Review Article

Dermatoscopy of non-melanocytic skin tumors

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ABSTRACT

Dermatoscopy is a cheap and non-invasive diagnostic technique that improves the diagnostic accuracy of non-pigmented benign and malignant skin tumors. Dermatologist should be aware of dermatoscopic features of non-melanocytic skin tumors to reach the correct diagnosis.

Key words: Dermatoscopy, dermoscopy, non-melanocytic skin tumors, skin tumors

INTRODUCTION

Dermatoscopy (also known as dermoscopy, incident light microscopy, epiluminescence microscopy and skin-surface microscopy) is an inexpensive *in vivo* and non-invasive technique that permits the visualization of morphologic features that are not visible to the naked eye.[1] Although a 10-fold magnification is sufficient for the assessment of the suspicious skin lesions, magnifications in various dermatoscopy instruments range from 10× to 100×. Dermatoscopy is widely used currently for the diagnosis of pigmented and non-pigmented skin lesions.

There are conflicting data in the literature regarding the history of dermatoscopy. Johan Christophorus Kolhaus investigated small vessels in the nail bed using a microscope in 1636. In 1893, Unna used oil immersion to make the skin more transparent and examined lupus vulgaris lesions.[2] The German dermatologist, Johann Saphier, published four reports on his method adding a built-in light source to the dermatoscope in 1920 and 1921. He was the first to use the term "dermatoscopy". In the 1950s, Goldman coined the term "dermoscopy".[3]

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Dermatoscopy helps in the diagnosis of many pigmented skin lesions such as seborrheic keratosis (SK), pigmented basal cell carcinoma (BCC), hemangioma, blue nevus, atypical nevus, and cutaneous melanoma. It is 10–27% more sensitive than clinical criteria of ABCD (asymmetry, border regularity, color distribution, and diameter) in the early diagnosis of cutaneous melanoma.[4,5] Dermatoscopy of melanocytic lesions increases the presurgical accuracy rate of clinical diagnosis from 50 to 85%.[6,7]

The accuracy of clinical diagnosis of pigmented Spitz nevi improved from 56 to 93% by using dermatoscopy.[8,9] Demirtasoglu *et al.* found that dermatoscopy raised the rate of diagnostic accuracy for pigmented BCC from 60 to 90% and reported that dermatoscopy is a valuable diagnostic tool in the diagnosis of pigmented BCC.[10] Use of the dermatoscopic methods by experienced physicians increases clinical diagnostic accuracy for hemangioma and angiokeratoma by 87–100%.[11,12]

Correlation between the dermatoscopic and histopathologic features of the non-melanocytic skin tumors has not been a highly studied area of dermatoscopy practice. Cabrijan *et al.* reported a 72.8% correlation between histopathology and dermatoscopy in diagnosing skin tumors.[13] Corresponding histopathologic findings can be predicted by means of dermatological examination in pigmented BCC.[14] Warshaw *et al.* reported that the addition of dermatoscopic images to clinical images increased the diagnostic accuracy in teledermatologic evaluation of malignant non-melanocytic lesions.[15]

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Basal cell carcinoma

BCC is the most common type of skin cancer in humans.[16] It originates from the basal layer of the epidermis. Non-pigmented BCCs are much more common than pigmented BCC.[17] In the dermatological examination, non-pigmented BCCs can be easily distinguished from any other skin lesion by their asymmetrical arborizing vessels, pink color, and focal ulceration [Figure 1].[18] White regression areas may be seen.[19]

Pigmented BCCs sometimes can be difficult to distinguish clinically from melanoma. Dermatoscopy has been proven to be a useful diagnostic tool to distinguish pigmented BCC from other pigmented lesions.[19-22] Menzies *et al.* proposed a simple dermatoscopic method for diagnosing pigmented BCCs. This method has a sensitivity of 93% and a specificity of 89%. In this diagnostic method, a pigmented BCC to be diagnosed must have the negative feature (absence of pigment network) and at least one of the positive features [Figure 2 and Table 1].[21]

