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How do we recognize a difficult squamous cell carcinoma? A retrospective analysis of clinically and dermoscopically misdiagnosed tumours

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Abstract

Background In people with lighter skin phototypes, squamous cell carcinoma (SCC) is typically nonpigmented and must be distinguished from other nonpigmented tumours. Although the dermoscopic features of SCC are well-known, some SCCs are challenging to recognize even with dermoscopy.

Objectives To investigate the clinical and dermoscopic features responsible for an inaccurate clinical diagnosis of invasive SCC and potential clues that could help in the recognition of this tumour.

Methods We retrospectively screened our institutional database for clinically misdiagnosed SCCs over a 10-year time period (2013–2023). We then presented 10 expert dermoscopists with a series of clinical and dermoscopic images of misdiagnosed invasive SCCs and sought their opinion.

Results In total, 73 SCCs from 73 patients (55 men and 18 women) aged 37–97 years (mean 78.8) were included. Most tumours were located on the cheek (21%), followed by the forehead (16%), nose (12%) and scalp (12%). Thirty-seven SCCs were misdiagnosed as basal cell carcinoma, 15 as actinic keratosis, 10 as irritated seborrhoeic keratosis, 7 as Bowen disease, 2 as viral warts and 2 as cutaneous horn. White scales and keratin were voted by the experts as the main features (n=34/73) that might have helped in the accurate clinical diagnosis of the included SCCs.

Conclusions The dermoscopic characteristics of invasive SCC might overlap with other types of tumours. In challenging tumours, the presence of white scales and keratin might guide the accurate recognition of invasive SCC.

What is already known about this topic?

- The dermoscopic criteria for squamous cell carcinoma (SCC) are widely reported in the literature.
- Some tumours might mimic SCC and can thus represent a diagnostic challenge.

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What does this study add?

- SCC sometimes exhibits features that overlap with various other types of tumours, particularly basal cell carcinomas, actinic keratosis and seborrhoeic keratosis.
- Keratin masses and white structureless areas might represent particularly useful clues suggestive of SCC, helping clinicians to reduce the proportion of incorrectly evaluated tumours.
- The combination of a patient's clinical picture together with dermoscopic features can help to determine the correct diagnosis of SCC prior to excision.

Skin cancer remains one of the most frequent malignancies worldwide,[1] with an increasing incidence due to sun exposure, changing traditions and fashions, and an ageing population.[2,3] The most frequent nonmelanoma skin cancers are basal cell carcinoma (BCC) and squamous cell carcinoma (SCC). Although most SCCs only progress locally, some have metastatic potential and may require complex treatment.[4] Timely diagnosis is crucial and facilitates the treatment plan. Macroscopically, SCC typically presents as a nonpigmented nodule, generally in people with lighter skin phototypes. It is important to distinguish SCC from BCC, irritated seborrhoeic keratosis, Merkel cell carcinoma, cutaneous horn, and various other benign or malignant tumours.[5] However, the morphology of SCC is variable, and it can occasionally acquire an atypical clinical and dermoscopic pattern.[6]

Dermoscopy greatly improves the early diagnosis of skin cancer.[7] The dermoscopic criteria of invasive SCC have been widely described and depend on the histopathological differentiation grade. In well-differentiated SCC tumours, these criteria include white circles, white structureless areas, hairpin and glomerular vessels, white scales and keratin masses,[8,9] while poorly differentiated SCC tumours are predominantly red in colour and exhibit dense vascularity, with an absence of white-coloured features.[9] Despite the widespread knowledge of the dermoscopic criteria of SCC and the tumours included in its differential diagnosis, the assessment of some lesions may still be challenging and lead to misdiagnosis. This is particularly relevant for nonpigmented tumours, as lesions with pigmented structures are generally easier to classify.[7] The aim of this study was to assess the dermoscopic features that contribute to the misdiagnosis of invasive SCC in clinical practice and identify features that could increase the accurate classification of this challenging group of tumours.

