Basic Dermoscopy for the Resident

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Dermoscopy is a valuable and highly diagnostic tool for evaluating skin lesions. Most dermatology residency programs teach dermoscopy and have expert clinicians available. If you find yourself in a program where dermoscopy is not taught, it is my recommendation that you learn the technique on your own. There are easy-to-attend conferences and Web sites as well as books that teach dermoscopy. In Europe and Australia, dermoscopic evaluation of skin lesions is the standard of care, and in the United States, it continues to grow in popularity.[1]

Dermoscopy can aid in evaluating any skin lesion, and disease-specific features have been described for a number of dermatologic conditions including rashes, infections, and infestations. Usefulness of the dermoscopic examination in these conditions is less well-established though. Dermoscopy's most published and salient application is its utility in evaluating pigmented lesions and identifying nonmelanoma skin cancers. Before leaving residency, proficiency in the dermoscopic diagnosis of melanoma, basal cell carcinoma (BCC), and squamous cell carcinoma (SCC) should be achieved. The focus of this article is to review the most common dermoscopic findings of each of these lesions (Figure 1).

Background

A dermatoscope is a handheld device that uses a magnifier and light source to provide additional subsurface morphologic details about a lesion that are not readily apparent to the naked eye.[2] These morphologic details, made perceptible by the dermatoscope, have been richly described and frequently are diagnostic. A variety of methodologies for dermoscopic lesion evaluation have been described. Generally, when evaluating a lesion for the first time, the initial step is to establish if the lesion is melanocytic.[3] Intuitively, it makes the most sense to make this determination first because melanocytic lesion assessment is distinctive and more laborious than other analyses. Solar lentigines, seborrheic keratoses, and dermatofibromas can mimic melanocytic lesions, which occasionally poses diagnostic difficulty. However, each of these lesions has its own unique dermoscopic features, and once known, differentiating melanocytic from nonmelanocytic lesions is straightforward. (The dermoscopic features of these entities will not be covered here.)

Melanocytic Lesions and Melanoma

A pigment network, blue-gray pigmentation, dots, globules, or streaks identify a lesion as being melanocytic. A pigment network is a gridlike network consisting of pigmented lines and hypopigmented holes.[4] An atypical pigment network is characterized by irregular holes and thick lines unevenly distributed throughout the lesion.[5] Homogeneous blue-gray pigmentation usually denotes a blue nevus, but in the context of a blue-white veil, it is melanoma (Figures 2–7). Dots and globules (larger in size than a dot) are small round structures, and streaks are linear structures usually at the periphery of a lesion. All of these features represent structures restricted to melanocytic lesions, though there can be imitators. As a general rule, the dermatoscopic structures in benign melanocytic lesions tend to be symmetric and orderly, whereas in melanoma they are asymmetric and disorganized.[4]

Once a lesion has been identified as melanocytic, an algorithm can be applied to categorize a lesion as benign, indeterminate, or melanoma. Validated algorithms include pattern analysis, CASH (colors, architecture, symmetry vs asymmetry, homogeneity vs heterogeneity) method, ABCDE (asymmetry, borders, colors, dermoscopic structure, evolving) rule, 3-point checklist, 7-point checklist, and Menzies method. It is unnecessary and overwhelming to

