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Bowen's Disease in Dermoscopy

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ABSTRACT Bowen's disease, named after John Templeton Bowen, also known as squamous cell carcinoma in situ is a type of non-melanocytic intraepidermal malignancy. It is estimated that in general population around 3% to 5% of Bowen's disease transform into invasive squamous cell cancer. Dermoscopy aims in the identification of the Bowen's disease. The most typical dermoscopic features of Bowen's disease include glomerular vessels and scaly surface. Although dermoscopy of Bowen's disease has been well established other skin lesions may present similar or identical structures in dermoscpic images leading to differential diagnosis dilemmas. Histopathological confirmation should be obtained prior the treatment of suspected cases of Bowen's disease in order to avoid a misdiagnosis.

KEY WORDS: dermoscopy, dermatoscopy, Bowen's disease, skin cancer, pigmented Bowen's disease, squamous cell carcinoma

INTRODUCTION

Bowen's disease, named after John Templeton Bowen, also known as squamous cell carcinoma in situ is a type of non-melanocytic intraepidermal malignancy. Clinically it usually appears as a single, well-demarcated, erythematous, scaly patch which correspond to non-pigmented subtype and is mostly found on sun-exposed areas such as the head, neck and extremities (1). A pigmented variant, according to the study of Ragi *et al*., represents 1.7% cases of Bowen's disease, occurs usually on sun-unexposed areas in patients with darker skin phototypes and clinically represents a pigmented, scaly plaque (2, 3). Multiple Bowen's disease is found in approximately 10 to 20% of thepatients (4).

Bowen's disease may arise on preexisting actinic keratosis or in the previously unchanged skin (5). It is estimated that around 3 to 5% of Bowen's disease cases in general population transform into invasive squamous cell cancer (6). A tendency for spontaneous regression has been observed but remains questionable. (7) Epidemiological data suggest that the incidence of skin cancers, including Bowen's disease, has been increasing and is nowadays more frequent in younger patients (8, 9).

Dermoscopy is an examination method commonly used by dermatologist for the detection of Bowen's disease.

DERMOSCOPY OF NON-PIGMENTED BOWEN'S DISEASE

The first description of dermoscopy in Bowen's disease that appeared in literature is by Zalaudek *et al*. in 2004. According to the study, glomerular vessels (Fig. 1) and scaly surface (Fig. 2) were seen in 90% of cases of Bowen's disease (10). Many subsequent publications also showed that the most frequent dermoscopic features of non-pigmented Bowen's disease were glomerular vessels and scaly surface (Fig. 2) (11-13).

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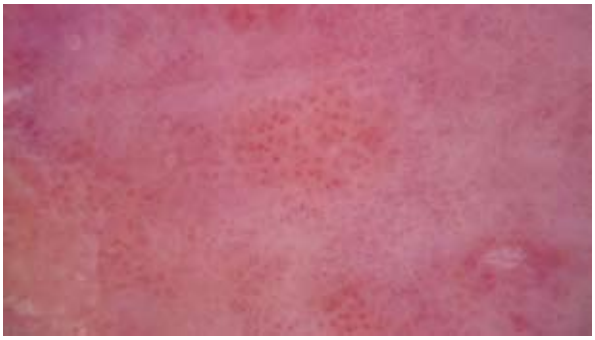

Figure 1. Glomerular vessels.

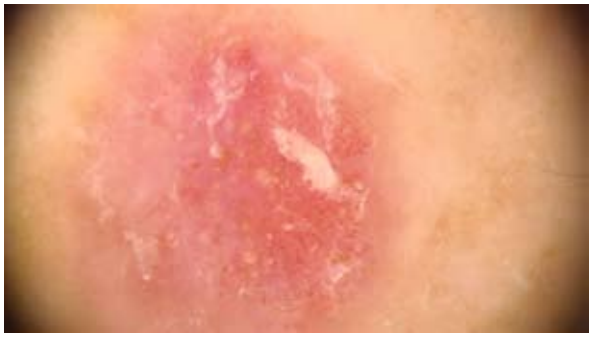

Figure 2. Scaly surface.

An algorithm proposed by Kittler *et al*. (14) for flat non-pigmented skin lesions shows that Bowen's disease may be recognized based on the vascular pattern. According to Kittler *et al*. (14) a monomorphous vessels pattern consisting of coiled vessels is characteristic for Bowen disease. In cases of polymorphous vessels pattern, Bowen's disease can be suspected if vessels as dots are absent (14). The term coiled vessels is used by latter authors synonymously for glomerular vessels.

Other authors described dotted vessels as the main vascular pattern in Bowen's disease, but it appears that in those cases glomerular vessels and dotted vessels were classified as the equal structures (15, 16). It may be explained by the fact that the appearance of the vessels depends on the magnification level used in capturing a dermatological image. (14) Other authors distinguish these types of vessels and use them as separate not interchangeable terms (11, 17).