Materials and methods

This retrospective study was conducted at the Hospital of Skin and Venereal Diseases in Thessaloniki, Greece. The institutional database was screened for eligible patients with SCC diagnosed from 2013 to 2023. The research took place between October and November 2023. Inclusion criteria were: (i) a histopathologically confirmed SCC; (ii) a preoperative clinical diagnosis other than invasive SCC; and (iii) the availability of a high-quality dermoscopic image. All clinicians who performed the initial dermoscopic examinations were experienced in dermoscopy. Dermoscopic images were obtained using a Dermlite Foto dermoscope (Dermlite, Aliso Viejo, CA, USA) at × 10 magnification; the dermoscope was connected to a Canon camera (Canon, Tokyo, Japan).

Our study was based on the findings from a survey questionnaire, created using Google Forms, distributed to 10 expert dermoscopists who evaluated the clinical and dermoscopic images. The evaluators were unblinded (i.e. they were aware of the clinical and histopathological diagnoses), and they had been informed about the objectives of our study.

The study consisted of a two-part questionnaire, completed sequentially. In the first part, the evaluators were asked to provide a feature-based explanation of the inaccurate clinical diagnoses. Specifically, they were asked to select the main feature that, in their opinion, might have misled the diagnosing clinicians; they selected the main feature from a predefined list of criteria associated with each clinical diagnosis. The list of predefined features was compiled based on the literature. The evaluators were also given the opportunity to provide a free-text explanation. In the second part, the evaluators were asked to propose features that, in their view, might have helped a diagnosing clinician to recognize SCC, again selecting from a predefined list of SCC-related criteria with the option to add a free-text explanation.

Only fully completed questionnaires were considered valid for future evaluation. The most frequent feature provided by the evaluators was selected as the collective vote and was assigned to each category of misdiagnosed lesion.

Results

Overall, we included 73 SCCs that had been misdiagnosed from 73 patients (55 men and 18 women) aged 37–97 years (mean 78.8). Most tumours were located on the cheek (21%), followed by the forehead (16%), nose (12%), scalp (12%), upper extremities (10%), lower extremities (10%), ear (6%), lip (4%), neck (4%), chest (4%) and eyelid (1%) (Table 1).

Of the 73 misdiagnosed SCCs, 37 (51%) had been clinically diagnosed as BCC, 15 (21%) as actinic keratosis (AK), 10 (14%) as seborrhoeic keratosis (SK), 7 (10%) as Bowen disease (BD), 2 (3%) as viral warts and 2 (3%) as cutaneous horn.

Survey part 1: features that contribute to misdiagnosis

According to the evaluators, in the 37 SCCs clinically misdiagnosed as BCCs, the most frequent feature responsible for misdiagnosis was ulceration (n=22/37), followed by linear branching (arborizing) vessels (n=6/37), erosions (n=3/37), blue clods (n=2/37) and shiny white blotches and strands (n=2/37) (Table 2). Of the 15 SCCs clinically diagnosed as AK, the flat surface of the lesion and the presence of

Table 1 Anatomical locations of the misdiagnosed squamous cell carcinoma (SCC) tumours

Anatomical locations	Misdiagnosed SCC tumours
Cheek	15 (21)
Forehead	12 (16)
Nose	9 (12)
Scalp	9 (12)
Upper extremity	7 (10)
Lower extremity	7 (10)
Ear	4 (6)
Lip	3 (4)
Neck	3 (4)
Chest	3 (4)
Eyelid	1 (1)

Data are presented as *n* (%).

dermoscopic erythema were assessed as being responsible for misdiagnosis in 5 and 3 lesions, respectively. Among the 10 SCCs clinically misdiagnosed as SK, the evaluators could not define any typical SK features in 6 cases, while white clods and sharply demarcated borders were the features considered to be responsible for incorrect diagnosis in 2 patients each. In the seven SCCs clinically assessed as BD, white scales and keratin were the features voted as being responsible for the inaccurate diagnosis of five lesions, while glomerular/coiled vessels were suggested to have led to misdiagnosis in the two remaining lesions. In the two lesions assessed as viral warts, dotted blood spots were voted as being the feature responsible for misdiagnosis, whereas in the two SCCs incorrectly diagnosed as cutaneous horn, the evaluators attributed the misdiagnosis to the presence of hyperkeratosis. Images of some of the misdiagnosed tumours are presented in Figure 1.

