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Delayed Diagnosis of Plantar Melanoma: Insights from a Case Report

Plantar Melanomun Gecikmiş Tanısı: Bir Olgu Sunumundan Çıkarımlar

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ÖZET

Akral lentijinöz melanom (ALM), başlıca avuç içi, ayak tabanı ve tırnakları tutan, kutanöz melanomun en nadir alt tipidir. Diğer alt tiplerden farklı olarak etiyopatogenezinde güneş maruziyetinden ziyade mekanik stres ve kronik travmanın rol oynadığı düşünülmektedir. Özellikle ileri yaş hastalarda plantar bölgenin rutin muayenesinin ihmal edilmesi, bu bölgede gelişen ALM'nin tanısında gecikmeye yol açmaktadır. Bu olgu sunumunda, sağ ayak tabanında diken batması sonrası gelişen ve ağrılı lezyonla başvuran 74 yaşındaki kadın hasta sunulmaktadır. Dermatoskopik incelemede diffüz heterojen pigmentasyon, peppering, atipik noktalar ve globüller, ülserasyon ve regresyon alanları izlendi. Histopatolojik inceleme ile ALM tanısı doğrulandı ve Breslow kalınlığı 15 mm olarak ölçüldü. Pozitron emisyon tomografisi/bilgisayarlı tomografi (PET/BT) incelemesinde sağ inguinal-femoral lenf nodlarında artmış 18F-fluoro-2-deoxy-D-glucose (FDG) tutulumu saptandı; ancak eksize edilen lenf nodlarının histopatolojik değerlendirmesinde malign tutulum izlenmedi. Geniş lokal eksizyon uygulanan hastanın bir yıllık takiplerinde nüks saptanmadı. Bu olgu, ALM'nin klinik, dermatoskopik ve histopatolojik özelliklerini vurgulamakta ve özellikle ileri yaşlarda plantar bölgenin dikkatli değerlendirilmesinin önemini vurgulamaktadır.

Anahtar Kelimeler: Plantar melanom, akral lentijinöz melanom, kutanöz onkoloji, melanom

ABSTRACT

Acral lentiginous melanoma (ALM) is the rarest subtype of cutaneous melanoma, primarily affecting the palms, soles, and nail units. Unlike other melanoma subtypes, ALM is thought to be associated with mechanical stress and chronic trauma rather than ultraviolet exposure. In elderly patients, inadequate routine examination of the plantar region may lead to delayed diagnosis and advanced-stage presentation. We report the case of a 74-year-old female who presented with a painful lesion on the right plantar foot that developed following a thorn injury. Dermoscopic examination revealed diffuse variegated pigmentation, peppering, atypical dots and globules, ulceration, and regression areas. Histopathologic evaluation confirmed the diagnosis of ALM, with a Breslow thickness of 15 mm. Positron emission tomography/computed tomography (PET/CT) demonstrated increased 18F-fluorodeoxyglucose (FDG) uptake in the right inguinal-femoral lymph nodes; however, histopathologic examination of the excised lymph nodes showed no evidence of malignancy. This case underscores the clinical, dermoscopic, and histopathologic features of ALM and highlights the importance of careful plantar examination for early diagnosis, particularly in elderly patients.

Key words: Plantar melanoma, acral lentiginous melanoma, cutaneous oncology, melanoma diagnosis

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INTRODUCTION

Malignant melanoma is one of the most aggressive tumors with a high mortality rate. It is also the most common malignant tumor of the foot, and all melanoma subtypes except lentigo maligna melanoma have been reported at this site (1,2). Acral lentiginous melanoma (ALM), a rare subtype, typically presents on the palms, soles, or nails. It represents 4-6% of all melanoma cases in Caucasian populations, but accounts for up to 75% of melanoma cases in non-white individuals (3,4). Delayed diagnosis of ALM is associated with poor patient outcomes, and early detection remains challenging (5). This report highlights the clinical, dermoscopic, and histopathologic characteristics of plantar ALM. It emphasizes the importance of timely diagnosis for improving survival and reducing diagnostic delay.

CASE

Clinical Findings

A 74-year-old female patient presented with a two-month history of a painful lesion on the right plantar foot. She reported that the lesion appeared two months earlier following a thorn injury and noted that there was no history of a pre-existing nevus on the affected area. Her medical history was notable for diabetes mellitus and hypertension; there was no personal or family history of cutaneous melanoma. Physical examination revealed a 7 × 6 cm irregularly bordered hyperpigmented patch with variegated pigmentation, as well as a 4 × 4 cm ulcerated hyperpigmented plaque surrounded by a keratotic border on the right plantar surface (Figure 1a).