Recently, it has been confirmed that both types of vessels, dots and glomerular vessels, may be detected under dermoscopy examination in Bowen's disease. Moreover, the vessels are usually arranged in a clustered manner (18-20) (Fig. 3). Diagnostic probability of intraepidermal carcinoma up to 98% is proposed if there is conexistence of glomerular vessels, clustered pattern and hyperkeratosis (19).

Other types of vessels, such as linear, irregular, arborizing vessels and polymorphic, have been rarely described (12).

DERMOSCOPY OF PIGMENTED BOWEN'S DISEASE

Dermoscopy of pigmented variant of Bowen's disease is not specific (21). Small brown globules regularly packed in a patchy distribution and brown to grey homogenous pigmentation are often observed (10).

In a pigmented variant, features resembling those in melanocytic lesions, such as reticular pigmentation, regression-like areas, irregular brown glomerular structures, have been described (22).

In 2010, a retrospective analysis of 52 pigmented Bowen's disease additionally described brown and grey dots arranged linearly as the clue to the diagnosis of pigmented Bowen's disease (23). Pigmented network was detected in 4% of the cases. In 67% of lesions, vascular structures were observed, predominantly coiled vessels. The vessels were also arranged in a linear fashion in 11.5% of the cases (23).

Radial lines or streaks may also be presented in pigmented Bowen's disease . Streaks in Bowen's disease occur at the periphery and within the border of the lesion. Additionally, they show no tendency to converge toward the center of the lesion or to a common base and therefore may be distinguished from those seen in melanocytic lesion or in basal cell carcinoma (24). Recently, a starburst pattern in pigmented Bowen's disease was described (25).

According to Kittler *et al*. (14), the most common pattern in pigmented Bowen's disease is structureless brown (Fig. 4). The Combination of brown and grey dots or clods and structureless, hypopigmented areas is less frequent, but on the other hand much more specific. Coiled vessels, term used by some authors interchangeably to glomerular vessels, are recognized in hypopigmented areas and can be arranged in a linear, clustered or random manner. Linear configurations of brow and grey dots are called radial lines (14).

A list of criteria for pigmented Bowen's disease from different reports appeared in 2010 (21).

PARTIALLY PIGMENTED BOWEN'S DISEASE

Dermoscopic classification of Bowen's disease has been recently proposed. Three types of Bowen's

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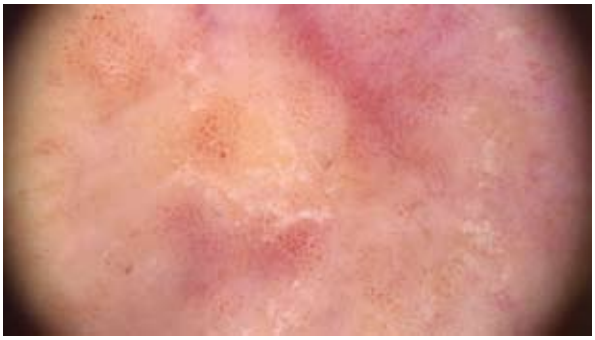

Figure 3. Non-pigmented Bowen's disease. Vessels arranged in clustered manner.

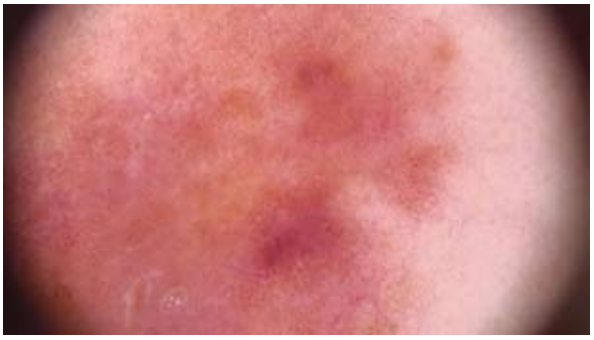

Figure 4. Pigmented Bowen's disease. Structureless brown areas.

disease were described: classical non-pigmented, partially pigmented and pigmented type (17). Partially pigmented Bowen's disease was classified as displaying less than 50% of pigmented structures. Consequently, the pigmented variant presents more than 50% of pigmentation. Among all described structures in the partially pigmented type of Bowen's disease, the most frequently detected features are scaling, glomerular vessels, structureless pigmentation, grey dots or globules. Other dermoscopic structures are pinkish-white structureless areas, and dotted vessels. The dermoscopic image of partially pigmented Bowen's disease presents a combination of structures found in pigmented and non-pigmented types. Partially pigmented Bowen's disease was found in 35% of patients and was recognized as the second most often disease type, after the non-pigmented variant (17).

