Bowen Disease of the Nail Bed Presenting as Longitudinal Melanonychia: Detection of Human Papillomavirus Type 56 DNA

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GOAL

To gain a thorough understanding of Bowen disease (BD) in the periungual region

OBJECTIVES

Upon completion of this activity, dermatologists and general practitioners should be able to:

1. Recognize the clinical presentation of BD in the periungual region.
2. Discuss the pathogenesis of BD in the periungual region.
3. Explain the treatment options for BD in the periungual region.

CME Test on page 296.

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A case of Bowen disease (BD) presenting as longitudinal melanonychia (LM) on the right third fingernail of a 25-year-old African American man is described. Findings from the histopathologic examination revealed full-thickness epidermal atypia, hypergranulosis, and koilocytic changes. Human papillomavirus (HPV) type 56 was identified by polymerase chain reaction. To the best of our knowledge, we describe the first case of BD of the nail unit in which HPV-56 DNA has been identified.

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Bowen disease (BD) of the nail unit has multiple clinical presentations, often making its diagnosis challenging. BD is a squamous cell carcinoma (SCC) in situ with various cited etiologic causes, including ionizing and nonionizing radiation, hydrocarbon exposure, trauma, arsenic ingestion, chronic paronychia, ectodermal dysplasia, and dyskeratosis congenita.[1-4] Human papillomavirus (HPV) has been associated with the pathogenesis of BD and SCC of the anogenital, oral, and periungual regions.[3-9] Specifically, HPV-16 is well recognized as the predominant type associated with periungual BD and SCC, though HPV-34, -35, and -73 also have been identified.[2-8] We describe the case of a 25-year-old African American man with BD of the third right fingernail presenting as longitudinal melanonychia (LM), in which HPV-56 DNA was identified.

Case Report

A 25-year-old African American man presented to our dermatology service for evaluation of a pigmented streak of the third right fingernail that had been present for several years. Findings from the examination revealed a band of LM on the right third fingernail associated with overlying linear dystrophy of the nail plate. There was no periungual extension of pigmentation onto the adjacent cuticle or the lateral nail fold (Figure 1).

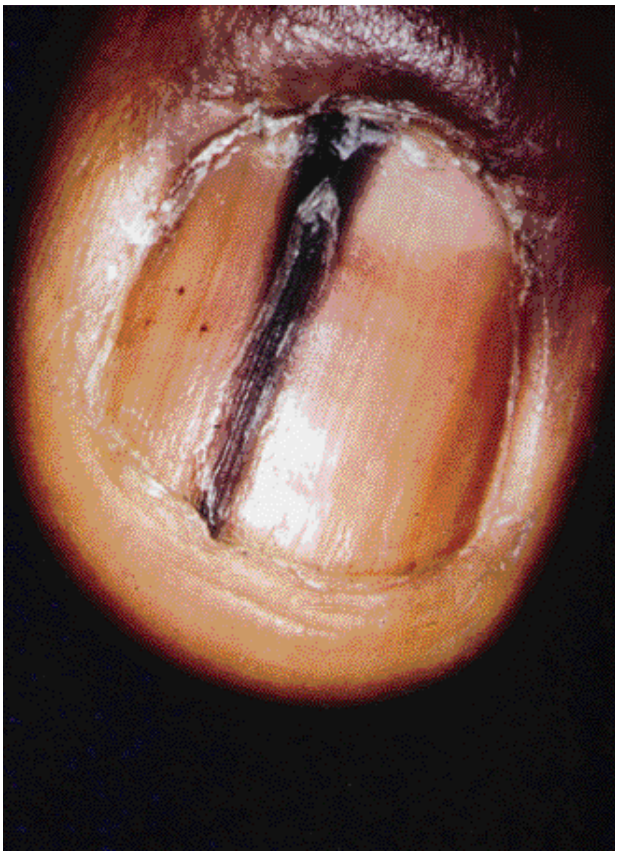

Figure 1. Longitudinal melanonychia with overlying linear nail dystrophy.

A 3-mm punch biopsy of the proximal nail matrix was performed and revealed acanthosis, hyperkeratosis, and full-thickness epidermal atypia (Figure 2). Hypergranulosis and koilocytic changes were noted (Figure 3). MART-1 (melanoma antigen recognized by T cells 1) staining demonstrated a normal number and distribution of melanocytes.