Dermoscopic Findings

Dermoscopic examination revealed diffuse heterogeneous pigmentation, peppering, atypical dots and globules, ulceration, and areas of regression (Figure 1b).

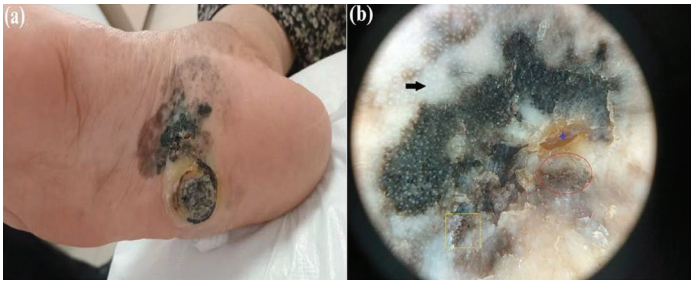

Figure 1. Clinical and Dermoscopic Images. (a) A 7 × 6 cm multicolored, irregularly demarcated patch and a 4 × 4 cm ulcerated hyperpigmented plaque with a keratotic border on the right plantar surface. (b) On dermoscopy, a multicomponent pattern with areas of regression (black arrow), atypical globules (yellow square), black peppering (red circle), and ulceration (blue star).

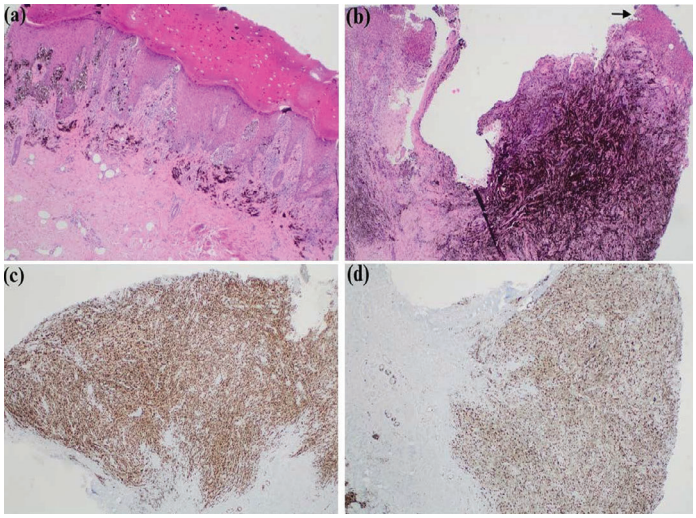

Figure 2. Histopathologic Examination. (a) Atypical melanocytes with nest formation and pagetoid spread (hematoxylin and eosin) (b) Epidermal ulceration (black arrow) and intradermal component of acral melanoma demonstrating atypical melanocytes (hematoxylin and eosin). (c) Nuclear SOX-10 positivity in tumor cells (immunohistochemistry SOX-10). (d) The Ki-67 proliferation index is 90% in tumor cells (immunohistochemistry Ki67) (x40 magnification).

Histopathology

Histopathologic examination revealed atypical melanocytic cells with pagetoid spread in the epidermis beneath a hyperkeratotic stratum corneum adjacent to the ulcer. In the dermis, atypical melanocytic cells showing marked nuclear atypia and pleomorphism, prominent eosinophilic nucleoli, and numerous mitotic figures were observed. Immunohistochemical studies showed diffuse expression of Melan-A, HMB45, and SOX-10 in tumor cells. The Ki-67 proliferation index was 90% (Figure 2a-d). A diagnosis of malignant melanoma was established. Molecular testing for common driver mutations, including BRAF, NRAS, KIT, and CDKN2A, was negative. A wide local excision of the lesion was performed by plastic reconstructive surgery. The tumor extended into the subcutaneous tissue. The Breslow thickness was 15 mm.

Imaging

18F-fluoro-2-deoxy-D-glucose (FDG) positron emission tomography/computed tomography (PET/CT) showed increased FDG uptake in the right inguinal-femoral lymph nodes and right plantar foot, with maximum standardized uptake values of 1.4 and 4.6, respectively. FDG uptake in other regions within the imaging field was unremarkable (Figure 3). Six inguinal-femoral lymph nodes were excised, none of which showed any evidence of malignant infiltration.