Seborrheic keratosis

SK is a common benign skin tumor seen mostly amongst the elderly population.[23,24] Although diagnosis of SK is generally a clinical diagnosis, sometimes the differentiation between SK and cutaneous melanoma may be difficult in the clinical aspect. Braun *et al.* reported the frequencies of the dermatoscopic structures in SK in a study with 203 patients.[25] Although the classical dermatoscopic criteria of SK that include multiple milia-like cysts and comedo-like openings had a high prevalence, additional structures such as hairpin blood vessels, fissures, sulci and gyri improved the diagnostic accuracy [Figures 3–5].[25,26] The dermatoscopic features of SK are easily distinguishable but nonspecific [Table 2].[25-27]

Actinic keratosis

Actinic (solar) keratosis (AK) is a direct precursor of squamous cell carcinoma (SCC) and caused by chronic exposure of UV radiation of sunlight which induces abnormal proliferation of epidermal keratinocytes.[28,29] AK can be pigmented or non-pigmented. Facial AK is a differential diagnosis of cutaneous melanoma (lentigo maligna) since pigmented facial AK may have a broken-up pseudonetwork.[28-32] Pseudonetwork can be observed in dermatoscopic examination of certain benign pigmented facial lesions such as AK, ephelide, and junctional nevus. Zaluadek *et al.* observed four essential dermatoscopic features in facial AK and defined the combination of these features as "strawberry" pattern [Table 3 and Figure 6].[33]

Sebaceous hyperplasia

Sebaceous hyperplasia is a benign proliferation of sebaceous lobules around the follicular infundibulum.[36,37] Yellow nodules surrounding a central follicular opening can be seen in dermatoscopic examination [Figure 7]. Sebaceous hyperplasia must be differentiated from small non-pigmented BCC. Dermatoscopic examination of sebaceous hyperplasia can reveal vessels that extend to the center of the lesion but they are never arborizing.[1]

Dermatofibroma

Dermatofibroma, also known as fibrous histiocytoma, is a common benign fibrohistiocytic mesenchymal growth of the skin. The etiology of dermatofibroma remains unclear.[38,39] Dermatofibromas clinically exhibit "dimple sign" with lateral depression in the

Table 1: Dermatoscopic features of pigmented BCC (Adopted)[19,21]

Negative feature: Absence of pigment network
+ at least one of the following positive features
Linear and arborizing telangiectasia
Leaf-like or structureless areas on the periphery of the lesion
Multiple blue-gray globules
Large blue-gray ovoid nests
Focal ulceration
Spoke wheel areas

Table 2: Dermatoscopic features of seborrheic keratosis[25-27]

Multiple milia-like cysts
Pseudofollicular (comedo-like) openings
Hyperkeratosis/fissures/ridges
Light brown finger-like structures
Hairpin blood vessels
Cerebriform appearance (sulci and gyri)

Table 3: Dermatoscopic criteria of facial actinic keratosis[33-35]

Pink/red pseudonetwork and erythema surrounding the hair follicles
White to yellow surface scale
Linear or wavy vessels surrounding the hair follicles
Hair follicle openings filled with yellowish keratotic plugs

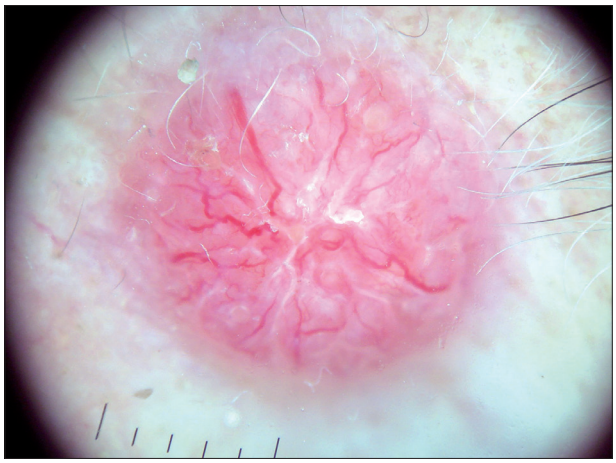

Figure 1: Dermatoscopy of non-pigmented BCC – pink color, absence of pigment network, and arborizing vessels