Polymerase chain reaction amplification, with subsequent hybridization with probes specific to the DNA of HPV, showed strong positivity for HPV-56. Mohs micrographic surgery was performed to excise the tumor with clear margins (Figure 4). The wound was primarily closed using a modified running winch stitch (Figure 5). An anogenital examination performed during follow-up was negative for any verrucous lesions.

Comment

BD of the nail unit commonly has been described as wartlike but may present as periungual erythema with associated crusting, ulceration or fissuring, paronychia, onychocryptosis, or nail dystrophy, with eventual partial to complete degeneration of the nail.[1,10] The digits of the hands are more commonly involved than the feet.[10] In most cases, a single digit is involved, with the thumb being the most common. More invasive disease should be suspected in nodular cases and when bleeding and ulceration occur.[5,10] LM is another presentation of BD involving the nail unit first described by Baran and Simon[11] in 1988.

Sass et al[2] described the first case of BD presenting as LM, in which HPV-16 was identified, and further demonstrated genomic integration of the viral DNA in the chromosomal host DNA. HPV infection, especially type 16, has been implicated both in the pathogenesis of anogenital and oral BD[2-4,7] and in the development of BD or invasive SCC in the periungual area.[1-4,6] In addition, HPV-34, -35, and -73 have been described.[4,7,8]

HPVs related to mucosal or genital lesions likely play an important role in the pathogenesis of BD and invasive SCC in the periungual region.[3,5,7] Guitart et al[5] described a case in which similar HPV genomes were detected in a uterine cervical neoplasia and a subungual SCC in the same patient. Similarly, Rudlinger et al[12] described a patient with HPV-35 positive bowenoid papulosis in the anogenital region who presented 11 years

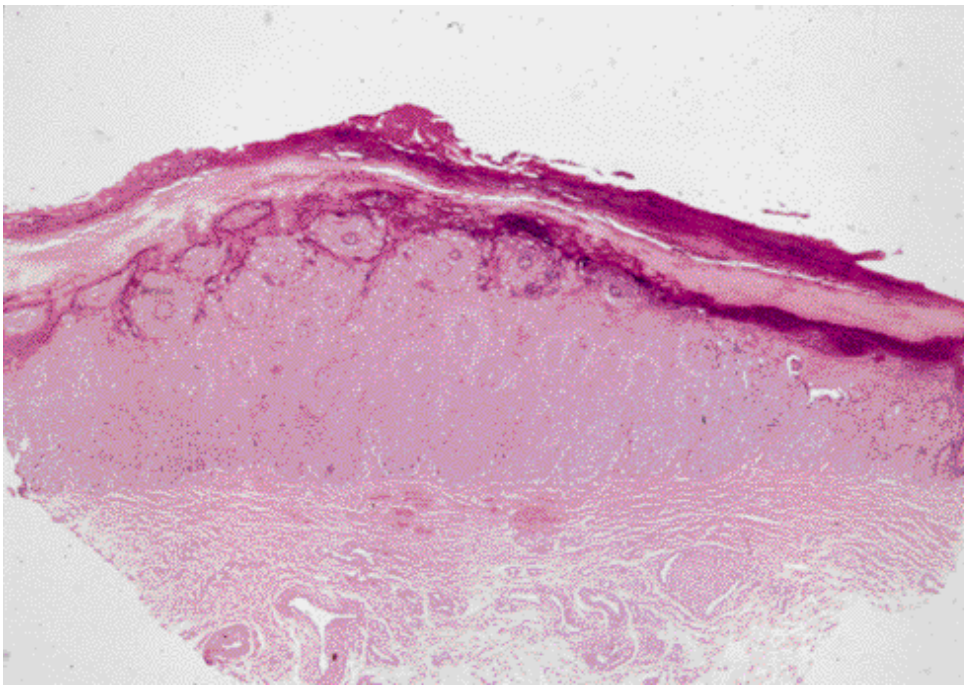

Figure 2. Acanthosis and hypergranulosis with full-thickness epidermal atypia (H&E, original magnification ×10).