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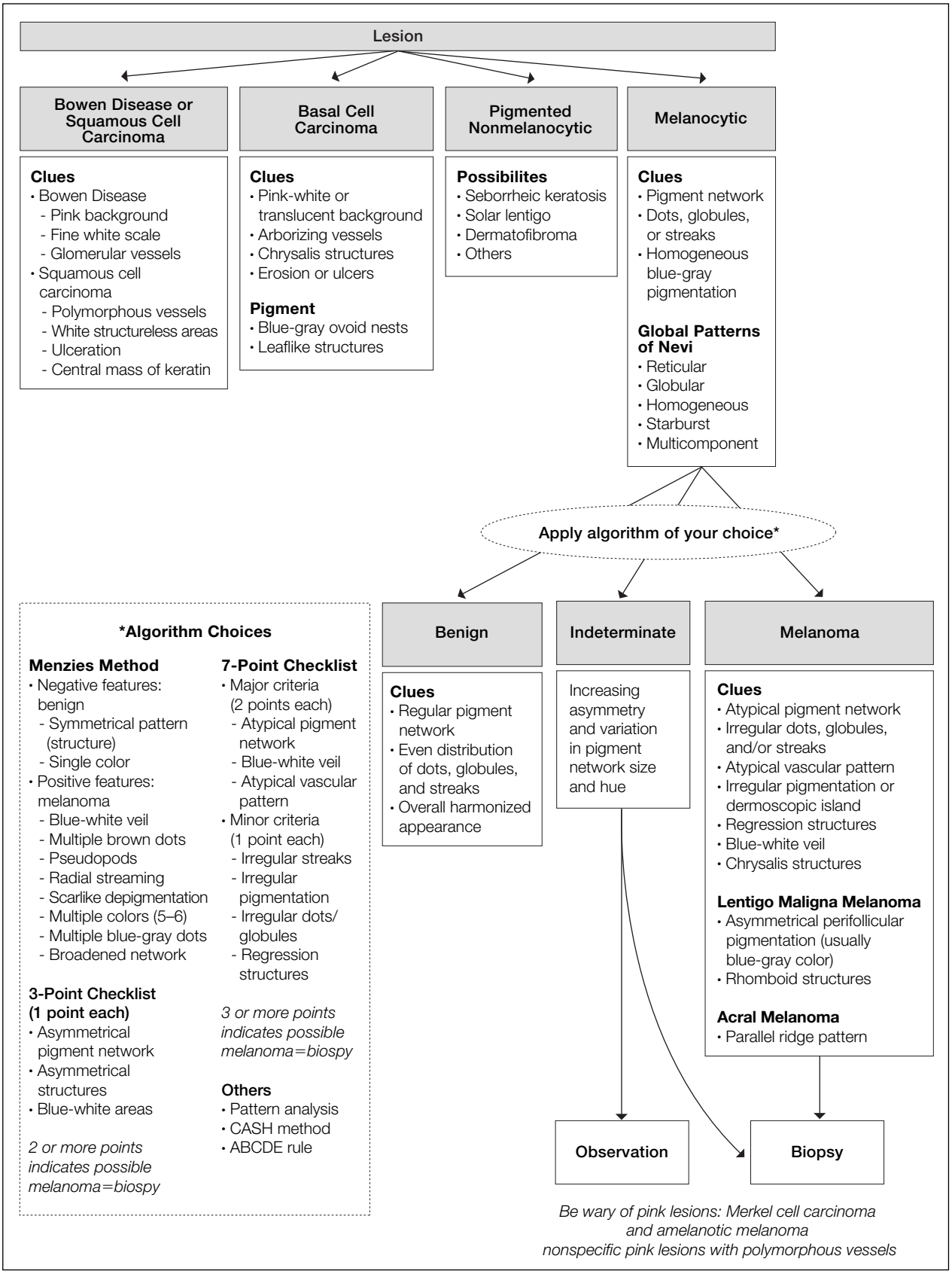

Figure 1. Algorithm for evaluating pigmented lesions using dermoscopy. CASH indicates colors, architecture, symmetry vs asymmetry, homogeneity vs heterogeneity; ABCDE, asymmetry, borders, colors, dermoscopic structure, evolving.