Table 2 Features voted most likely to have led to misdiagnosis of squamous cell carcinoma (SCC)

Clinical misdiagnosis	Features voted most likely to have led to misdiagnosis of SCC
Basal cell carcinoma (*n*=37)	Ulceration (*n*=22)
	Arborizing vessels (*n*=6)
	Erosions (*n*=3)
	Blue clods (*n*=2)
	Shiny white blotches and strands (*n*=27)
Actinic keratosis (*n*=15)	Flat clinical presentation (*n*=5)
	Erythema (*n*=3)
	White and wide hair follicles (*n*=1)
Irritated seborrhoeic keratosis (*n*=10)	Yellow clods (*n*=2)
	Well-demarcated borders (*n*=2)
Bowen disease (*n*=7)	White scales/keratin (*n*=5)
	Glomerular/coiled vessels (*n*=2)
Viral wart (*n*=2)	Glomerular vessels (*n*=1)
	White scales/keratin (*n*=1)
Cutaneous horn (*n*=2)	Hyperkeratosis (*n*=2)

Survey part 2: suggested features for correct diagnoses

Out of all 73 misdiagnosed cases, the features voted most likely to suggest a diagnosis of SCC were white scales/keratin

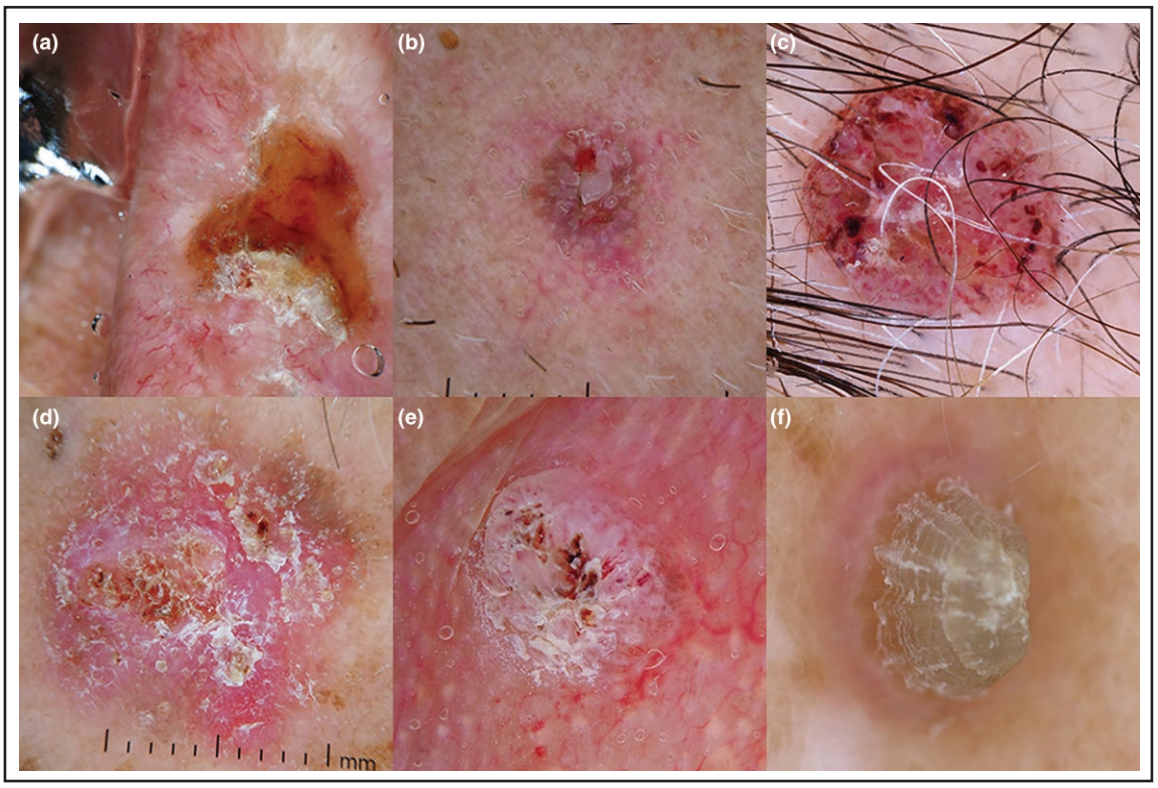

Figure 1 Dermoscopic images of squamous cell carcinoma lesions misdiagnosed as (a) basal cell carcinoma displaying ulceration, branched vessels and white structureless areas; (b) actinic keratosis exhibiting erythema, white circles, white scales and an erosion; (c) irritated seborrhoeic keratosis presenting haemorrhages, hairpin vessels with white haloes and keratin; (d) Bowen disease with keratin with haemorrhages, pinkish–white structureless areas, brown lines arranged radially and glomerular vessels in clusters; (e) a viral wart with multiple exophytic papillomatous structures and haemorrhages; and (f) cutaneous horn displaying erythema at the base and hyperkeratosis.

Table 3 Features of squamous cell carcinoma (SCC) that were voted most likely to facilitate the correct diagnosis for each type of misdiagnosis

Clinical misdiagnosis	SCC features voted most likely to facilitate the correct diagnosis
Basal cell carcinoma (n=37)	White scales/keratin (n=15) White structureless areas (n=14)
Actinic keratosis (n=15)	White scales/keratin (n=9)
Irritated seborrhoeic keratosis (n=10)	White scales/keratin (n=5)
Bowen disease (n=7)	White scales/keratin (n=5)
Viral warts (n=2)	Dotted blood spots (n=1)
Cutaneous horn (n=2)	White structureless areas (n=2)
Total	White scales/keratin (n=34)

BCC, basal cell carcinoma; SCC, squamous cell carcinoma. [a]The BCC group was not counted toward the total because 'white scales/keratin' and 'white structureless areas' received an almost equal number of votes.