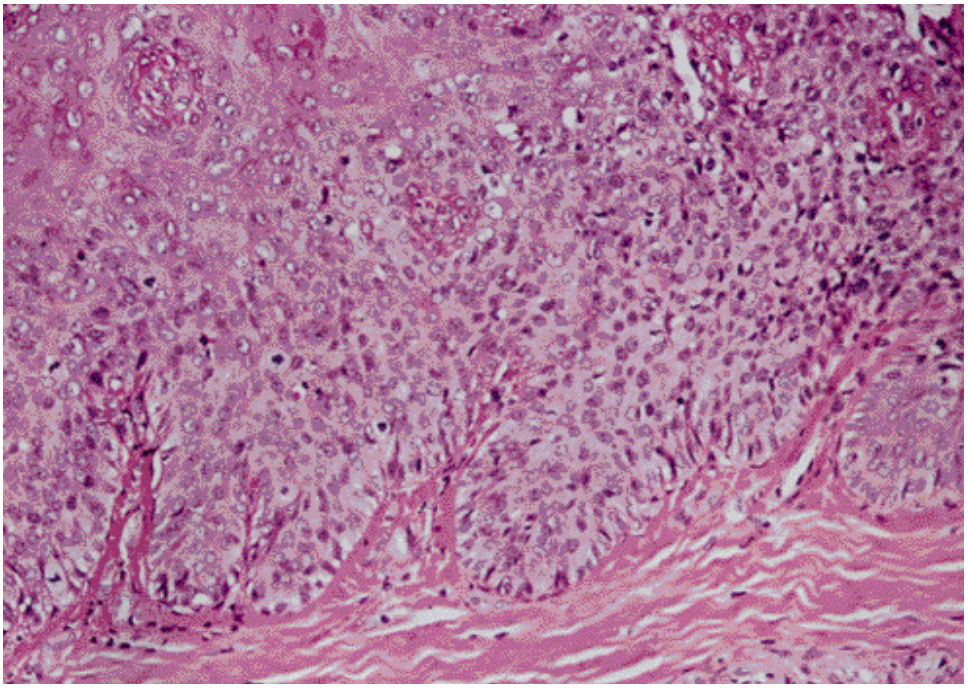

Figure 3. Koilocytic changes in the upper epidermis (H&E, original magnification ×20).

later with bowenoid dysplasia of a verruca on the right ring finger with the same HPV type. The presence of the same HPV type in both anogenital and periungual regions occurring in the same patient could be explained through autoinoculation or direct contact.[1,3,5,7] This is consistent with the observation that extragenital BD lesions are found more commonly in the upper extremities.[1,3,7]

Lorincz et al[13] first reported HPV-56 in 1989 after having been detected in invasive cervical cancers. HPV-56 is included in the high-risk group of HPV types often detected in either cervical intraepithelial neoplasia or invasive cancers, or both.[3,9,13] In 1999, Uezato et al[3] reported the first case in which HPV-56 was found in extragenital BD. The lesion occurred on the first great

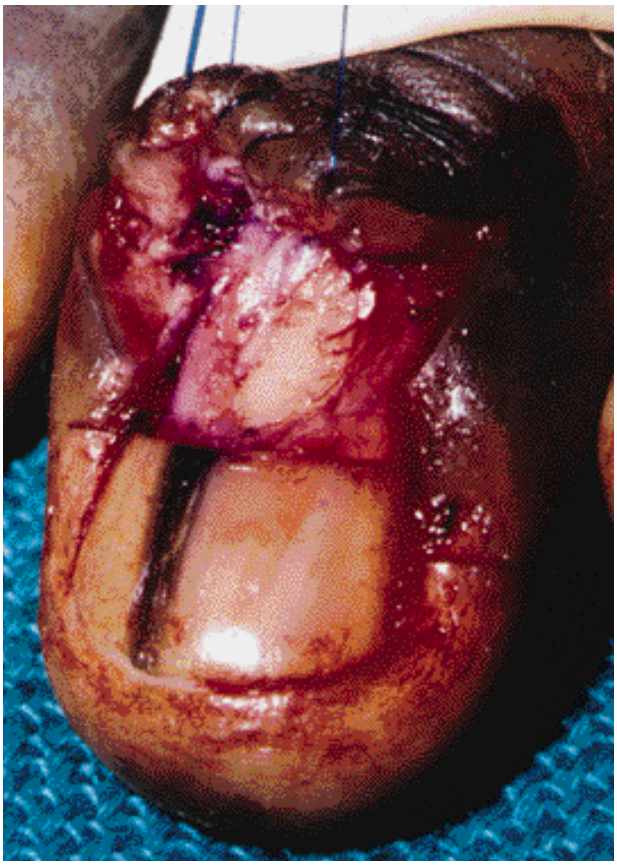

Figure 4. Extirpation of tumor with Mohs micrographic surgery.

toe of an 81-year-old Japanese woman who subsequently underwent surgery, including skin grafting, without evidence of recurrence. To our knowledge, our case represents the second report in which HPV-56 was found in a case of extragenital BD.