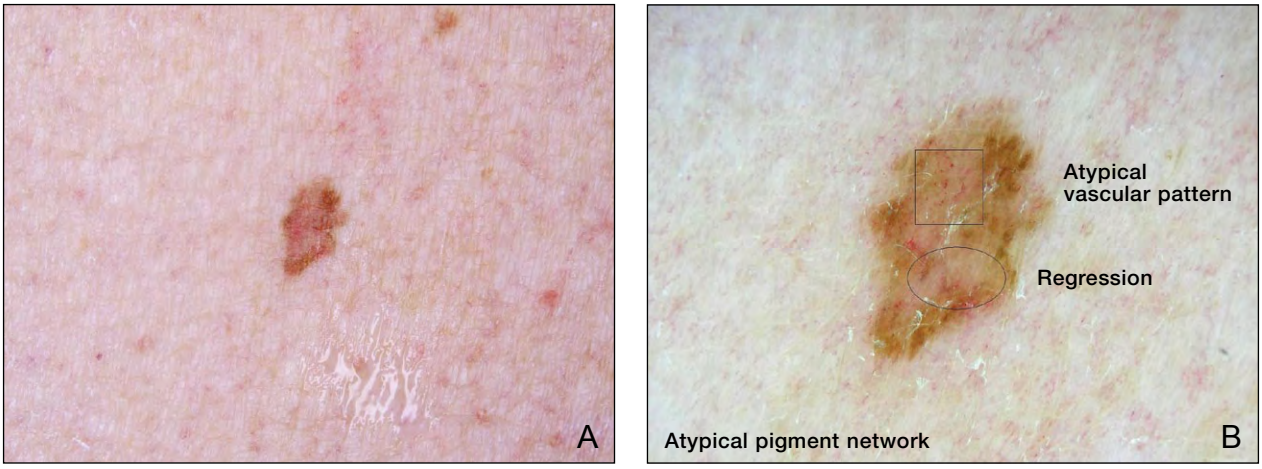

Figure 2. Malignant melanoma in situ (A) with an atypical pigment network, atypical vascular pattern, and regression structures on dermoscopy (B). Photographs courtesy of David Swanson, MD, Mayo Clinic Arizona, Scottsdale.

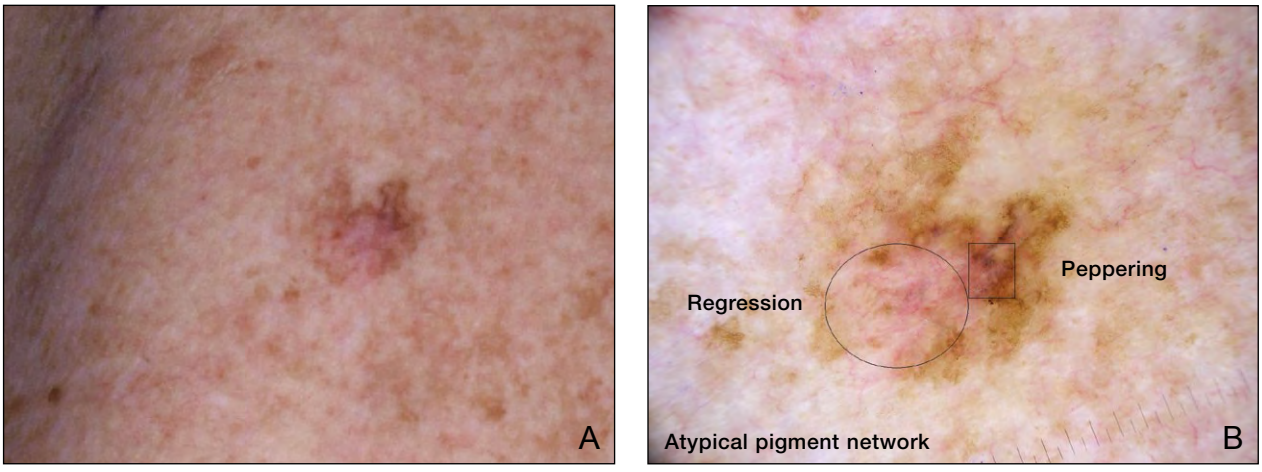

Figure 3. Melanoma (A) with an atypical pigment network, regression structures, and peppering on dermoscopy (B). Photographs courtesy of David Swanson, MD, Mayo Clinic Arizona, Scottsdale.

