Clinical Diagnosis of Skin Cancer

Enhancing Inspection and Early Recognition

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KEYWORDS

• Skin cancer • Melanoma • Screening • Detection • Diagnosis • ABCDE

KEY POINTS

- Early recognition and removal of melanoma and other skin cancers can help prevent significant morbidity and cancer-related deaths and is associated with increased survival.
- Numerous public health initiatives have been used to create awareness of the dangers of skin cancer and to help patients recognize suspicious lesions on themselves.
- Despite technological advancements, the cornerstone of diagnosis of skin cancer remains based on clinical recognition.

INTRODUCTION

Nonmelanoma (NMSC) and melanoma skin cancer are two of the most commonly diagnosed forms of human malignancy in the United States and worldwide.[1,2] NMSC is far more common but melanoma has a greater lethal potential. Cutaneous malignancy can cause significant morbidity and mortality and has an increased cost of therapy associated with advanced disease. Over the past century, the incidence of skin cancer has increased significantly. However, detection is happening earlier while prognosis is more favorable before disease becomes disfiguring or advanced. For all of these reasons, accurate and effective early clinical diagnosis of skin cancer continues to be paramount.

Over time, approaches for diagnosing NMSC have remained constant based on clinical inspection and patient history of any suspicious lesions that may be growing or changing. The diagnosis of melanoma has evolved significantly over the past century and now more melanomas are being detected at earlier stages. Clinical inspection and recognition of melanoma and NMSC continues to be the cornerstone of diagnosis and management for these cancers.

CONTENT

The clinical recognition of skin cancer has long been the foundation of identification and diagnosis of malignant skin lesions. Clinical diagnosis of NMSC has been unchanged over the past century. Typically, through patient history, lesions that are red, raised, topographically abnormal, growing, bleeding, crusting, or changing are identified and visually examined. Based on clinical expertise, a decision is made to biopsy and/or treat the suspicious lesions. New technologies now exist that are used in conjunction to increase the accuracy of clinical diagnosis

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(discussed elsewhere in this issue), but few have been widely adopted.

In contrast, diagnosis and treatment of melanoma has evolved significantly since this neoplasm was first recognized as a disease entity more than 200 years ago. The importance of early diagnosis of melanoma cannot be understated. Melanoma first grows horizontally within the epidermis (superficial or horizontal growth phase) and over time penetrates and grows vertically into the dermis (invasive or vertical growth phase).[3] Prognosis is directly proportional to the vertical depth of the neoplasm, so early detection has the potential to significantly limit disease burden and decrease cancer deaths. Most health care costs associated with melanoma occur with treatment of advanced disease demonstrating that there are also significant cost savings associated with earlier detection.[4]

Despite increasing incidence for all histologic subtypes and thicknesses of melanoma, the survival rates have steadily improved.[5] Overall 5-year survival rates for invasive melanoma increased from 82% to 93% from 1979 to 2008.[6] Earlier detection has generally led to a greater proportion of thinner depth lesions being removed, which typically are associated with improved outcomes. For thin lesions, treatment is usually surgical excision without the need for further work-up, which results in significant health care savings.

Although melanoma is now more frequently detected earlier, this has not always been the case. Before the 1980s, melanomas were often not diagnosed until gross clinical signs or metastatic disease was present and prognosis was generally poor. There were few advances that had occurred to improve patient awareness or clinician recognition because the clinical features of early melanoma were not well described. Diagnosis was typically made by inspection for gross clinical features including but not limited to extremely large size, bleeding, ulceration, and fungation. This led to a high disease burden and poor prognosis at the time of diagnosis.

The importance of early detection was first understood in the 1960s. Clark and colleagues[7] first correlated the level of histologic invasion, from the epidermis to the subcutaneous fat, with the likely progression and prognosis of disease. In 1970, Breslow[8] then demonstrated that prognosis was proportional to thickness, depth of invasion, and volume of the primary malignancy. He also noted that metastasis rarely occurred in lesions less than 0.76 mm in thickness. Since 1970 numerous studies have confirmed this concept that thinner lesions directly correlate with increased survival and better prognosis.[9] The goal of developing guidelines to detect melanoma earlier, when lesions were thinner and had a better prognosis, was therefore imperative to increase overall survival.

Before the 1980s, the clinical characteristics of early melanoma were not well described. Detecting melanoma was typically a learned entity based on many years of clinical experience. There was a critical need to educate less-experienced dermatologists, other physicians, and the general public on features of early melanoma to improve disease outcomes. In 1985, dermatologists at New York University devised the ABCD (*A*symmetry, *B*order irregularity, *C*olor variegation, *D*iameter >6 mm) acronym to help aid in the clinical diagnosis of early melanoma.[10] This study demonstrated that these parameters were some of the most commonly encountered clinical features seen in early melanomas and served as a guideline for atypical features that should be potentially concerning in pigmented skin lesion (PSL)s.

The ABCDs were intended to help describe and differentiate early, thin melanomas that might be confused with benign PSLs. Its straightforward nature allowed it to be used by clinicians and laypeople to identify potentially suspicious lesions before gross symptoms occurred. Ulcerated and elevated features were excluded because they were suggestive of more advanced disease. In 2004, a fifth parameter was added to the mnemonic, E (*E*volving), making it the ABCDE criteria (**Table 1**).[11] The addition of E improved the ability to recognize melanoma earlier because it includes lesions that are changing size, shape, or color and does not preclude lesions less than 6 mm.

Because of the diverse nature of early melanoma, one or more of the ABCDEs may be lacking, especially in early disease. Diameter has been the most controversial parameter, because as early diagnosis has improved, many melanomas less than 6 mm wide are now being identified. However, recent studies have reconfirmed that diameter remains a useful differentiating parameter.[12]

The ABCDE criteria have been verified in multiple studies that have demonstrated their sensitivity, specificity, and diagnostic accuracy.[13–16] The sensitivity and specificity of these parameters when used individually ranges from 57% to 90% and 59% to 90%, respectively.[17] Determining quantitative ABCDs through the use of computer image analysis has reinforced these findings.[18] Sensitivity and specificity both increase when criteria are used in conjunction with one another. Additionally, studies have demonstrated high interrater reliability and objectivity in assessing these clinical features, enhancing their utility as a screening measure.[19]