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CONCISE COMMUNICATION

Differentiation of pityriasis rubra pilaris from plaque psoriasis by dermoscopy

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Abstract Pityriasis rubra pilaris (PRP) and plaque psoriasis (PP) are two distinctive erythemato-squamous skin diseases that often have to be differentiated from each other and from other similar dermatoses. Dermoscopy has been proven to aid the clinical diagnosis of several inflammatory disorders, minimizing the need for skin biopsy. Our aim was to determine the dermoscopic patterns of PRP compared to PP and to assess the significance of certain dermoscopic criteria in the diagnosis of PRP. This case–control study included 11 patients with biopsy proven PRP and 25 patients with biopsy proven plaque psoriasis. The most recently developed lesion of each patient was examined by non-contact dermoscopy. Whitish keratotic plugs and linear vessels in yellowish background are significant dermoscopic features of PRP compared to white diffuse scales and dotted vessels in a light red background in PP. In conclusion, PRP and PP reveal specific distinguishing dermoscopic patterns that may assist in their clinical diagnosis and may also be useful for the differential diagnosis from other resembling dermatoses.

Keywords Dermoscopy · Psoriasis · Pityriasis rubra pilaris

Introduction

Pityriasis rubra pilaris (PRP) is a relatively uncommon skin disease characterized clinically by erythematous scaly plaques with islands of normal skin, follicular plugs, and palmoplantar hyperkeratosis [4]. Nevertheless, in atypical cases, PRP has to be differentiated from other erythemato-squamous dermatoses especially plaque psoriasis (PP), which may at times be a diagnostic challenge [4]. In such cases, histopathology contributes significantly towards the accurate diagnosis [9].

Dermoscopy is a non-invasive diagnostic tool that permits visualization of many morphologic features not visible to the naked eye especially vascular and pigmented structures; therefore, it represents a link between macroscopic dermatology and microscopic dermatopathology [1].

In addition to its well-documented value in the diagnosis of skin tumors, dermoscopy significance in the field of general dermatology is constantly expanding. It has been shown to facilitate the clinical diagnosis of pigmentary disorders, hair and nail disorders, and inflammatory and infectious diseases [6]. Dermoscopic studying of inflammatory dermatoses is probably the most promising topic in terms of development and usefulness, considering the frequent challenges in their differential diagnosis [2]. Several papulosquamous dermatoses have been shown to exhibit characteristic and repetitive dermoscopic patterns such as psoriasis, dermatitis, pityriasis rosea, and lichen planus [7].

While the dermoscopic features of psoriasis have extensively been investigated [5–7, 9–11], those of PRP have been described only in two case-reports [5, 8].

The aim of this study was to determine the dermoscopic findings characteristic for PRP compared to PP and to investigate their significance.

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Patients and methods

This case–control study was carried out at Department of Dermatology, Assiut University Hospital, Egypt. After institutional review board approval, patients with biopsy proven PRP and plaque psoriasis were enrolled in the study. They had all provided written informed consent.

Patients on topical or systemic treatment in the last one and three months respectively were excluded. Lesions located on the scalp, palms, soles, and genital areas were also excluded from the study.

The most recently developed lesion of each patient was examined by non-contact dermoscopy (Dermlite II pro HR) and several photographs were taken by the attached camera (digital canon IXUF). The dermoscopic examination and the photographs interpretations were performed by an independent dermoscopist (EF) blinded to the histopathological diagnosis. The description of the dermoscopic variables included in this study was based on the third consensus conference of the International Society of Dermoscopy [3].

Statistical analysis

Data collected and analyzed by computer program SPSS (version16). Fisher exact test was used for non-parametric data. A probability value (p value) was expressed as significant when $p \leq 0.05$.

Results

The study included 11 patients with PRP (eight patients with adult onset classical type and three patients with juvenile onset classical type) (F/M ratio, 6/5) and 25 patients with PP (F/M ratio, 5/20). Their mean ages were 19.5 ± 6.4 and 36.15 ± 19.11 for PRP and PP, respectively.