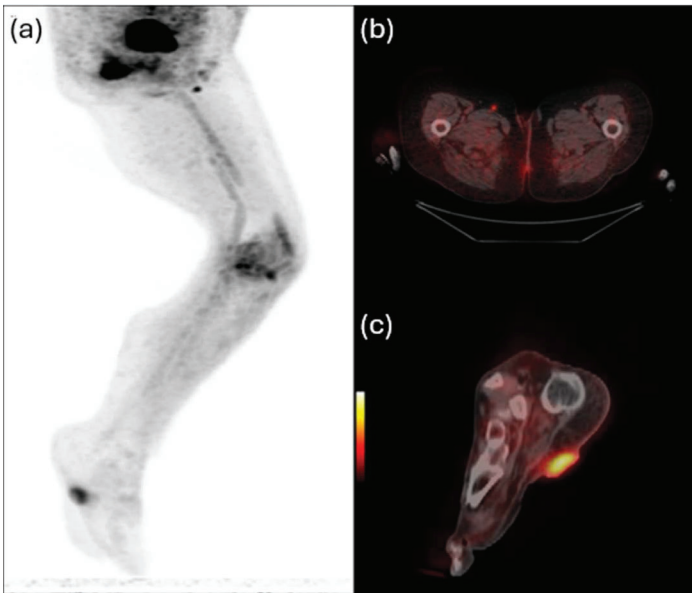

Figure 3. Initial PET / CT scan. (a) Maximum intensity projection image of the lower extremities showing FDG uptake in the right inguinal-femoral region and right plantar foot. (b) Hypermetabolic lymph nodes in the right inguinal-femoral region (SUVmax: 1.4). (c) Pathological metabolic activity in the right plantar foot consistent with primary malignancy (SUVmax: 4.6). FDG - Fluorodeoxyglucose; PE T/ CT - Positron emission tomography - computed tomography; SUVmax: Maximum standardized uptake value.

Treatment and Follow-Up

Based on histopathological and imaging findings, the patient was staged as stage IIC (pT4bN0M0) cutaneous melanoma according to the AJCC staging system. The patient had an uneventful recovery from surgery and was referred to medical oncology for further management. The patient was instructed to follow up with a PET/CT scan and full-body skin examinations every three months.

DISCUSSION

General Characteristics of ALM

Acral lentiginous melanoma is the rarest of the four main subtypes of cutaneous malignant melanoma, accounting for only 4-10% of cases. It predominantly affects the palms, soles, and nail beds (6). Risk factors such as sun exposure, fair skin type, personal or family history of melanoma, and pre-existing melanocytic nevi that are relevant to other cutaneous melanoma subtypes do not apply to ALM. Instead, mechanical stress and trauma have been suggested as potential risk factors for ALM (5). Minagawa et al. reported a higher incidence of ALM in the heel and forefoot, regions most exposed to shear forces (7). These findings further support a potential role of trauma.

Diagnostic Challenges in ALM

Patients with ALM often have a poor prognosis due to delayed diagnosis. Many patients, especially the elderly, have difficulty properly examining the soles of their feet. As a result, melanoma is often detected at a more advanced stage. Melanomas that present as ulcers on the foot are particularly challenging, because the differential diagnosis for such lesions is extensive. Non-healing traumatic wounds, warts, fungal infections, pyogenic granulomas, and hematomas are included in the differential diagnosis of plantar ALM. This can lead to delays in diagnosis and complicate the management of these cases (3,6).

Clinically, ALM begins as a pigmented macule or papule with irregular borders and progresses to large, exophytic nodules with areas of blue-black pigmentation (3). For early detection of plantar malignant melanoma, age over 50 years and a lesion diameter greater than 7 mm are considered important risk factors. The CUBED acronym may be helpful in evaluating suspicious lesions on the foot or nail unit. It stands for Color (C), Diagnosis Uncertain (U), Bleeding (B), Enlargement (E), and Delayed Healing (D). The presence of at least two of these features indicates the need for further diagnosis and evaluation (5).