The prognosis for patients with BD involving the nail unit is good. In the case of invasive carcinoma of the nail unit, the reported incidence of local bone invasion ranges from 18% to 60%.[14-16] The high rate of local invasion may reflect a delay in diagnosis due to patient neglect and/or confusion regarding the clinical presentation. Metastatic disease is rare. However, it has been reported in 4 cases, one of which is a patient with hereditary ectodermal dysplasia.[4,15,17,18]

Surgical removal is the preferred therapeutic intervention, with either simple excision followed by skin graft or healing by secondary intention.[1,10,19] Mohs micrographic surgery is the treatment of choice, allowing for complete removal of the tumor with maximal preservation of normal tissue and physiologic function.[1,10,19]

In conclusion, our case represents the first report of BD of the nail unit associated with HPV-56. As new HPV subtypes are identified and classified according to their oncogenic potential, the well-established association among high-risk HPV types

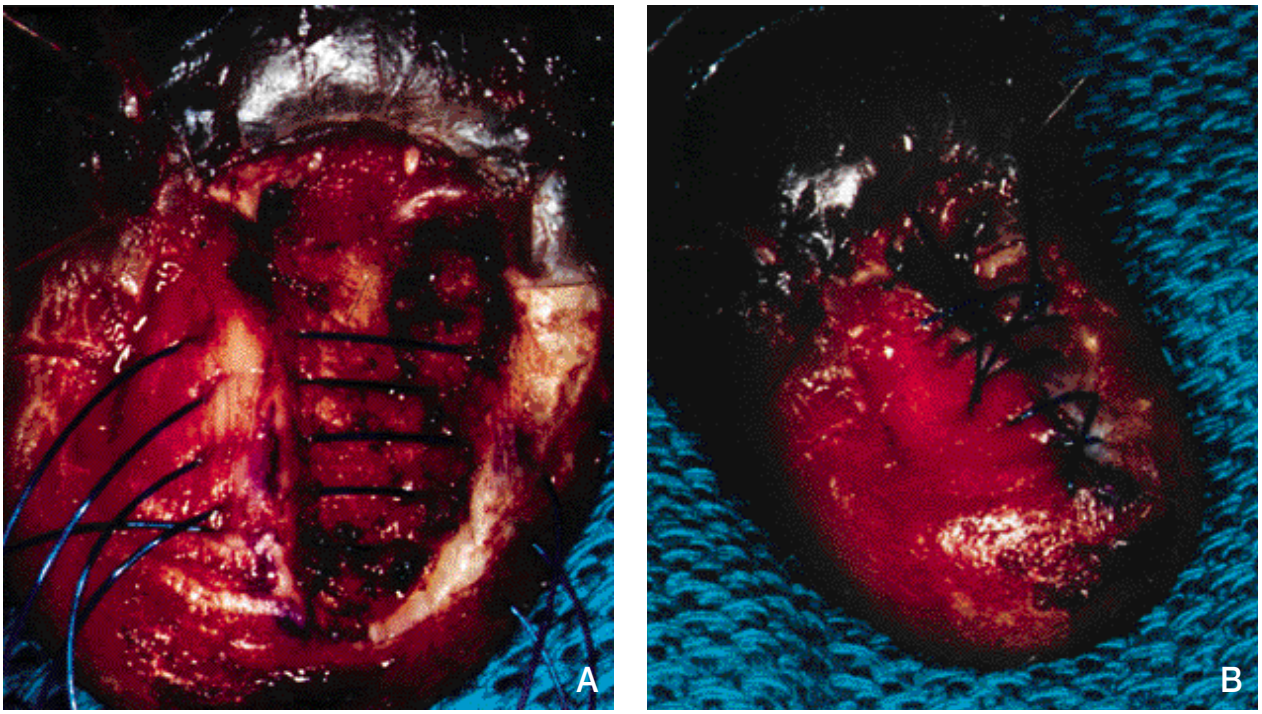

Figure 5. A Mohs defect before closure (A) and the final appearance of the wound after closure (B).

in both anogenital and nail unit neoplasias is reinforced by these reports. Recognition of LM as a presenting sign of nail unit BD may result in early diagnosis and treatment.

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