The specific dermoscopic features of PRP and PP are shown in Table 1. The most common dermoscopic finding of PRP (present in 90.9% of the cases) was yellowish background. Whitish keratotic plugs were also very common (88.9%) in PRP patients (Figs. 1, 2). Linear vessels were demonstrated in 81.8% in PRP either solely (45.4%) or mixed with dotted vessels (36.4%). Those vessels were arranged mainly peripherally (54.5%).

The main dermoscopic features of PP include dotted vessels (100.0%) (solely in 96.0%), and white scales (72.0%) in a light red background (88.0%) (Figs. 1, 2).

Statistical analysis showed that the frequencies of certain features are significantly high ($p < 0.000$) in PRP compared to PP, such as, yellowish red back ground (90.9%), whitish keratotic plugs (81.8%), linear (45.4%), peripheral (54.5%) vessels, and clustered scales (45.4%) The frequencies of light red background (88.0%) ($p < 0.000$), diffuse (80.0%) ($p < 0.001$), dotted (96.0%) ($p < 0.000$) vessels, and white scales (72.0%) ($p < 0.003$) were significantly high in PP compared to PRP.

Table 1 Dermoscopic features of pityriasis rubra pilaris and plaque psoriasis

	PRP ($n = 11$), n (%)	PP ($n = 25$), n (%)	p value
Background colour			
Light red	0 (0.0)	22 (88.0)	0.000*
Dark red	1 (9.1)	2 (8.0)	0.961
Yellowish red	10 (90.9)	1 (4.0)	0.000*
Keratotic plugs	9 (81.8)	0 (0.0)	0.000*
Vascular morphology			
Dotted	2 (18.2)	24 (96.0)	0.000*
Linear	5 (45.4)	0 (0.0)	0.000*
Dotted and linear	4 (36.4)	1 (4.0)	0.031*
Vascular arrangement			
Diffuse	3 (27.3)	20 (80.0)	0.001*
Clustered	2 (18.2)	2 (8.0)	0.102
Circles	0 (0.0)	3 (12.0)	0.061
Peripheral	6 (54.5)	0 (0.0)	0.000*
Scale color			
Whitish	4 (36.4)	18 (72.0)	0.003*
Yellowish	3 (27.3)	1 (4.0)	0.003*
Whitish and yellowish	1 (9.1)	2 (8.0)	0.961
Scale distribution			
Central	1 (9.1)	4 (16.0)	0.366
Clustered	5 (45.4)	2 (8.0)	0.000*
Diffuse	2 (18.2)	15 (60.0)	0.006*

PRP pityriasis rubra pilaris, *PP* plaque psoriasis

*$p \leq 0.05$: statistically significant

Discussion

Dermoscopic features may be specific for a particular disease and may be seen in more than one entity and are consequently considered 'non-specific'. Non-specific feature coupled with certain other clinical dermoscopic criteria often leads to either an accurate definite diagnosis or a narrowed list of differential diagnoses [6]. The present study points to significant differences in the dermoscopic patterns of PRP and PP, which may assist the non-invasive diagnosis in certain cases.

Although as a single feature, yellowish background is not specific for PRP, it is very helpful in differentiating PRP from psoriasis. In fact, yellowish background has previously been presented as a major negative prognostic predictor for the diagnosis of psoriasis [7].