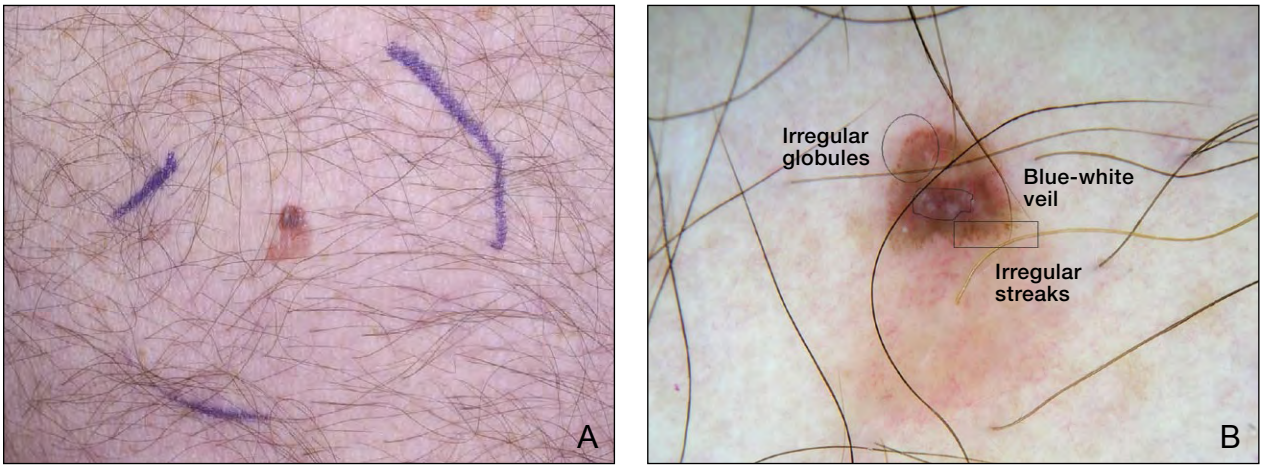

Figure 4. Melanoma (A) with irregular globules and streaks as well as blue-white veil on dermoscopy (B). Photographs courtesy of David Swanson, MD, Mayo Clinic Arizona, Scottsdale.

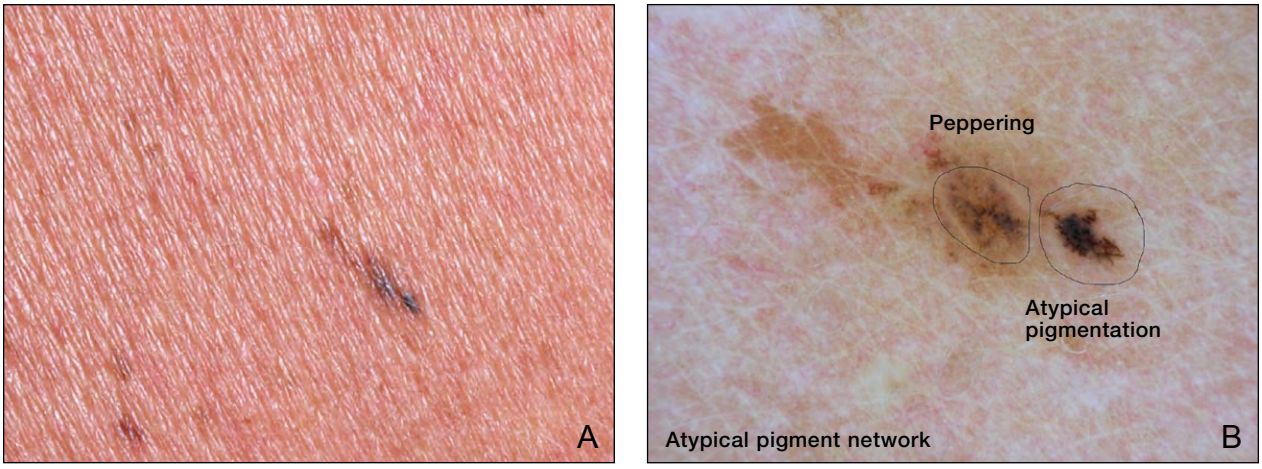

Figure 5. Nevus with moderate atypia (A) with an atypical pigment network, atypical pigmentation, and peppering on dermoscopy (B). Photographs courtesy of David Swanson, MD, Mayo Clinic Arizona, Scottsdale.