(n=34/73) (Table 3). In the BCC-like group, the features most suggestive of a diagnosis of SCC were white scales or keratin in 15 patients and white structureless areas in 14 patients. Among 15 lesions incorrectly diagnosed as AK, for 9 of them, the evaluators voted that white scales/keratin would be the clues most suggestive of invasive SCC. In the group of tumours misdiagnosed as SK, the evaluators rated white scales or keratin as the dermoscopic feature most suggestive of SCC. In the group clinically diagnosed as BD, white scales or keratin were again suggested as the most prevalent feature likely to indicate SCC (n=5/7 lesions). In two lesions diagnosed as viral warts, the evaluators could not identify any features of invasive SCC in one case and attributed dotted blood spots as the most likely characteristic suggestive of invasive SCC in the other case. In two patients misdiagnosed as having cutaneous horns, white structureless areas were considered to be most suggestive of SCC.

Discussion

In our series of inaccurately diagnosed SCCs, the most frequent clinical misdiagnosis was BCC. This is not surprising, as BCC and SCC share several characteristics in common. They both tend to occur on sun-exposed skin, and their clinical presentation can often be similar. Even if the dermoscopic features of both entities are widely known, a morphological overlap may exist.[10,11] Ulceration is widely associated with BCC, and the fact that any malignant tumour might ulcerate is often overlooked.[12] Another relatively frequent misleading feature was the presence of linear branching (arborizing) vessels. While these vessels are generally considered to be specific for BCC, they may also be found in other cancers, such as poorly differentiated SCC. They are associated with deeper invasion and a more advanced stage,[13–15] which suggests that their presence should be carefully analysed along with other dermoscopic and clinical clues. Additional suggested reasons for misclassifying SCC as BCC were an 'elevated shiny border', a 'shiny pink tumour' and the 'typical BCC location'.

AK was a second major contributor to the misdiagnosis of SCC. This finding is particularly relevant as the treatment of AK and SCC differs substantially.[16] Distinguishing early SCC from AK is particularly challenging, especially given that the majority of SCCs develop on pre-existing AKs.[17] In our study, the feature of AK voted most likely to lead to the inaccurate classification of SCC was the flat surface. Although the flat presentation is reasonably suggestive of intraepidermal lesions,[17,18] a study involving 143 patients with SCC found that poorly differentiated SCC is often clinically evaluated as flat.[9] Furthermore, in a study by Ertop Doğan *et al.* that included 87 SCCs, 29 of them were flat.[19] Based on these various observations, we advocate that a flat clinical appearance should not be considered an indication of an intraepidermal tumour per se and should be interpreted in conjunction with dermoscopic findings.

