ABCDE—An Evolving Concept in the Early Detection of Melanoma

Evolution
Definition: A process of change leading to an improved state

The public health impact of malignant melanoma continues to increase. It has been estimated that 59,580 newly diagnosed cases of invasive melanoma and an additional 46,170 cases of in situ melanoma will occur in the United States in 2005. Currently, 1 in 62 people in the United States will develop invasive melanoma during their lifetime (up from 1 in 1500 in 1930), and should the current rate of increase in incidence continue, by 2010 the lifetime risk will increase to 1 in 50 (Figure 1). If in situ cases are included, the lifetime risk of a US patient developing melanoma is 1 in 34. The annual cost of treating skin cancer in the Medicare population alone in the United States is now estimated at $1 billion, with 90% of treatment costs associated with therapy for advanced disease.

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Melanoma is perhaps the most clear-cut case of a cancer in which early detection is key in ensuring that effective treatment can be achieved. A patient who presents for treatment with an early melanoma (<1 mm in thickness) has an estimated 5-year survival rate of 94%, and a simple excision will most likely be successful. Survival of patients with more advanced lesions (>4 mm in thickness) decreases to 49%, and there is virtually no effective therapy for melanoma once it has metastasized. For all of these reasons, the importance of facilitating identification of melanoma at its earliest state is critical.

In the past half century, advances in the ability to diagnose melanoma at early stages in tumor progression have been the primary factor that contributes to the improved survival of patients with melanoma. Enhancements in diagnosing melanoma early have been the primary factor in better survival of these patients during the past 50 years (Figure 2). This improvement in early diagnosis has also led to stable or decreasing mortality rates at a time when incidence continues to increase (Figure 3).

The techniques for early detection of melanoma have evolved significantly. Through the 1970s, clinical suspicion was often not aroused until lesions were elevated, nodular, ulcerated, and/or bleeding. As a result, most melanomas were diagnosed as advanced tumors. The prognosis for these patients was generally poor.

In the early 1980s, our group at New York University (NYU) recognized the need to develop an easily memorable, readily usable paradigm to improve survival by enhancing the detection of early melanoma through the recognition of visible clinical features. At that time, when we displayed images of lesions of early melanomas to experienced clinicians and asked for a diagnosis, they were generally able to correctly identify them as melanoma. However, when asked why they thought a lesion was a melanoma, they invariably answered, “Because it looked like one.” It was clear that more objective, reproducible criteria were needed to allow for an early melanoma diagnosis algorithm that could be extrapolated beyond experienced dermatologists to other health care professionals and the lay public. Through an analysis of cases of early melanoma in the NYU cooperative group database, 3 easily recognizable clinical features—asymmetry, border irregularity, and color variation—differentiated these lesions from benign melanocytic nevi. In addition, 95% of these early cases had maximum diameters greater than 6 mm, thereby differentiating them from most banal nevi. These findings led to the creation of the ABCD acronym, which subsequently has been accepted as a significant aid in the early diagnosis of melanoma.

Diagnostic evolution continued through the 1990s, leading to the appreciation of the value of a new set of subsurface features related to melanoma diagnosis. Through the use of dermoscopy (epiluminescence microscopy), differentiation between benign and malignant melanocytic lesions was shown to significantly improve.

Although histopathologic analysis remains the gold standard for definitive melanoma diagnosis, in the current decade the focus on improving early melanoma detection has been in the area of computer-aided diagnosis. Digital image analysis systems are being developed with dermoscopic images, which may surpass the diagnostic accuracy of physician-based algorithms. Systems are being developed to enhance melanoma diagnosis through the use of image recognition algorithms by analyzing visible and nonvisible wavelengths.

Despite these technological advances, the most common way that melanoma is currently detected remains through the “naked eyes” of the physician and the patient. For this reason, factors related to human recognition of early melanoma continue to be studied and need to be enhanced.

As the early diagnosis of melanoma has evolved, the importance of the clinical evolution of a given pigmented lesion as a factor in helping to make an accurate
diagnosis has also become increasingly apparent. In this issue of the ARCHIVES, Banky et al15 present data that confirm the importance of change in pigmented lesions as a clue to early malignancy in persons with multiple atypical nevi. Our group has also noted the importance of the association of change in pigmented lesions in histologically confirmed melanomas. In a series of 696 NYU patients with melanoma, 615 (88%) noted evolution of their melanomas before removal.16 Lesional evolution has also been demonstrated by others to be a significant warning sign for risk of melanoma. In a study of 92 patients with nodular melanoma, 71% of patients noted evolution of their lesions.17

Does the inclusion of lesional evolution in an early melanoma detection paradigm improve the ability to successfully diagnose early melanoma? Prospective studies are needed to fully demonstrate this, but several efforts suggest that this may be so. Healsmith et al18 noted that 5 of 65 lesions that were melanomas missed by physicians using the 7-point checklist template had been noted by the patient to have evolved. Lucas et al19 found when using dermatoscopy that lesions suggestive of malignancy that had also changed had a 4-fold increased risk of being melanoma compared with those without change. Thomas et al20 noted that enlargement was a more specific warning sign than the ABCD paradigm. Cassileth et al21 noted that changes in size, shape, and color were the most frequent signs noted in patients who sought treatment for pigmented lesions that were subsequently confirmed as melanoma.

Given these and other findings, it is clear that change (evolution) in a lesion is an important factor in establishing an increased clinical suspicion that a pigmented lesion may be a melanoma. To incorporate this fact with the prior successful efforts, we have proposed that the ABCD criteria be augmented by the addition of an E for evolving.22 By adding the idea of lesional change to the already validated ABCD algorithm, the ABCDE method should, in fact, improve early detection efforts. Harris et al23 noted a statistically significant improvement in pigmented lesion diagnosis when the ABCD criteria were combined with the importance of change in a lesion.

How can the evolution concept be integrated into broad-based professional and public education to improve the sensitivity and specificity of early melanoma diagnosis? For public health messages to be effective they must be simple and straightforward, and the ABCDE criteria are consistent with this requirement. Organizations such as the American Academy of Dermatology, the Skin Cancer Foundation, and the American Cancer Society have promoted lesion change in their educational materials. The formal integration of evolution into these resources would be a strong first step that would greatly simplify and reinforce this message.

Over time, techniques in early melanoma diagnosis will continue to evolve, and further refinements will become necessary. For example, as noted by Banky et al15 in this issue of the ARCHIVES, age of the patient is related to importance of lesional evolution (change in an older patient having more significance), and perhaps the idea of the importance of change may be age related. When basic research unlocks the secrets of the cellular changes that are seen in evolving melanoma, additional clinical correlates may be identified and included in an early detection paradigm.
However, given what is currently available, our goal as dermatologists is simple and straightforward. We want every melanoma to be detected in an early (and thereby virtually curable) state. Through the addition of \( E \), the revamped ABCDE is a simple, succinct, helpful tool that will be more effective in educating the public and medical communities about the key features of early melanoma. We hope that use of the ABCDE will prove to be a positive step in the evolution of early melanoma detection. We look forward to greater improvements in the effectiveness of secondary prevention efforts in the most dangerous cancer that dermatologists see and the one place where we can make a life-and-death difference on a daily basis.

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Financial Disclosure: Dr Friedman is a board member and shareholder in Electrical Optical Sciences. Drs Kopf and Rigel are members of the medical advisory board of Electrical Optical Sciences.

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