopathological pattern analysis revealed PEPss as the most frequent (54.1%) where a lobular growth pattern and broad connection to the overlying epidermis of poroid cells and cuticular cells, with abundance of melanin, followed by PDDT (23%), PHS (19.7%) and PPH (3.8%).

Results are fully displayed in Tab.1.

Conclusions

EPs are a rare variant of a benign adnexal tumor originating from the epithelium of the intraepidermal portion of eccrine sweat ducts, typically located on the acral regions, such as the palms and soles, but they can also occur in non-acral sites [3]. PEP corresponds to only 17% of cases of EP and it

Table 1. Dermoscopic, reflectance confocal microscopy and histopathological features of pigmented eccrine poromas in the whole study population.

Dermoscopic features		N (61)	%
	Comedo-like openings	18	29,5
	Cerebriform Pattern	21	34,4
	Milia-like cysts	31	50,8
	Dots	3	4,9
	Irregular Shape	34	55,7
	Brown Pseudo-network	25	41
	Fingerprint-like Perifollicular structures	5	8,2
	Glomerular Vessels	11	18
	Dotted Vessels	3	4,9
	Atypical Vessels (Hairpin, one-looped)	16	26,2
RCM features		N (11)	%
	Tumour nest with small cells	11	100
	Dark round spaces	6	54,5
	Well-demarcated borders of the nest	5	45,5
	Bright structures in the upper dermis	7	63,6
	Dilated and prominent vessels in upper dermis	3	27,3
Histologic features		N (61)	%
	Lobular growth pattern and broad connection to the overlying epidermis of poroid cells and cuticular cells, with abundance of melanin (PEPss)	33	54,1
	Small poroid cells, large and pale cuticular cells with clusters of sebocytes, foci of keratohyaline granules and cystic areas (PPH)	2	3,8
	Delineated and sharp aggregations of poroid and cuticular cells with tubular structures within the epidermis and an increase in melanin (PHS)	12	19,7
	Poroid cells and cuticular cells aggregated in small, discrete intradermal nodules with almost no connection to the epidermis and an increase in melanin (PDDT)	14	23

PEP = pigmented eccrine poroma; PHS = pigmented hidroacanthoma simplex; PPH = pigmented poroid hidroadenoma; RCM = reflectance confocal microscopy.

is more commonly found in non-acral sites [6,7]. Clinically, PEP can be challenging to distinguish from other pigmented lesions, including seborrheic keratosis, nevus, histiocytofibroma, basal cell carcinoma, squamous cell carcinoma and cutaneous melanoma [8].

Our data, which reflect the largest sample of PEPs described in the published Literature, provides relevant information concerning the epidemiology, the clinical, dermoscopic and RCM presentation of PEPs, focusing on their specific features. We aimed to investigate the clinical, dermoscopic and RCM presentation of such tumors, which might be helpful to guide a correct histopathological diagnosis in difficult cases. Although specific dermoscopic criteria are not yet available, certain features might be helpful to better define our clinical orientation. Regarding our data, the most predominant features were irregular shape (N = 34/55.7%), milia-like cysts (N = 31/50.8%), brown pseudo-network (N = 25/41%) and comedo-like openings (n = 18/29.5%), combined with the presence of atypical vessels in about 30% of cases (Figure 1). These findings partially align with previous studies that have reported similar dermoscopic patterns in PEP and consolidate them on a larger scale [6,9-10-12]. The main challenge remains the differential diagnosis with seborrheic keratosis, which may show similar patterns, as well as basal cell carcinoma (although in our series, only a few PEPs displayed blue-brown globules and arborizing vessels, that may be commonly found in basal cell carcinomas) and cutaneous melanoma [8,11,12]. In this sense, RCM provided valuable insights into the architecture and cellular features of PEP, giving us the chance to make a correct clinical diagnosis possible. In our series, RCM features included well-defined tumor nests (N = 11/100%), bright structures representing melanocytes and melanophages in the upper dermis (N = 7/63.6%), and dark round spaces within the tumor nests (N = 6/54.5%). The architecture of the lesions was overall symmetric (Figure 2). These findings are consistent with previous reports on RCM features of PEP, emphasizing the utility of RCM in differentiating them from malignant pigmented lesions, mostly basal cell carcinoma, although no standardized criteria have ever been described [13,14].