Most cases of SK can be easily recognized clinically and dermoscopically because of their typical characteristics, such as white clods (milia-like cysts); brown, yellow or orange clods (comedo-like openings); or sharply demarcated borders.[20] Nevertheless, irritated SK is a peculiar variant that may show morphological overlap with SCC. The irritated SKs in our pre-selected group did not exhibit the typical SK findings, as in more than half of the cases, the evaluators could not distinguish any traits associated with SK. In two cases, the experts reported white clods as the most prevalent feature leading to misdiagnosis. White clods (milia-like cysts) are commonly associated with SK; however, they may also be present in nonmelanocytic skin cancers or melanoma and typically correspond to intraepithelial cysts.[20–22]

BD usually presents as a single red plaque on sun-exposed or covered skin. It has been reported that 3–5% of these lesions evolve into an invasive SCC.[23] Important clues in the diagnosis of BD are glomerular vessels and white/yellow scales.[24] In our study, the majority of SCCs diagnosed as BD presented with keratin masses, which could have misled the diagnosing clinicians.

Cutaneous warts are benign epithelial lesions caused by human papillomavirus.[25] Despite typically being easy to diagnose clinically, dermoscopically they often display features of keratinizing tumours, such as a papillomatous surface, haemorrhages, linear vessels and hairpin-like or dotted vessels.[26,27] In our study, two SCCs were clinically inaccurately assessed to be viral warts. The dermoscopic presence of dotted blood spots was probably the reason for this misdiagnosis, as they can also be present in SCC, usually combined with other features.[28]

Keratin and white scales were the features voted by our panel as being most suggestive of the correct diagnosis (in approximately 40% of the cases). SCC is a tumour that alters normal keratinocyte differentiation and subsequently drives cell metabolism toward abnormal keratinization.[29] The white circles seen in dermoscopic examinations correspond to acanthosis and hypergranulosis of the infundibular epidermis and a dilated infundibulum, often filled with a keratin plug.[30] White circles and keratin are very useful for differentiating SCC from other nonpigmented pink tumours.[28] However, intraepidermal entities within the SCC spectrum (BD and AK) may also exhibit keratin clues, rendering the differential diagnosis particularly challenging, especially considering that SCC usually arises on a pre-existing AK.[31] Therefore, although keratin and white scales are generally reliable clues to diagnose SCC, they may be insufficient to distinguish between invasive and intraepidermal tumours.

Keratin may also be present in BCC, especially in the metatypical subtype (basosquamous carcinoma).[32] The coexistence of BCC-related features might favour the diagnosis of the latter over SCC.

White structureless areas are defined as areas lighter than the surrounding skin and histopathologically correspond to epidermal hyperplasia.[33,34] They were present in both tumours misdiagnosed as cutaneous horn, and a frequently chosen attribute in the group of SCCs misdiagnosed as BCC. Indeed, although the white colour may be present in BCC, it is usually seen as shiny white blotches and strands (in several subtypes) or white, scar-like areas (in morphoeaform BCC).[35,36] The only BCC subtype that frequently displays white structureless areas is metatypical BCC (basosquamous carcinoma). They may also be present in BD (in our study, in 72% of cases); however, in a study by Fougelberg *et al.*, the intraobserver agreement for this feature was low, at just 0.02.[37] White structureless areas have also been reported in amelanotic and hypomelanotic melanomas, often accompanied by a polymorphous vascular pattern, rendering distinction from SCC or other invasive pink tumours virtually impossible.[38]

Our study had some limitations. A retrospective study is prone to recall and observation bias, which we addressed by involving 10 independent external evaluators. In addition, having an unblinded image assessment can obviously lead to an observation bias, but this was inevitable as the aim of the study was precisely to explain the reasons for misdiagnosis. Furthermore, this study was performed on a limited number of cases in a selected population of patients seen in a single referral centre.

