DERMOSCOPY – A NEW DIAGNOSTIC APPROACH OF PIGMENTED SKIN LESIONS

M. Kadurina, B. Dimitrov
Military Medical Academy, Department of Dermatology and Venereology, Sofia, Bulgaria

ABSTRACT
Dermoscopy is a noninvasive diagnostic method, which is becoming increasingly reliable and, as a consequence, increasingly popular among dermatologists and patients. Especially in the field of pigmented skin lesions (PSLs), dermoscopy may add useful information to the clinical constellation, improving the diagnostic performance for early diagnosis of melanoma and for differentiating various melanocytic and nonmelanocytic pigmented lesions. This method has various other potential applications besides diagnosis, including lesion’s selection for biopsy, determination of appropriate therapeutic modalities, verification of treatment efficacy, and decision of surgical margins.

What is dermoscopy?
The introduction of dermoscopy into the clinical practice of dermatology has disclosed a new and fascinating morphologic dimension of pigmented skin lesions (PSLs). Dermoscopy is a noninvasive, simple, and cheap diagnostic technique that permits the visualization of morphologic features that are not visible to the naked eye, thus forming a link between macroscopic clinical dermatology and microscopic dermatopathology. This submacroscopic observation of PSLs enriches the available clinical diagnostic tools by providing new morphologic criteria for the differentiation of melanoma from other melanocytic and nonmelanocytic PSLs. Over the past years, dermoscopy has been known by a variety of names, including skin surface microscopy, epiluminescence microscopy, incident-light microscopy, dermatoscopy, and video-dermatoscopy. The term “dermoscopy,” however, first used by Friedman et al. (1) in 1991, currently enjoys the greatest international consensus (2).

Dermoscopy involves covering the skin lesion with mineral oil, a hand-held lens, a hand-held scope (also called a dermatoscope), a stereomicroscope, a camera, or a digital imaging system. Magnifications of these various instruments range from x 6 to x 40 and even up to x 100. The widely used dermatoscope has a 10-fold magnification that is sufficient for routine assessment of PSLs. The fluid placed on the lesion eliminates surface reflection and renders the cornified layer translucent, thus allowing better visualization of pigmented structures within the epidermis, the dermal–epidermal junction, and New hand-held dermatoscopes are now available on the market that are provided with polarized light, rendering the fluid placed on the lesion unnecessary for inspecting pigmented skin structures.

The current practice in the diagnosis of melanoma
In the last 2 decades, a rising incidence of melanoma has been observed. Because of the lack of adequate therapies for metastatic melanoma, the best treatment currently is still early diagnosis and prompt surgical excision of the primary tumor. The current practice in the diagnosis of melanoma is based on the ABCD rule, which
uses four simple, clinical, morphologic features of melanoma (Asymmetry, Border irregularity, Color variegation, and Diameter of more than 5 mm) (3). There are, however, two major problems with the current practice of clinical diagnosis of melanoma. First, clinical diagnosis based on the ABCD rule reaches only 65% to 80% sensitivity because this method does not recognize that small melanomas (less than 5 mm) may occur (4). In addition, very early melanomas may have a regular shape and homogeneous color; such lesions would falsely be assessed as benign. Second, numerous unnecessary excisions may be performed, as a number of benign melanocytic nevi may mimic melanoma from a clinical point of view. Dermoscopy can help overcome these problems and is a useful addition to clinical diagnosis.

The Role of Dermoscopy in Management of PSLs

It has been claimed that dermoscopy improves the sensitivity (up to 35%) and specificity of melanoma diagnosis compared with clinical diagnosis (5).

In view of the increasing interest in dermoscopy to evaluate PSLs, it is timely to ask this: “What is the most important purpose of the procedure?” Even if the conventional answer is to improve the ability to diagnose melanoma, the primary purpose should be more simply - to determine whether a lesion needs to undergo a biopsy procedure. Because melanoma is a life-threatening disease that is completely cured if removed early, the critical issue is to remove all lesions that may be melanoma while minimizing the excision of benign lesions. The dermoscopic procedures should focus on that goal rather than the more difficult one of maximizing diagnostic accuracy.