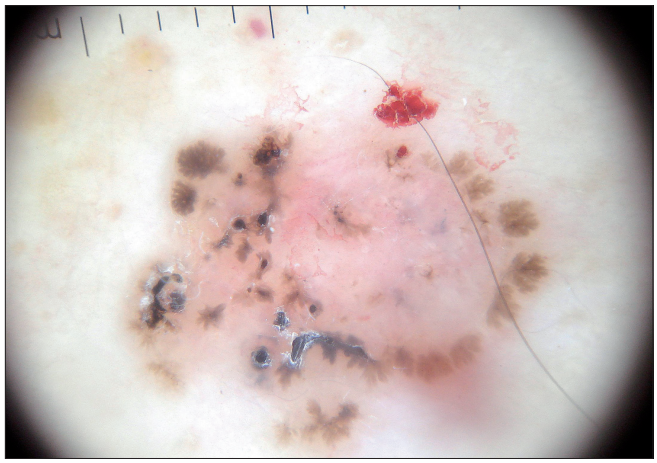

Figure 2: Dermatoscopy of pigmented BCC – structureless areas at the lesion periphery, leaf-like structures, absence of pigmented network, blue-gray globules

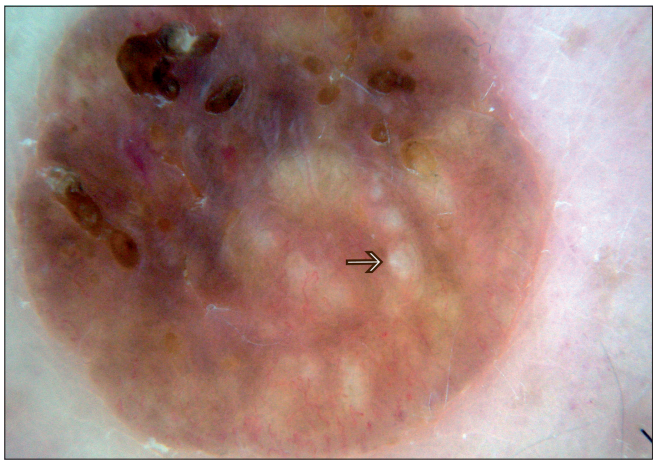

Figure 3: Dermatoscopy of SK – milia-like cysts

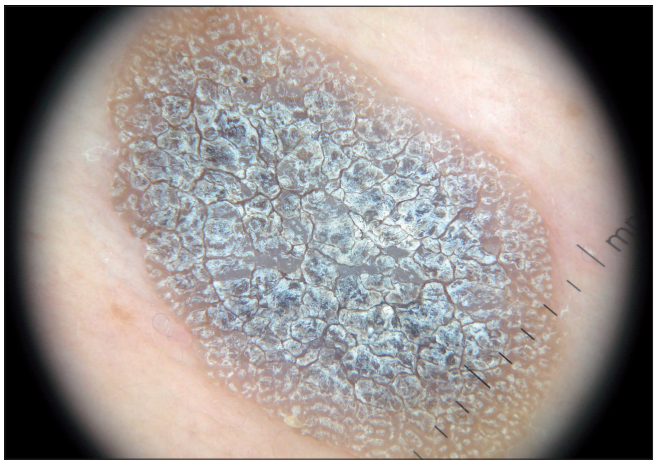

Figure 4: Dermatoscopy of SK – hyperkeratosis with fissures and ridges

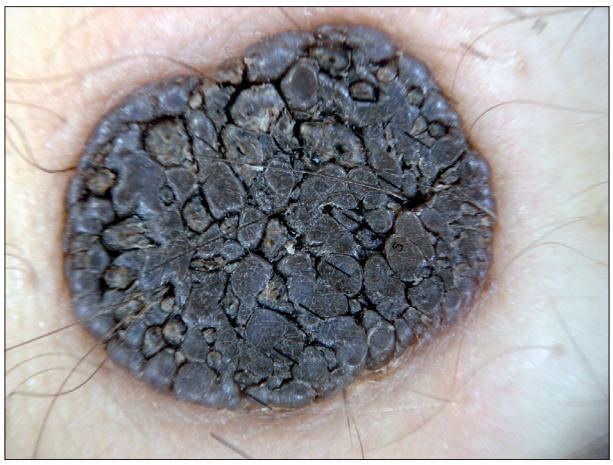

Figure 5: Dermatoscopy of SK – cerebriform appearance (sulci and gyri)