In conclusion, our study showed that SCC sometimes exhibits features that overlap with those of several other types of tumours, particularly BCCs, AK and SK. Keratin masses and white structureless areas might represent particularly useful clues, helping clinicians to reduce the number of incorrectly evaluated tumours.

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Conflicts of interest

The authors declare no conflicts of interest.

Data availability

The data underlying this article will be shared upon reasonable request to the corresponding author.

Ethics statement

Not applicable.

Patient consent

Not applicable.

References

1 Zambrano-Román M, Padilla-Gutiérrez JR, Valle Y *et al.* Non-melanoma skin cancer: a genetic update and future perspectives. *Cancers (Basel)* 2022; **14**:2371.
2 Nakamura A, Kataoka K, Takatsuka S, Takenouchi T. Aging trends in skin cancer: a long-term observational study in Japan. *JAAD Int* 2023; **13**:32–4.
3 Cives M, Mannavola F, Lospalluti L *et al.* Non-melanoma skin cancers: biological and clinical features. *Int J Mol Sci* 2020; **21**:5394.
4 Dreyfuss I, Kamath P, Frech F *et al.* Squamous cell carcinoma: 2021 updated review of treatment. *Dermatol Ther* 2022; **35**:e15308.
5 Lallas A, Apalla Z, Argenziano G *et al.* The dermatoscopic universe of basal cell carcinoma. *Dermatol Pract Concept* 2014; **4**:11–24.
6 Ciążyńska M, Kamińska-Winciorek G, Lange D *et al.* The incidence and clinical analysis of non-melanoma skin cancer. *Sci Rep* 2021; **11**:4337.
7 Lallas A, Argenziano G, Zendri E *et al.* Update on non-melanoma skin cancer and the value of dermoscopy in its diagnosis and treatment monitoring. *Expert Rev Anticancer Ther* 2013; **13**:541–58.
8 Papageorgiou C, Lallas A, Manoli SM *et al.* Evaluation of dermatoscopic criteria for early detection of squamous cell carcinoma arising on an actinic keratosis. *J Am Acad Dermatol* 2022; **86**:791–6.
9 Lallas A, Pyne J, Kyrgidis A *et al.* The clinical and dermoscopic features of invasive cutaneous squamous cell carcinoma depend on the histopathological grade of differentiation. *Br J Dermatol* 2015; **172**:1308–15.
10 Ryu TH, Kye H, Choi JE *et al.* Features causing confusion between basal cell carcinoma and squamous cell carcinoma in clinical diagnosis. *Ann Dermatol* 2018; **30**:64–70.
11 Neagu N, Lallas K, Maskalane J *et al.* Minimizing the dermatoscopic morphologic overlap between basal and squamous cell carcinoma: a retrospective analysis of initially misclassified tumours. *J Eur Acad Dermatol Venereol* 2020; **34**:1999–2003.
12 Koyuncuer A. Histopathological evaluation of non-melanoma skin cancer. *World J Surg Oncol* 2014; **12**:159.
13 Lallas A, Apalla Z, Ioannides D *et al.* Dermoscopy in the diagnosis and management of basal cell carcinoma. *Future Oncol* 2015; **11**:2975–84.
14 El-Ammari S, Elloudi S, Baybay H *et al.* Cutaneous squamous cell carcinoma: clinico-dermoscopic and histological correlation: about 72 cases. *Dermatol Pract Concept* 2024; **14**:e2024042.
15 Pyne J, Sapkota D, Wong JC. Squamous cell carcinoma: variation in dermatoscopic vascular features between well and non-well differentiated tumors. *Dermatol Pract Concept* 2012; **2**:204a05.
16 Gutzmer R, Wiegand S, Kölbl O *et al.* Actinic keratosis and cutaneous squamous cell carcinoma. *Dtsch Arztebl Int* 2019; **116**:616–26
17 Sgouros D, Theofili M, Damaskou V *et al.* Dermoscopy as a tool in differentiating cutaneous squamous cell carcinoma from its variants. *Dermatol Pract Concept* 2021; **11**:e2021050.
18 Arlette JP, Trotter MJ. Squamous cell carcinoma *in situ* of the skin: history, presentation, biology and treatment. *Australas J Dermatol* 2004; **45**:1–11.
19 Ertop Doğan P, Akay BN, Okçu Heper A *et al.* Dermatoscopic findings and dermatopathological correlates in clinical variants of actinic keratosis, Bowen's disease, keratoacanthoma, and squamous cell carcinoma. *Dermatol Ther* 2021; **34**:e14877.
20 Papageorgiou C, Spyridis I, Manoli SM *et al.* Accuracy of dermoscopic criteria for the differential diagnosis between irritated seborrheic keratosis and squamous cell carcinoma. *J Am Acad Dermatol* 2021; **85**:1143–50.
21 Minagawa A. Dermoscopy–pathology relationship in seborrheic keratosis. *J Dermatol* 2017; **44**:518–24.
22 Stricklin SM, Stoecker WV, Oliviero MC *et al.* Cloudy and starry milia-like cysts: how well do they distinguish seborrheic keratoses from malignant melanomas? *J Eur Acad Dermatol Venereol* 2011; **25**:1222–4.
23 Scalvenzi M, Villani A, Mazzella C *et al.* Cutaneous Bowen's disease: an analysis of 182 cases according to age, sex, and