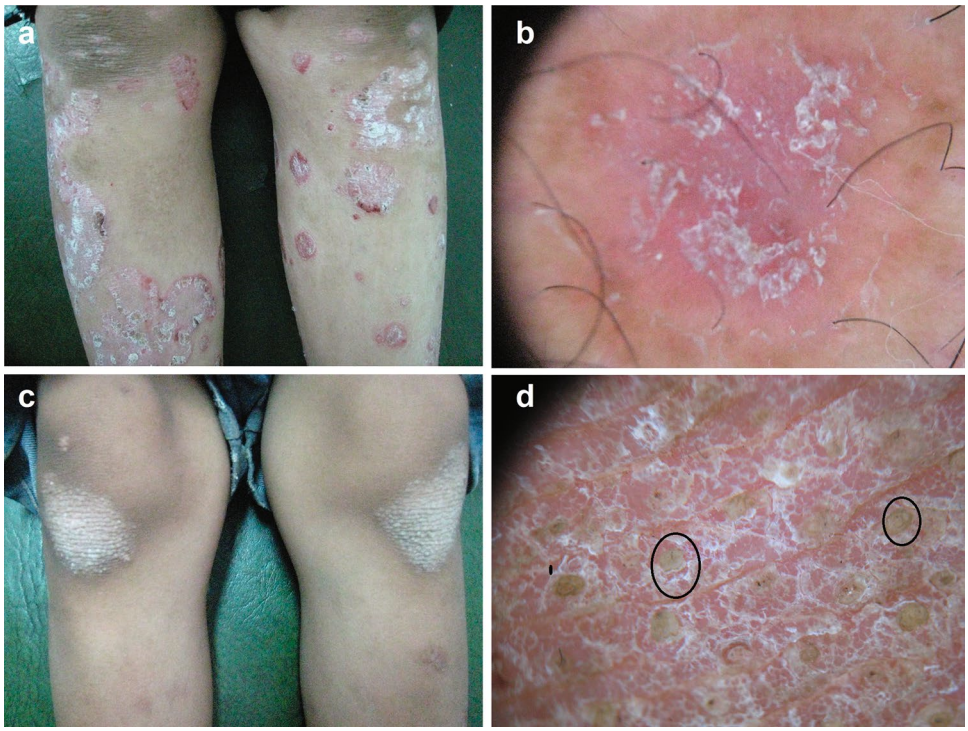

Fig. 1 Patients with plaque psoriasis (PP) (**a**) and pityriasis rubra pilaris (PRP) (**c**), dermoscopic examination of PP shows white scales in *light red background* (**b**); in contrast, PRP reveals yellow and white scales and keratotic plugs (*black circle*) in *yellowish red background* (**d**)