Argenziano et al. performed a study to verify whether the use of dermoscopy allows changing the clinical management of PSLs and, in particular, whether this method permits to decrease the number of excised, benign PSLs compared with standard clinical examination (6). From January to December 2000, 231 PSLs in 225 patients were consecutively excised at a specialized pigmented lesion clinic. All lesions were considered by experienced dermatologists to merit excision on clinical grounds. Before excision, each lesion was diagnosed dermoscopically, and on the basis of a management decision made during dermoscopy, each lesion was further categorized as follows: (I) equivocal PSLs to be excised or (II) benign PSLs not to be excised. Histopathologically, approximately two thirds of the lesions were diagnosed as benign PSLs, and one third was diagnosed as melanoma or pigmented basal cell carcinoma (BCC). Dermoscopically, sensitivity, and specificity for melanoma were 89.7% and 92.0%, respectively. In contrast, using dermoscopy for determining whether the lesion should undergo biopsy, 100% of melanomas and BCCs were correctly classified as “equivocal PSLs to be excised” and 39.6% of benign PSLs were correctly categorized as “benign PSLs not to be excised.” These results underline that from a purely diagnostic point of view, dermoscopy does not allow 100% sensitivity for melanoma (6).

In contrast, when dermoscopy is used for establishing whether the lesion needs to undergo a biopsy procedure, this method permits improvement of the clinical management of PSLs.

Because all 231 lesions were considered clinically equivocal and therefore subsequently excised to undergo histopathologic examination, the authors think that the use of dermoscopy will allow to remove all malignant pigmented skin tumors while avoiding the excision of nearly 40% of benign PSLs (6).

Although it seems that dermoscopy may help to reduce the number of excised benign PSLs, there is no definite evidence concerning the value of dermoscopy in im-
proving the number of excised melanomas compared to clinical examination. This is due to the fact that dermoscopy is currently used as a second-level diagnostic procedure for PSLs that were already considered equivocal by the naked eye. Up to now, there are no studies focusing on the impact of dermoscopy in the daily routine and, particularly, on its value as a first-level screening procedure in the diagnosis of melanoma. Based on the results of a recent Internet-based study on dermoscopy, known also as Consensus Net Meeting on Dermoscopy (CNMD), the set of dermoscopic criteria that is relevant for making a diagnosis, particularly for distinguishing melanoma, in the evaluation of PSLs has been redefined (2). Results of this CNMD study showed that the following three criteria were especially important in distinguishing malignant from benign PSLs (Figs 1–3): 1- asymmetry, 2-atypical pigment network, and 3-blue-white structures (a combination of the earlier categories of blue-whitish veil and regression structures). A preliminary calculation showed that the presence of any two of these criteria indicates a high likelihood of melanoma, as evidenced by the results of the best performer in the CNMD.

Based on these purely statistical findings, Ruocco et al. designed a retrospective clinical study to verify the reproducibility and validity of this new simplified dermoscopic method, called the three-point checklist, which could be applied as a screening procedure for melanoma by non-experienced observers (7). Six nonexperienced dermoscopists were gathered, and they examined, after a short introduction of
1-hour duration, 231 clinically suspicious PSLs on basis of the three dermoscopic criteria, which constitute the three-point checklist. Using this method, the nonexperts were able to classify correctly 96.3% of melanomas with a specificity of 32.8% that was comparable to the specificity obtained by one expert who was asked to decide whether the given lesion should be removed. In other words, the nonexperts correctly categorized as banal lesions approximately one third of benign but clinically equivocal lesions, and a comparable number of them were also thought not to be excised by an expert on a face-to-face evaluation of the lesions (7).

Further confirmation on the validity of the three-point checklist for the first-level screening of melanoma will hopefully be achieved performing two additional studies: The first is an open Internet study that will be performed on the Web by a large number of physicians who will evaluate 200 PSLs to test reproducibility and validity of the method (see www.dermoscopy.org); the second is a prospective, intervention study involving a group of general physicians who will be asked to use the three-point checklist in their clinical practice. The aim is to determine whether the adjunct of dermoscopy to the standard clinical examination allows improving the accuracy of physicians in the melanoma screening conducted in a primary care setting. In other words, it will verify whether the use of dermoscopy allows a decrease in the number of benign PSLs that are considered suspicious in the primary clinical screening for melanoma and whether the use of dermoscopy may increase the number of early melanomas correctly identified compared with standard clinical examination.