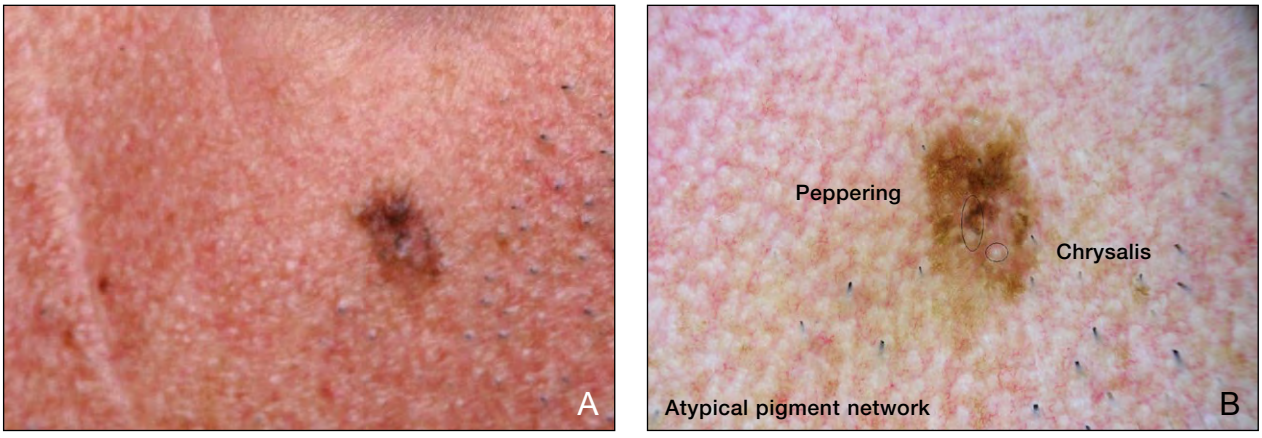

Figure 6. Melanoma (A) with an atypical pigment network, peppering, and chrysalis structures on dermoscopy (B). Photographs courtesy of David Swanson, MD, Mayo Clinic Arizona, Scottsdale.

learn all of these algorithms when one begins dermoscopy. Fundamentally, all of the algorithms work by evaluating a nevus for features found to correlate with increasing risk for melanoma. Despite overlap between algorithms, there is evidence to suggest pattern analysis may be superior.[6] My recommendation is to pick the algorithm you find most comfortable. I use the 3-point checklist because it is uncomplicated and easy to remember. Criteria for the 3-point checklist include asymmetry of pigment network, asymmetry of structures, or blue-white areas; if 2 of 3 criteria are met, the lesion is biopsied on suspicion for melanoma. All evaluations are subjective, but accuracy is honed with experience.

The key dermoscopic features scored by several of the melanoma algorithms include atypical pigment network, irregular dots or globules, irregular streaks, irregular pigmentation, atypical vascular pattern, regression structures, blue-white veil, and chrysalis structures. An atypical vascular pattern is characterized by circumscribed areas of hairpin, dotted, or linear vessels. Regression structures are white scarlike spots or fine dotty blue areas. The fine dotty blue areas also are referred to as peppering and correspond to melanophages on histology. A blue-white veil is a confluent, irregular, structureless area of whitish blue pigmentation that is highly diagnostic for melanoma when present.[5] Chrysalis structures can be seen in melanoma or BCC and are shiny, white, circular or linear streaks that represent collagen; they are only visible with a polarized dermatoscope. The dermoscopic features of lentigo maligna melanoma and acral melanoma also are important but not covered here. Oftentimes, just becoming familiar with the

