Acral lentiginous melanoma *in situ* with a characteristically benign dermatoscopic parallel-furrow pattern

Shifa Akhtar, BS,[a] Harold Rabinovitz, MD,[b,c] and Jane M. Grant-Kels, MD[d,e]
Miami, Plantation, and Gainesville, Florida; Augusta, Georgia; and Farmington, Connecticut

Key words: acral lentiginous melanoma; acral lentiginous melanoma *in situ*; acral melanosis; dermatoscopy; parallel-furrow pattern.

INTRODUCTION

Acral lentiginous melanoma (ALM) comprises less than 5% of all melanomas. It is associated with a worse prognosis than non-acral melanoma and represents approximately 75% of melanomas in Black and Asian patients.[1]

Dermatoscopy is a powerful tool for the early detection of ALM. Typically, benign melanocytic tumors have pigment predominantly localized to the furrows, while ALM has pigment predominantly localized to the ridges (resulting in the parallel ridge pattern [PRP]) or diffusely across ridges and furrows. Although the PRP is specific for ALM and useful in diagnosis of early lesions, approximately one-third of ALMs do not demonstrate this dermatoscopic pattern.[2] Herein we present a case of an acral pigmented lesion with dermatoscopic features consistent with an acral nevus that was confirmed histologically to be acral lentiginous melanoma *in situ* (ALMIS).

Abbreviations used:

ALM:	acral lentiginous melanoma
ALMIS:	acral lentiginous melanoma *in situ*
DEJ:	dermoepidermal junction
PRP:	parallel ridge pattern

CASE REPORT

A 41-year-old woman presented to the dermatology clinic for evaluation of a pigmented lesion on the left plantar surface. The lesion had been present for 10 years and was previously partially biopsied 5 years previously and reported to be benign. The patient noted progressive darkening of the lesion over the past few years, which prompted her to seek further evaluation.

Physical examination demonstrated a 30-mm, uneven, brown patch with irregular borders and variegated pigmentation (Fig 1, *A* and *B*). Although the clinical findings were concerning for an early melanoma, dermatoscopy of the lesion diffusely exhibited a parallel-furrow pattern double dotted-line variant, suggestive of a benign acral nevus (Fig 2).

A partial shave biopsy of the lesion was performed, with pathology revealing single and aggregated melanocytic hyperplasia at the dermoepidermal junction (DEJ) with extension into the papillary dermis (Fig 3, *A*). Some of the melanocytes were noted to have slightly large hyperchromatic nuclei with pale-staining cytoplasm. Melan-A/MART-1 immunostaining revealed confluent melanocytes at the DEJ with occasional melanocytes above the DEJ (Fig 3, *B*). The biopsy was initially interpreted to be consistent with lentiginous melanocytic proliferation; a second opinion found the changes more consistent with a compound melanocytic nevus with severe intraepidermal atypia. The result of melanoma gene expression profile testing was indeterminate. Based on the clinical development of the lesion, including changes

From the Florida International University Herbert Wertheim College of Medicine, Miami[a]; Department of Dermatology, Medical College of Georgia, Augusta[b]; Skin and Cancer Associates, Plantation[c]; Department of Dermatology, University of Connecticut School of Medicine, Farmington[d]; and Department of Dermatology, University of Florida College of Medicine, Gainesville.[e]

Funding sources: None.
IRB approval status: Not applicable.

Correspondence to: Jane M. Grant-Kels, MD, Department of Dermatology, University of Connecticut Health Center, 21 South Rd, Farmington, CT 06032. E-mail: grant@uchc.edu.

JAAD Case Reports 2022;22:53-5.
2352-5126

https://doi.org/10.1016/j.jdcr.2022.01.032

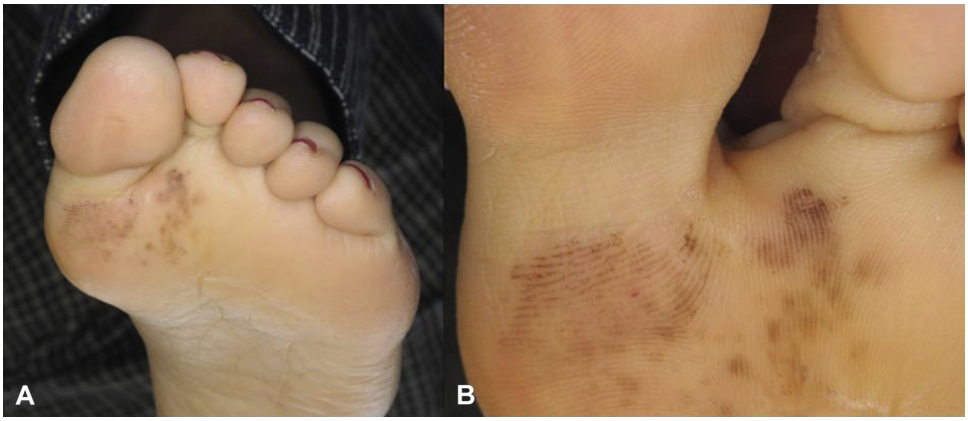

Fig 1. **A** and **B**, Pigmented lesion on the left plantar surface.