DERMOSCOPY AID AND LIMITATIONS IN DIFFERENTIAL DIAGNOSIS OF BOWEN'S DISEASE

Many skin lesions may clinically resemble squamous carcinoma in situ. Dermoscopy is a useful dermatological diagnostic tool, which may help in differential diagnosis. Actinic keratosis, invasive squamous cell carcinoma, basal cell carcinoma and malignant melanoma should be primarily considered in the differential diagnosis of Bowen's disease. Others skin lesions such as seborrheic keratosis, adnexal tumors, angiokeratoma, verruca vulgaris should also be taken into consideration in the differential diagnosis.

Dermoscopic criteria characteristic for actinic keratosis, intraepidermal carcinoma and squamous cell carcinoma are summarized by Lallas *et al* (5).In actinic keratosis erythema, red pseudonetwork, strawberry pattern and rosettes are present, whereas in squamous cell carcinoma structures like hairpin vessels, irregular-linear vessels and white structureless areas are specific and not seen in Bowen's disease (5). Dermoscopy also aids in distinguishing basal cell carcinoma from an intraepidermal carcinoma (19). Dermoscopy of basal cell carcinoma reveals mostly arborizing vessels, short fine telangiectasia, ulceration or multiple small erosions, blue-ovoid nests and shiny white-red structures (26), which are not described as characteristic for Bowen's disease (11).

Dermoscopy may aid additionally in the differentiation of acral lentiginous malignant melanoma from periungual Bowen's disease. Brown dots distributed in lines can be observed in the pigmented disease subtype. Parallel furrow pattern, scaly surface, hypopigmented structureless zones, dotted vessels, brown and grey dots arranged in linear fashion have been observed in the analysis of periungual Bowen's disease. Parallel ridge pattern is characteristic for malignant melanoma in acral regions and was not found in Bowen's disease (27). In another example of periungual Bowen's disease resembling paronychia, dermoscopy enabled to establish the proper diagnosis. (28) Hidroacanthoma simplex which clinically may be confused with Bowen's can be distinguished by dermoscopy. Detection of black fine dots, scaly surface arranged annularly in the absence of glomerular vessels argue for the diagnosis of hidroacanthoma simplex. (29) Although in certain situations dermoscopy is useful in the differential diagnosis of Bowen's disease, there are some limitations to this diagnostic method. Not only clinically but also dermoscopically Bowen's disease may be confused with many other skin conditions.

Several cases of Bowen's disease mimicry in dermoscopy are reported in literature. Often Bowen's disease, especially its pigmented variant, is confused with and mimics superficial spreading melanoma by the demonstration of atypical network and dotted vessels in dermoscopy (30). Irregular dotted

vessels and remnants of pigment usually warrant the suspicion of melanoma but examples of histopathologically confirmed Bowen's disease with similar dermoscopy image have been reported (21). The presence of irregular flossy streaks, irregular brown dots or globules, blue-whitish regression structures, and overlaying whitish scaly areas in dermoscopy make pigmented Bowen's disease undistinguishable from melanocytic lesions by means of dermoscopy (31). Another authors postulated that dermoscopy image with pigmentation simulating remnants of atypical pigment network, irregular, brown globular structures and wide regression-like areas is not diagnostic and do not enable the discrimination between pigmented Bowen's disease and melanocytic lesion (22). We can get closer to the proper diagnosis of pigmented Bowen's disease by observation the absence of typical melanocytic structures in the presence of glomerular vessels, regular brown globules and keratosis (21).

It is worth mentioning that, both clinically and dermoscopically, Bowen's disease may imitate a common wart (32, 33). Dermoscopical features typical for verruca vulgaris such as yellowish, rough, verrucous surface areas and brown-red streaky hemorrhages were described in cases of Bowen's disease localized below the distal nail plate (34). Subungual Bowen's disease may appear clinically also as longitudinal melanonychia and then dermoscopically reveals inhomogeneous blocky streak. (35). Bowen's disease of nail apparatus is often misdiagnosed as verruca vulgaris, onychomycosis, posttraumatic dystrophy or melanocytic lesions what can delay the proper diagnosis.

Many cutaneous conditions may clinically and dermoscopically resemble Bowen's disease. These diseases include psoriasis, amelanotic melanoma, contact dermatitis, clear cell acanthoma or unilesional mycosis fungoides (36-38). Differential diagnosis of pigmented Bowens disease may be particulary difficult.

Cases of dermoscopical mimicry as well as clinical observations indicate the need of histopathological examination in doubtful cases.

CONCLUSION

Bowen's disease may clinically and dermoscopically mimic other (melanocytic and non-melanocytic) skin lesions and in reverse other disease may be misdiagnosed as Bowen's disease.

Although dotted and glomerular vessels are strong predictors of Bowens disease (39), histopatology may be required for final diagnosis. An early and correct diagnosis and treatment of Bowen's disease is of great importance as it prevents the process of transformation into invasive squamous cell carcinoma.

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