anatomical site from an Italian center. *Open Access Maced J Med Sci* 2019; **7**:696–7.
24 Zalaudek I, Argenziano G. Dermoscopy of actinic keratosis, intraepidermal carcinoma and squamous cell carcinoma. *Curr Probl Dermatol* 2015; **46**:70–6.
25 Dall'Oglio F, D'Amico V, Nasca MR, Micali G. Treatment of cutaneous warts. *Am J Clin Dermatol* 2012; **13**:73–96.
26 Al Rudaisat M, Cheng H. Dermoscopy features of cutaneous warts. *Int J Gen Med* 2021; **14**:9903–12.
27 Li X, Yu J, Thomas S *et al.* Clinical and dermoscopic features of common warts. *J Eur Acad Dermatol Venereol* 2017; **31**:e308–10.
28 Rosendahl C, Cameron A, Argenziano G *et al.* Dermoscopy of squamous cell carcinoma and keratoacanthoma. *Arch Dermatol* 2012; **148**:1386–92.
29 Kwa RE, Campana K, Moy RL. Biology of cutaneous squamous cell carcinoma. *J Am Acad Dermatol* 1992; **26**:1–26.
30 Jaimes N, Zalaudek I, Braun RP *et al.* Pearls of keratinizing tumors. *Arch Dermatol* 2012; **148**:976.
31 Hedberg ML, Berry CT, Moshiri AS *et al.* Molecular mechanisms of cutaneous squamous cell carcinoma. *Int J Mol Sci* 2022; **23**:3478.
32 Akay BN, Saral S, Heper AO *et al.* Basosquamous carcinoma: dermoscopic clues to diagnosis. *J Dermatol* 2017; **44**:127–34.
33 Marghoob NG, Liopyris K, Jaimes N. Dermoscopy: a review of the structures that facilitate melanoma detection. *J Am Osteopath Assoc* 2019; **119**:380–90.
34 Ankad BS, Madarkar M, Saipriya G *et al.* Trichoscopic patterns in squamous cell carcinoma: a case report. *Int J Trichology* 2016; **8**:191–4.
35 Álvarez-Salafranca M, Ara M, Zaballos P. Dermoscopy in basal cell carcinoma: an updated review. *Actas Dermosifiliogr (Engl Ed)* 2021; **112**:330–8.
36 Reiter O, Mimouni I, Dusza S *et al.* Dermoscopic features of basal cell carcinoma and its subtypes: a systematic review. *J Am Acad Dermatol* 2021; **85**:653–64.
37 Fougelberg J, Luong A, Bowling J *et al.* Dermoscopic findings in intraepidermal carcinoma: an interobserver agreement study. *Dermatol Pract Concept* 2023; **13**:e2023114.
38 Paolino G, Bearzi P, Pampena R *et al.* Clinicopathological and dermoscopic features of amelanotic and hypomelanotic melanoma: a retrospective multicentric study. *Int J Dermatol* 2020; **59**:1371–80.