Dermoscopic Follow-up of PSLs

Although further studies are needed to verify whether dermoscopy allows improving the number of excised melanomas, there are a few preliminary data attesting that the dermoscopic follow-up of PSLs may increase the number of early detected melanomas. There are two reasons that a patient must be examined over time. First, some patients run a high risk of developing melanoma (e.g., patients with a personal or family history of melanoma, a high number of nevi, or skin phototypes I or II) and thus should be monitored periodically. Second, morphologic changes eventually occur in melanocytic nevi, and objective, long-term observation is necessary to monitor those changes. This approach is even more important for monitoring patients who have many clinically atypical nevi, which would be practically difficult to remove simultaneously. Many video microscopes are now available that allow easy digital photographic documentation of PSLs. By means of a simple image storage and retrieval system, one can rapidly compare digitized images over a period of time. Compared with traditional methods of photographic documentation, this digital approach is simple to use.

The dermoscopic characteristics of growing lesions were described in a recent study carried out by Kittler et al. (8) on 1612 common melanocytic nevi. During a follow-up period averaging nearly 1 year, a rim of brown globules, symmetrically distributed around the edge of the lesions, was detected in approximately half the enlarging nevi (5% of the total number of lesions). This phenomenon was more common in lesions on younger patients (less than 20 years old). Furthermore, histopathologic examination of the enlarging lesions showed that the brown globules seen with dermoscopy were probably the visible manifestation of heavily pigmented junctional nests of melanocytes at the peripheral rim of the lesion. Also, in the absence of other atypical features, the symmetrical growth of a melanocytic lesion did not, on its own, indicate that it was malignant. Nevertheless, growing lesions in adults,
especially when accompanied by globular peripheral rims, must be treated with the utmost attention, as they may indicate melanoma.

In a second study performed by the same researchers, the dermoscopic patterns of modifications observed in early melanoma, atypical nevi, and common nevi were compared (9). In details, only 8 of 75 changed melanocytic lesions were demonstrated to be melanoma by histopathologic examination. These melanomas most frequently showed focal enlargement associated with a change in shape as well as appearance of dermoscopic structures that are known to be associated with melanoma. In contrast, the majority of benign changing lesions showed symmetric enlargement without substantial structural dermoscopy changes. Interestingly, six of the eight patients in whom melanoma developed were unaware of the fact that the lesion had changed over time. In this article, the authors demonstrated that follow-up of melanocytic lesions with digital dermoscopy may help to identify patterns of morphologic modifications typical for early melanoma.

The most challenging problem is thus represented by the so-called featureless melanomas that usually do not exhibit either clinical or dermoscopic criteria for the correct diagnosis. This type of melanoma could be detected only if the lesion is monitored and the previously described morphologic changes are then detected.

In a recent study by Menzies et al. (10) a follow-up interval of 3 months is indicated, allowing physicians to discriminate between nevi and featureless melanoma. In fact, after this short interval, a benign melanocytic proliferation is supposed not to change, whereas at least subtle morphologic modifications may be detected in a melanoma.

Conclusions

Dermoscopy opens up a new dimension of clinical morphology of PSLs and enables the well-trained physician to improve the diagnostic accuracy of PSLs in general and melanoma in particular. Digital dermoscopy allows easy storage and retrieval of dermoscopic images and opens the door for teledermoscopy and computer-assisted automated diagnosis of PSLs that are exciting new tools, probably changing the future management of pigmented skin tumors. Again, there is already a strong demand from individual patients, particularly those bearing numerous acquired melanocytic nevi, to be monitored with digital equipment. For these reasons, dermatologists (albeit not all) and patients (basically all) love dermoscopy, despite the fact that up to now there has been no real evidence that dermoscopy is superior to naked-eye examination for the diagnosis of melanoma.

Dermoscopy is a good noninvasive diagnostic method because shows new morphologic dimensions, with all of the peculiar criteria, and because of the possibility of more closely linking to cutaneous pathology.

REFERENCES