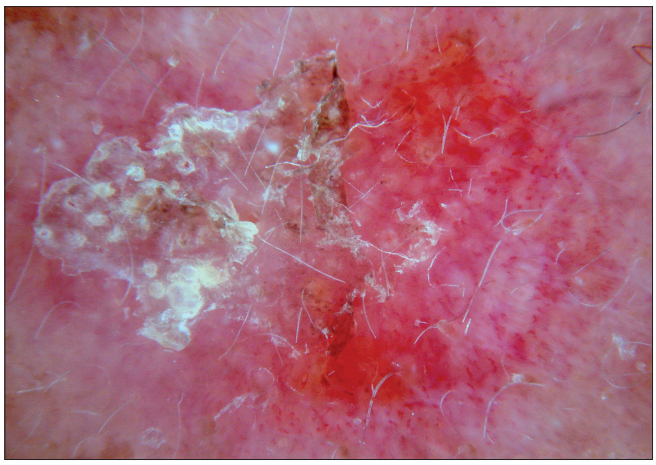

Figure 6: Dermatoscopy of AK – white surface scale, erythema, pseudonetwork

overlying skin.[40,41] Since dermatofibromas may mimic other skin tumors including melanoma, the definition of their dermatoscopic features is crucial [Figure 8 and Table 4]. In a recent study of 412 dermatofibromas (from 292 patients), 10 different dermatoscopic patterns were observed. The most common dermatoscopic pattern seen in the study group was central white patch and peripheral pigment network (34.7%).[35]

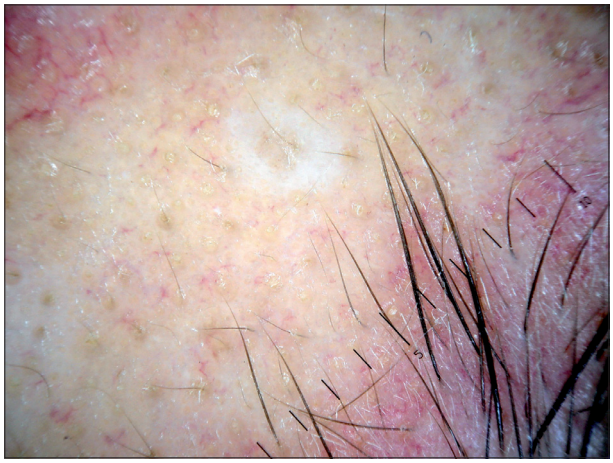

Figure 7: Dermatoscopy of sebaceous hyperplasia – central follicular opening and surrounding yellow lobule

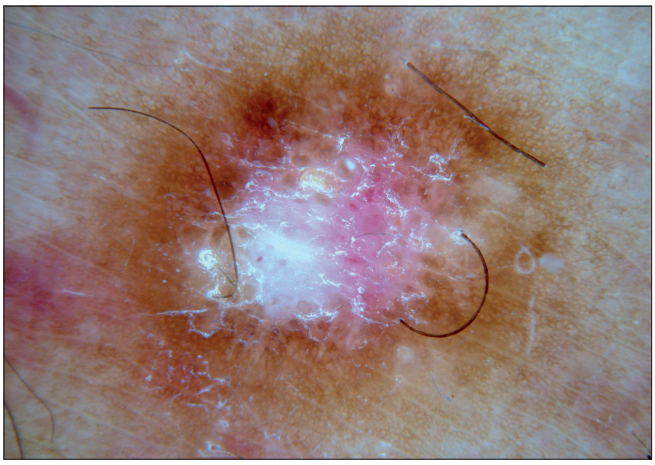

Figure 8: Dermatoscopy of a typical dermatofibroma – central scar-like patch and peripheral delicate network

Squamous cell carcinoma

The dermatoscopic features of SCC are a non-specific pattern with scales and grouped glomerular blood vessels surrounded by a whitish halo.[13,18,42] A scaly surface, brown globules and glomerular vessels can be seen in the dermatoscopic examination of pigmented Bowen's disease. Differential diagnosis between pigmented SCC and melanocytic lesions is difficult in some cases. Pigmented SCC can present a dermatoscopic pattern resembling melanocytic lesions