Dermoscopic Differential Diagnosis

The parallel ridge pattern is a typical early finding in ALM on dermoscopy. Other features, such as multicomponent pattern, irregular pigmentation, and atypical pigment network, may also be observed in ALM (8). In our case, all of these features were observed. Histopathologically, atypical melanocytic cells in ALM initially show lentiginous proliferation along the dermoepidermal junction, either as single units or in nests. As the tumor progresses, they extend into the epidermis by pagetoid spread. In advanced stages, spindle-shaped atypical melanocytes invade the dermis (2,8). Several clinicopathological factors, including male gender, high Breslow thickness, inadequate surgical resection, ulceration, and advanced disease stage (stage III-IV), have been associated with poorer prognosis and reduced overall survival in patients with ALM (4).

Management and Treatment Algorithms

The management of ALM generally follows the principles applied to other cutaneous melanoma subtypes, with wide local excision as the cornerstone of treatment. Available evidence indicates that the width of surgical margins, whether narrow or wide, does not significantly influence survival outcomes or recurrence risk (9). According to the current NCCN guidelines, sentinel lymph node biopsy (SLNB) is an important staging and prognostic tool in cutaneous melanoma. Its use is based on the estimated risk of nodal metastasis rather than tumor thickness alone. It is recommended for

patients with a risk >10%, which typically includes most T1b and all ≥T2 melanomas. However, SLNB is intended for clinically node-negative patients. In the presence of clinically or radiologically suspicious lymph nodes, direct nodal biopsy or excision is preferred, and SLNB is not indicated. Therefore, SLNB remains valuable for staging and guiding adjuvant therapy decisions, although it has not been shown to improve disease-specific survival (10). In our patient, radiologically suspicious lymph nodes with increased FDG uptake were directly excised, and SLNB was not performed, as the patient was no longer considered clinically node-negative.

Completion lymph node dissection is no longer routinely recommended after a positive SLNB due to the lack of demonstrated survival benefit and the risk of surgical morbidity. Current NCCN and ESMO guidelines support a personalized strategy with active nodal surveillance. Completion lymph node dissection may be considered in selected patients with clinically or radiologically evident nodal disease or high tumor burden (11). Given the poorer prognosis of ALM, accurate staging and early detection are particularly important. While no imaging is recommended for low-risk pT1a melanoma, PET/CT may be considered before surgery and SLNB in pT1b–pT4b disease. In one study, PET/CT demonstrated a specificity of 88.5% and a sensitivity of 41.4% for lymph node assessment in melanoma patients. Sensitivity varied according to tumor volume and was higher in patients with clinically palpable lymph nodes (12,13). In our case, however, PET/CT yielded a false-positive result, which may be attributed to reactive lymphadenopathy or secondary inflammatory changes associated with ulceration of the primary lesion. These findings underscore the need for histopathological confirmation of suspected lymph node involvement detected on PET/CT.

Following surgical resection, patients with advanced-stage disease may benefit from adjuvant systemic therapy, including immune checkpoint inhibitors or molecularly targeted agents directed against mutation-driven signaling pathways. In contrast to other melanoma subtypes, ALM exhibits a lower frequency of BRAF mutations and a higher prevalence of KIT mutations. KIT-targeted therapies such as imatinib and sunitinib have demonstrated variable clinical efficacy in advanced ALM, highlighting the need for further investigation (3,9). Immune checkpoint inhibitors are currently used as first-line therapy in advanced BRAF wild-type melanoma; however, their efficacy appears to be lower in ALM than in other subtypes, possibly related to reduced tumor-infiltrating lymphocytes (9). According to ESMO guidelines, adjuvant immunotherapy should be considered in patients at high risk of recurrence, even in the absence of nodal involvement. Phase III trials have shown that adjuvant pembrolizumab or nivolumab improves recurrence-free and distant metastasis–free survival compared with placebo in stage IIB/IIC melanoma (14). However, in our case, adjuvant treatment was not initiated as the patient was referred to medical oncology and declined therapy after discussion of risks and benefits.

Key Clinical Implications

This case study illustrates a rare presentation of plantar melanoma that was ulcerated and locally advanced. Acral lentiginous melanoma is a subtype of cutaneous melanoma with a poor prognosis that develops independently of common melanoma risk factors. As a result, these patients are not routinely screened by dermatologists, and plantar examinations are often overlooked or lesions are misdiagnosed, resulting in delayed diagnosis. If asymmetry, variegated colors, or atypical pigmentation are observed in this region, ALM should be considered and the patient referred for further evaluation. This study highlights the importance of early diagnosis to avoid delays and improve patient survival through timely treatment.

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