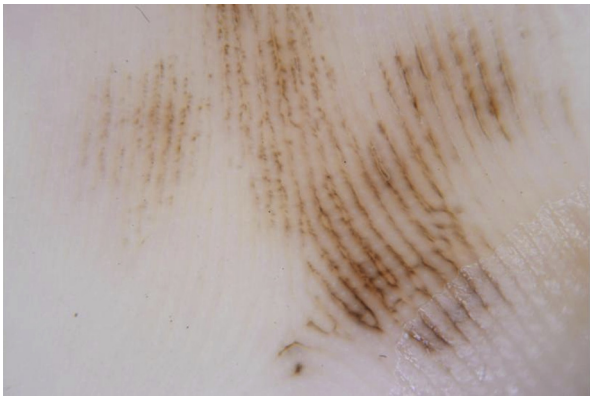

Fig 2. Dermatoscopic appearance of the parallel-furrow pattern, double dotted-line variant.

in color and size and the confluence of junctional melanocytes noted on immunopeoxidase staining, Mohs micrographic surgery was performed, resulting in negative surgical margins after 1 stage. Immunostaining of frozen debulking sections and permanent sections again revealed confluent melanocytes at the DEJ with occasional melanocytes above the DEJ, compatible with ALMIS.

DISCUSSION

Previously, lesions clinically consistent with early ALM that lacked distinguishable histologically atypical patterns were diagnosed as benign atypical melanosis of the foot. However, serial follow-up examinations and consecutive biopsies of these lesions revealed progression of these cases to ALMIS.[3,4] As a result, atypical melanosis of the foot is now considered to be early-phase ALMIS. Diagnosing early ALM may be difficult in the presence of subtle histopathologic findings. Histopathology of an acral nevus will exhibit a predominance of melanocytic nests that are cohesive, consistent in size, well-circumscribed, nonconfluent, and symmetric, while that of ALM will exhibit a single-cell pattern that is noncohesive, poorly circumscribed, confluent, and asymmetric. Both acral nevi and early ALM can demonstrate occasional melanocytes above the DEJ.

Utilizing a diagnostic algorithm can facilitate decision-making when evaluating pigmented acral lesions. Integration of clinical, dermatoscopic, histopathologic, and molecular characteristics is critical to diagnosing ALM. Clinically, ALM presents as an asymmetric dark brown-to-black macule or patch with variegated pigmentation and uneven borders. Clinical guidelines for the early detection of plantar malignant melanoma include age >50 years and a lesion diameter >7 mm as risk factors.[5] Although our patient was 41 years old, the lesion measured 30 mm in diameter and was changing in color and size.

Typical benign dermatoscopic patterns on acral surfaces include the parallel-furrow pattern, lattice-like pattern, fine-fibrillar pattern (when affecting plantar surfaces), globular pattern, homogeneous pattern, and reticular pattern. The parallel-furrow pattern occurs as a result of pigmentation along the sulcus superficialis (furrows) and is further classified into 4 subtypes: Single-line variant, double-line variant, single dotted-line variant, and double dotted-line variant. Benign lesions may also manifest a combination of these patterns. Conversely, specific dermatoscopic patterns for ALM include the PRP and multicomponent pigmentation pattern. PRP occurs due to pigmentation along the crista superficialis (ridges).

Although PRP is useful in identifying ALM even in early developing lesions, one-third of ALM lesions do not demonstrate PRP.[2] Therefore, its absence does not exclude the diagnosis of ALM, as evidenced in our case. Benign dermatologic entities can also demonstrate PRP, including pigmented warts, pigmented volar macules in patients with skin of color,

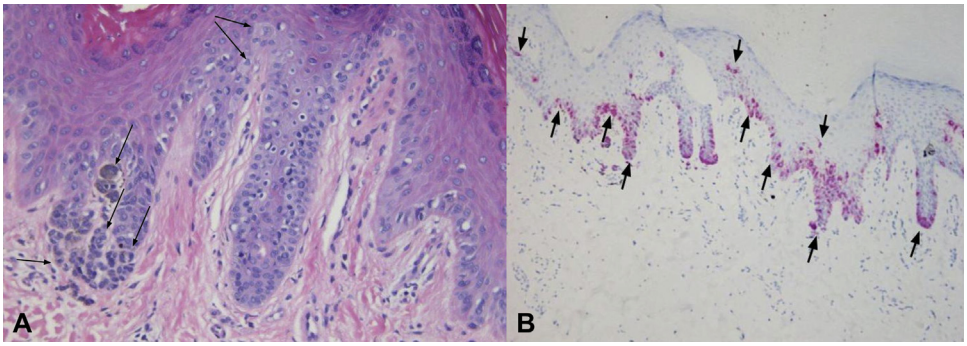

Fig 3. Shave biopsy of lesion on patient's left plantar surface. **A**, Hematoxylin-eosin stain demonstrating single and aggregated melanocytic hyperplasia at the dermoepidermal junction (DEJ) with extension into the papillary dermis (*arrowheads*). Some of the melanocytes have slightly large hyperchromatic nuclei with pale-staining cytoplasm.(Hematoxylin-eosin stained; original magnification 200× **B**, Immunoperoxidase stain with Melan-A (MART-1, original magnification 100×) revealed confluent melanocytes at the DEJ with occasional melanocytes above the DEJ (*arrowheads*).