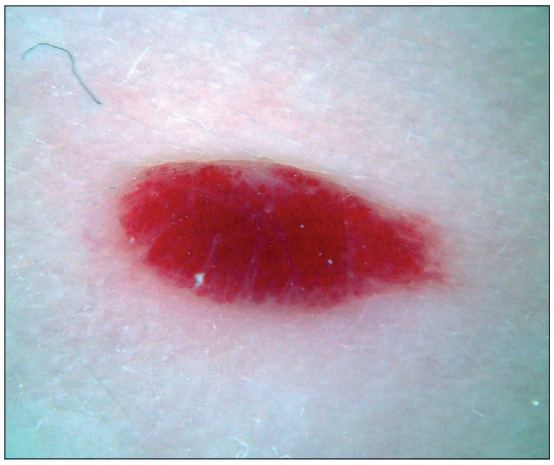

Figure 9: Dermatoscopy of hemangioma – red homogeneous area

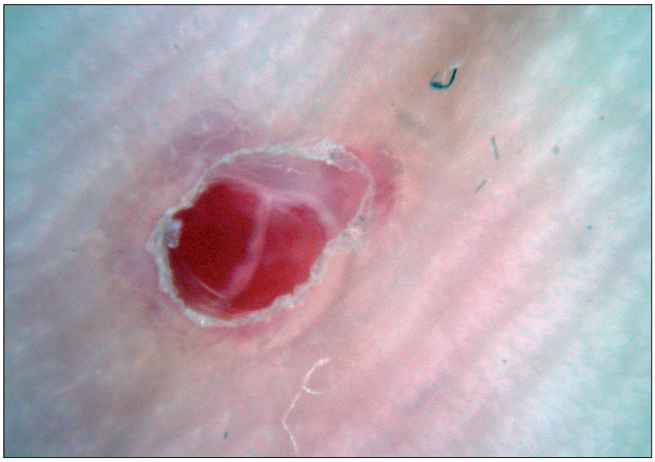

Figure 10: Dermatoscopy of pyogenic granuloma – red lagoons, appearance of white collarette and white "rail lines" that intersect the lesion

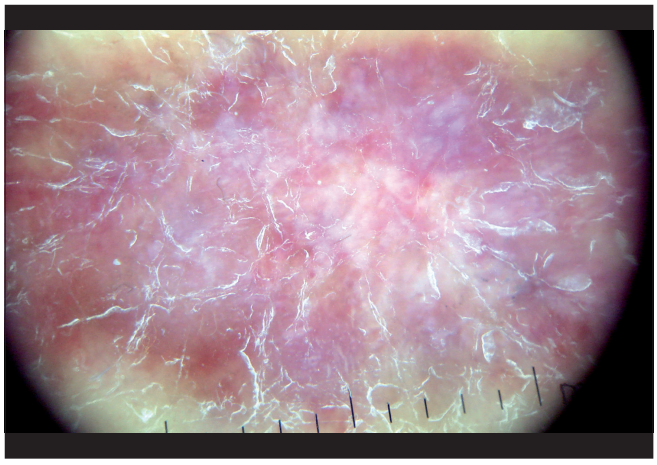

Figure 11: Dermatoscopy of Kaposi's sarcoma – bluish-red coloration and scaly surface

Table 4: Dermatoscopic features of dermatofibroma[34,35]

Peripheral pigment network
Central white scar-like patch
Different vascular structures
White network
Absence of melanocytic features

Table 5: Dermatoscopic features of pyogenic granuloma

Reddish homogenous areas
White collarette
Ulceration
White rail lines intersecting the lesion

with globules, radial streaks and homogeneous blue pigmentation and can lead a physician to a wrong diagnosis.[43]

Clear cell acanthoma

Clear cell acanthoma (CCA) is a rare, asymptomatic, slowly growing, benign epidermal tumor and characterized by pink or brown nodules or plaques with a "stuck on" appearance as collarette scaling.[44] CCA frequently develops on the legs of elderly people. Dermatoscopic pattern of CCA is described. Dermatoscopic findings of CCA are homogenous, symmetrically or bunch-like arranged pinpoint-like capillaries. Dermatoscopic pattern of CCA resembles that of psoriasis after the scales are removed.[44-46] Zalaudek and Argenziano reported that differentiation between CCA and psoriasis is made possible by evaluating the distribution pattern of vessels. Dermatoscopy of CCA reveals the linear pearl-like vessels as pearls in a line, which can be distinguished clearly from the dotted vessels in psoriasis.[47]