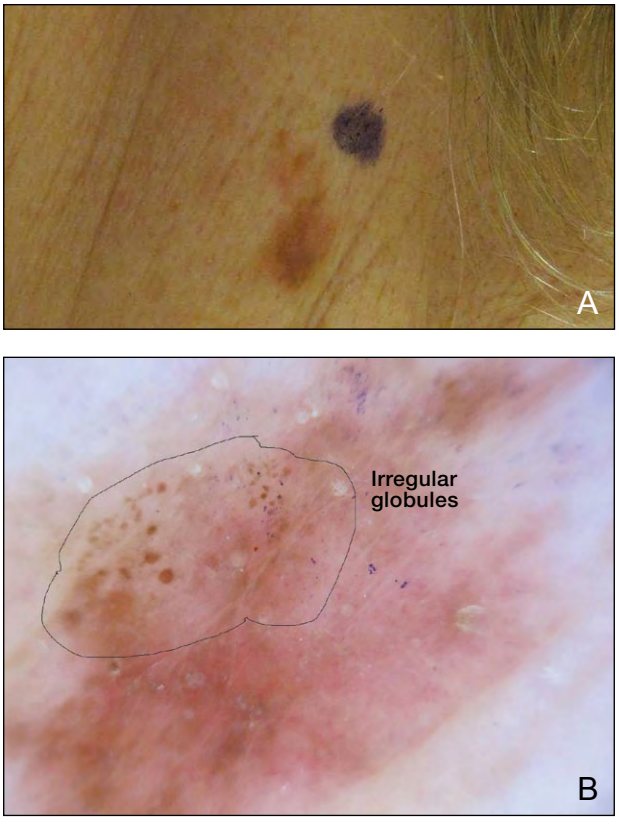

Figure 7. Melanoma (A) with irregular globules on dermoscopy (B). Photographs courtesy of David Swanson, MD, Mayo Clinic Arizona, Scottsdale.

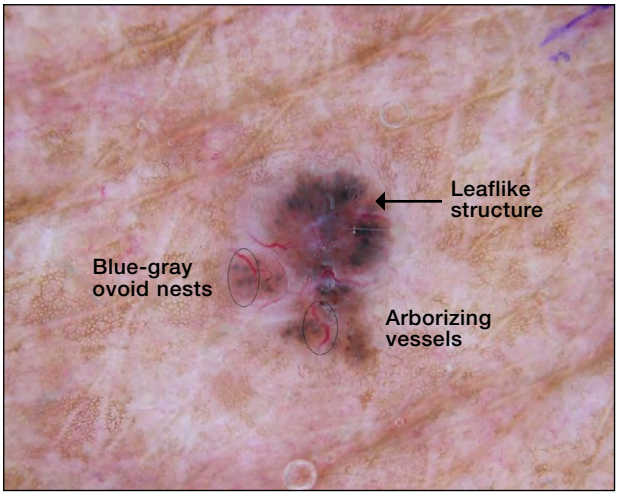

Figure 8. Pigmented basal cell carcinoma with blue-gray ovoid nests, arborizing vessels, and leaflife structures on dermoscopy. Photograph courtesy of David Swanson, MD, Mayo Clinic Arizona, Scottsdale.

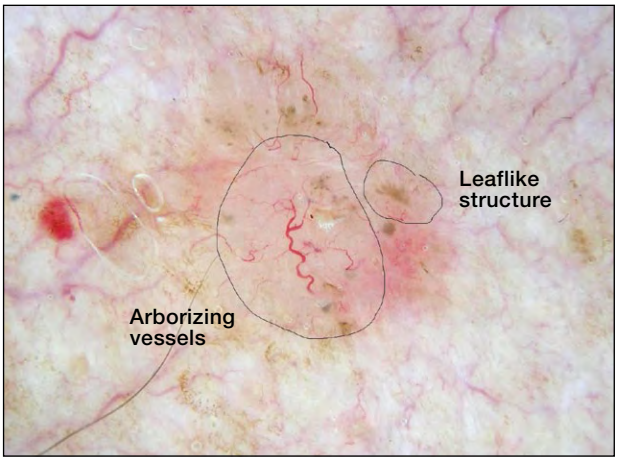

Figure 9. Basal cell carcinoma with arborizing vessels and leaflike structure on dermoscopy. Photograph courtesy of David Swanson, MD, Mayo Clinic Arizona, Scottsdale.

dermoscopic features that suggest atypia or melanoma will allow identification of nevi, which should be biopsied even without application of an algorithm.