drug-induced hyperpigmentation, subcorneal hemorrhage, and macules in Peutz-Jeghers and Laugier Hunziker syndromes. Usually, these simulants can be distinguished from ALM based on their history as well as clinical and dermatoscopic presentation.[6,7] For example, history of onset shortly after trauma, abrupt pigment edges, and ability to scratch off the lesion with a scalpel blade favor a diagnosis of subcorneal hemorrhage.[8]

Validated dermatoscopic algorithms have been developed to guide the management of acquired acral pigmented lesions. Saida and Koga[9] proposed a 3-step algorithm, which incorporates identification of PRP or a lesion >7 mm in diameter without a typical benign pattern. Another algorithm proposes the BRAAFF checklist, a scoring system composed of 4 positive features, including irregular blotches (1 point), PRP (3 points), asymmetry of structures (1 point), and asymmetry of colors (1 point) as well as 2 negative features, including parallel-furrow pattern (−1 point) and fibrillar pattern (−1 point).[10] Lesions that score 1 or higher warrant evaluation for ALM. Our patient would only have scored either a 0 or 1 with asymmetry of color and possibly structures and a parallel-furrow pattern. Another proposed algorithm for the diagnosis of ALMIS assesses the presence of PRP, typical benign patterns, other malignant patterns, and a diameter >7 mm.[4]

Our case presented as an acquired acral pigmented lesion with a benign parallel-furrow pattern on dermatoscopy but was of concern due to its clinical features, development, and histopathologic findings.

Conflicts of interest

None disclosed.

REFERENCES

1. Cress RD, Holly EA. Incidence of cutaneous melanoma among non-Hispanic whites, Hispanics, Asians, and blacks: an analysis of California cancer registry data, 1988-93. *Cancer Causes Control*. 1997;8(2):246-252. https://doi.org/10.1023/a:1018432632528
2. Lallas A, Sgouros D, Zalaudek I, et al. Palmar and plantar melanomas differ for sex prevalence and tumor thickness but not for dermoscopic patterns. *Melanoma Res*. 2014;24(1):83-87. https://doi.org/10.1097/CMR.0000000000000037
3. Darmawan CC, Jo G, Montenegro SE, et al. Early detection of acral melanoma: a review of clinical, dermoscopic, histopathologic, and molecular characteristics. *J Am Acad Dermatol*. 2019;81(3):805-812. https://doi.org/10.1016/j.jaad.2019.01.081
4. Han B, Hur K, Ohn J, Lim SS, Mun JH. Acral lentiginous melanoma in situ: dermoscopic features and management strategy. *Sci Rep*. 2020;10(1):20503. https://doi.org/10.1038/s41598-020-77425-z
5. Saida T, Yoshida N, Ikegawa S, Ishihara K, Nakajima T. Clinical guidelines for the early detection of plantar malignant melanoma. *J Am Acad Dermatol*. 1990;23(1):37-40. https://doi.org/10.1016/0190-9622(90)70182-h
6. Saida T, Miyazaki A, Oguchi S, et al. Significance of dermoscopic patterns in detecting malignant melanoma on acral volar skin: results of a multicenter study in Japan. *Arch Dermatol*. 2004;140(10):1233-1238. https://doi.org/10.1001/archderm.140.10.1233
7. Saida T, Oguchi S, Miyazaki A. Dermoscopy for acral pigmented skin lesions. *Clin Dermatol*. 2002;20(3):279-285. https://doi.org/10.1016/s0738-081x(02)00219-5
8. Zalaudek I, Argenziano G, Soyer HP, Saurat JH, Braun RP. Dermoscopy of subcorneal hematoma. *Dermatol Surg*. 2004;30(9):1229-1232. https://doi.org/10.1111/j.1524-4725.2004.30381.x
9. Saida T, Koga H. Dermoscopic patterns of acral melanocytic nevi: their variations, changes, and significance. *Arch Dermatol*. 2007;143(11):1423-1426. https://doi.org/10.1001/archderm.143.11.1423
10. Lallas A, Kyrgidis A, Koga H, et al. The BRAAFF checklist: a new dermoscopic algorithm for diagnosing acral melanoma. *Br J Dermatol*. 2015;173(4):1041-1049. https://doi.org/10.1111/bjd.14045