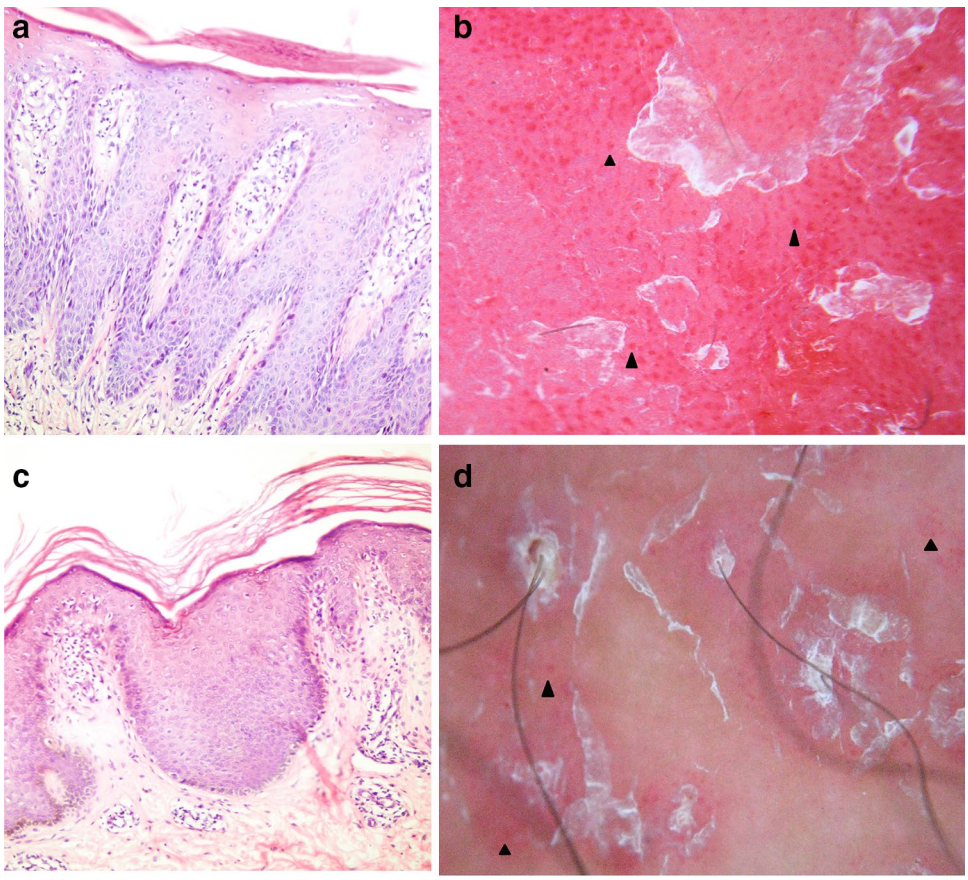

Fig. 2 Histopathology of plaque psoriasis (PP) (**a**) showing parakeratosis and psoriasiform hyperplasia of the epidermis, (haematoxylin–eosin, original magnification ×20) and that of pityriasis rubra pilaris (PRP) (**c**) showing irregular acanthosis and alternating orthokeratosis and parakeratosis (haematoxylin–eosin, original magnification ×20). Dermoscopic examination of PP shows diffuse dotted vessels (*black arrowhead*), and white scales in *light red background* (**b**); in contrast, PRP reveals clustered dotted vessels (*black arrowhead*) and white scales in *yellowish red background* (**d**)

Moreover, the presence of whitish keratotic plugs exclusively in PRP compared to PP indicates its value as a distinguishing feature; this finding is supported by López-Gómez et al. [8].

Detection of linear vessels in 81.8% of PRP cases (either sole or mixed with dotted vessels) compared to dotted vessels alone in 96% of PP cases is another important significant feature distinguishing those two dermatoses. These findings are in agreement with the case report of Lallas et al. [5] and the study of Va'zquez-Lo'pez et al. [10] who reported that the absence of dotted vessel should raise doubts about the diagnosis of PP.

Several other dermoscopic clues have been suggested to be of equal importance in the differential diagnosis of inflammatory skin lesions [6, 7, 10, 11]. Examples of these clue patterns are, the combination of regularly distributed dotted vessels over a light red background associated with diffuse white scales which was reported to be highly predictive of PP [2, 7] and allows a correct diagnosis with 88.0% specificity and 84.9% sensitivity [7]. Another clue pattern is the presence of yellow scales along with clustered distribution of dotted vessels in dark red background with or without yellowish serocrusts (yellow clod sign) which is indicative of nummular eczema [2, 6, 7]. A third example is the combination of peripheral whitish scaling (collarette sign) and clustered dotted vessels in yellowish background; it represents a valuable clue in the diagnosis of PR [2, 6, 7].

This is supported by our study, which revealed significant differences with respect to vascular arrangement, scale colour, and scale distribution between PRP and PP.

In conclusion, PRP and PP reveal specific distinguishing dermoscopic patterns that may assist in their clinical diagnosis and may also be useful for the differential diagnosis from other resembling dermatoses especially when skin biopsy is not available as it will remain the gold standard diagnostic tool in dermatology.

Compliance with ethical standards

Funding None.

Conflict of interest We, the authors, declare that we have no conflict of interest.

Ethical approval All procedures performed in our study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. We got the approval of our institution ethical committee before the beginning of the study.

Informed consent Informed consent was obtained from all individual participants included in the study. All patients signed the written informed consent after detailed explanation of the steps of the study, including their approval to publish their photos in case we need to do so.

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