Basal Cell Carcinoma

Basal cell carcinomas are the most common type of skin cancer and are classified as superficial, nodular, morpheaform, or pigmented (Figure 8). Many dermatologists can identify typical BCCs without the aid of a dermatoscope. However, BCCs can easily be mistaken for other lesions such as lichenoid keratoses. Frequently, in my experience, a dermatoscopic examination of a clinically questionable BCC will clarify diagnosis. Typical dermoscopic findings of BCCs are pink-white or translucent background, arborizing telangiectases, superficial erosions, and chrysalis structures (Figure 9). Pigmented BCCs can be confused with melanocytic lesions and also often will show blue-gray ovoid nests or leaflike structures. These structures represent tumor islands with pigment. Basal cell carcinomas are distinctive under dermoscopy, and even a small amount of familiarity with features of BCC can result in proficiency.

Squamous Cell Carcinoma

The dermoscopic diagnosis of Bowen disease and SCC can be difficult to diagnose, and many times I feel the lesions are nonspecific. However, if carefully evaluated, there are distinguishing features. More than 90% of lesions of Bowen disease show a dermoscopic pattern of a pink background with ball-shaped clusters of glomerular vessels (Figure 10).[7] Furthermore, a scaly surface is observed in more than 90% of cases.[8] For invasive SCC, reported findings include polymorphous vessels (eg, hairpin, linear, irregular), white structureless areas, ulceration, and a central mass of keratin in keratoacanthoma type.[9] I have been told that "pink" on dermoscopy means

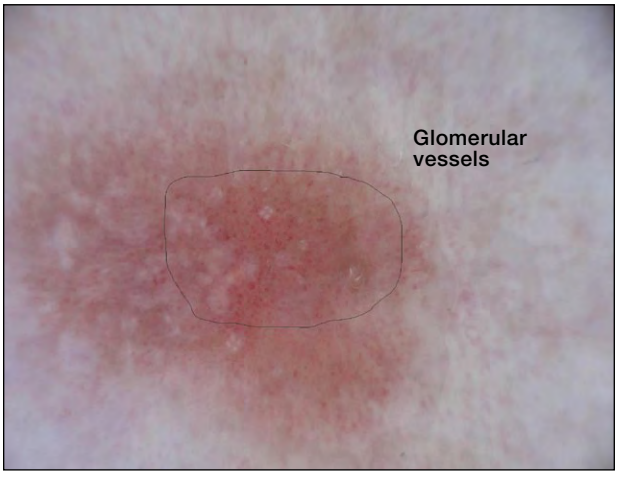

Figure 10. Bowen disease with glomerular vessels on dermoscopy. Photograph courtesy of David Swanson, MD, Mayo Clinic Arizona, Scottsdale.

"stop and think." Other lesions that can be nonspecific and pink are amelanotic melanoma and Merkel cell carcinoma; therefore, I would exercise caution when examining a pink lesion.

Comment

The length of time to become a competent dermatoscopist varies. A few studies have shown that even limited classroom instruction can result in proficiency.[10,11] To a beginner, dermoscopy can be daunting; there is a tremendous amount of published literature. Dermoscopy has its own language, and while one is evaluating, decisive attention to detail is required. It took a year of residency for me to feel comfortable, and I continue to work at improving. The key is to focus on the basics and look at many lesions. Ideally, if an expert dermatoscopist can periodically check your evaluation of a lesion and go over findings, competence and confidence can be achieved much more quickly.

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