Histopathological analysis of PEPs in our case series confirmed the characteristic features of this tumor. The tumor cells displayed differentiation towards the sweat gland ductal structures, with the presence of poroid cells, cuticular cells and tubular structures. The pigmentation observed in the tumor cells was attributed to melanin deposition (Figure 3). These histological findings align with previous studies, further supporting the diagnosis of PEP; the differences between every case show how chameleonic this entity could be, even through the lens of dermopathologists (furthermore, some cases of overlapping histological variants are reported in

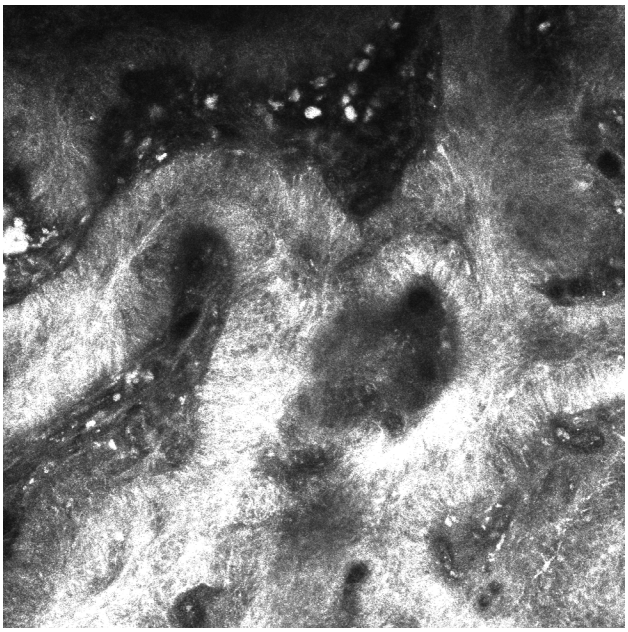

Figure 2. Reflectance confocal microscopy of pigmented eccrine poroma showing hypo-refractile dark oval spaces within the tumor nests; tumoral bands surrounded by abundant stroma with well demarcated borders.

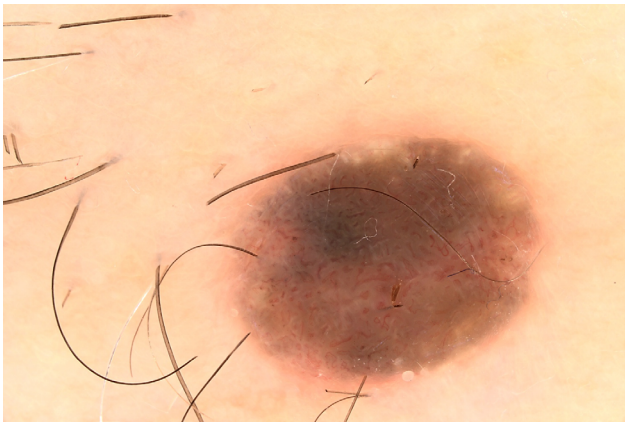

Figure 1. Dermoscopic image of pigmented eccrine poroma with milia-like structures, cerebriform pattern and hairpin vessels.

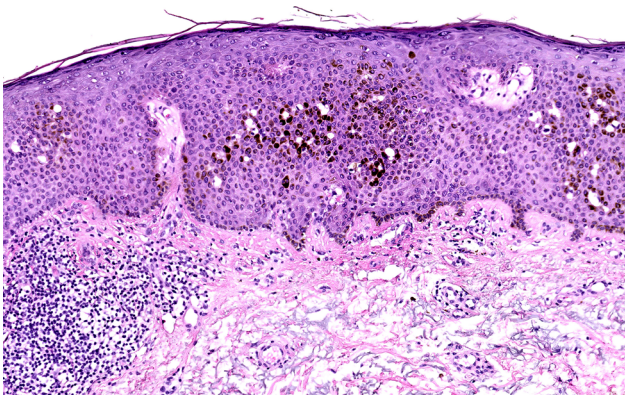

Figure 3. Proliferation of pigmented epithelial cells, focal hypergranulosis and melanin deposits in the epidermis. Dilated vessels, focal lymphocytic infiltrate, and solar elastosis in the superficial dermis.

literature, which makes the whole diagnostic process even more complex) [15-17].

Distinguishing PEPs from other conditions, mostly seborrheic keratosis, basal cell carcinoma and melanoma, poses a significant diagnostic challenge due to overlapping clinical and dermoscopic features. However, some distinctive dermoscopic patterns and confocal features observed in PEPs, provide valuable tools for differentiation. Histology remains the fundamental tool to achieve diagnosis.

Further studies comparing a larger number of cases and incorporating additional diagnostic modalities are warranted to refine the diagnostic criteria and improve the accuracy of differentiation between PEPs and other pigmented skin lesions. Increased awareness of the dermoscopic and confocal features of PEPs among clinicians and dermoscopists will aid in the early recognition and appropriate management of this rare entity.

In conclusion, our study provides valuable insights into the dermoscopic, RCM, and histological features of PEPs. The distinctive dermoscopic patterns, along with the confocal features aid in the differentiation from other pigmented lesions. However, distinguishing PEPs remains a diagnostic challenge due to overlapping features. Therefore, a comprehensive evaluation considering clinical, dermoscopic, confocal, and histopathological findings is essential for accurate diagnosis and appropriate management of these lesions.

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