Vascular lesions

Dermoscopy improves the diagnostic accuracy in the clinical evaluation of pigmented skin lesions, but it is also useful for the assessment of vascular lesions such as hemangioma, solitary angiokeratoma, and pyogenic granuloma.[1,20] The most typical dermatoscopic features of the vascular lesions are red, blue or black lacunae [Figures 9–11] and red-bluish or red-black homogenous areas. Dermatoscopic features of pyogenic granuloma were first studied by Zaballos *et al.* [Table 5].[48]

Kaposi's sarcoma (KS) is a multifocal angioproliferative disease characterized by the proliferation of spindle and endothelial cells. The dermatoscopic features of KS are bluish-reddish coloration (seen in the 84% of lesions), "rainbow pattern" (36%), scaly surface and small brown globules (15%).[49] The multicolored rainbow pattern is the most distinctive and diagnostic feature of KS under polarized dermatoscopy and it is associated with the vascular lumen-rich histologic subtype. The rainbow pattern can be rarely seen in melanoma and other skin lesions.[50]

CONCLUSION

Dermatoscopy is a simple, non-expensive and non-invasive technique that improves the diagnostic accuracy of non-melanocytic skin tumors. It is one of the most developing and investigative fields of dermatology. Dermatologists should be aware of dermatoscopic features of pigmented BCC for its discrimination from melanoma. Non-pigmented BCC sometimes cannot be clinically discriminated from sebaceous hyperplasia and dermatological evaluation of vascular structures is useful in the differential diagnosis. Facial AK that is one of the differential diagnoses of melanoma has a peculiar dermatoscopic pattern. CCA has a similar dermatoscopic appearance to psoriasis but not the same vascular structures. Kaposi's sarcoma can be easily distinguished from other vascular lesions by means of its particular multicolored pattern. Since novel dermatoscopic patterns and features are always reported for skin lesions, dermatoscopy is a continuously improving technique of dermatology. Thus, every dermatologist should acquire more in-depth knowledge relating to the dermatoscopic features and patterns of the benign and malignant skin lesions.

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Multiple Choice Questions

1. Dermatoscopic pattern of psoriasis resembles that of
   a. Squamous cell carcinoma
   b. Actinic keratosis
   c. Clear cell acanthoma
   d. Dermatofibroma

2. Which of the following is not one of the dermatoscopic features of pyogenic granuloma?
   a. Ulceration
   b. White collarette
   c. White rail lines
   d. White network

3. Dermatoscopic criteria of facial actinic keratosis does not include
   a. Wavy vessels around hair follicles
   b. Surface scale
   c. Pseudonetwork
   d. Hairpin blood vessels

4. Dermatoscopic rainbow pattern is associated with
   a. Basal cell carcinoma
   b. Kaposi sarcoma
   c. Pyogenic granuloma
   d. Giant cell granuloma

5. Which of the following is the "negative feature" in dermatological examination of basal cell carcinoma?
   a. Ulceration
   b. Arborizing vessels
   c. Ovoid nests
   d. Pigment network

6. "Strawberry pattern" under dermatoscopy includes the dermatoscopic features of facial
   a. Basal cell carcinoma
   b. Hemangioma
   c. Actinic keratosis
   d. Kaposi sarcoma

7. Which of the following is not a dermatoscopic feature of dermatofibroma?
   a. Dimple sign
   b. Vessels
   c. Pigment network
   d. White network

8. "White rail lines" appearance can be seen in dermatoscopy of
   a. Dermatofibroma
   b. Pyogenic granuloma
   c. Basal cell carcinoma
   d. Squamous cell carcinoma

9. Which of the following can reveal a dermatoscopic pattern resembling melanocytic lesions with globules, homogenous blue pigmentation and radial streaks?
   a. Pigmented basal cell carcinoma
   b. Pigmented squamous cell carcinoma
   c. Pigmented dermatofibroma
   d. Clear cell acanthoma

10. Which of the following is a wrong statement?
    a. Vessels in dermatoscopic examination of sebaceous hyperplasia are never arborizing
    b. Dermatoscopy of basal cell carcinoma may reveal white regression areas
    c. Dermatoscopy is a valuable diagnostic tool in the diagnosis of pigmented basal cell carcinoma
    d. Pseudonetwork can be observed in dermatoscopic examination of facial seborrheic keratosis

Answers

1. c, 2. d, 3. d, 4. b, 5. d, 6. c, 7. a, 8. b, 9. b, 10. d