Dermatoscopy, reflectance confocal microscopy, and gene expression profile findings in Spark's nevus

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INTRODUCTION

Spark's nevus, originally described by A. Bernard Ackerman,[1] is a melanocytic nevus that displays features of both Spitz and Clark's (dysplastic) nevi. These nevi have been documented to present clinically as larger than 5 mm diameter, asymmetric, darkly pigmented, and/or multicolored, and typically located on the trunk or lower extremities of females.[1,2] On histopathologic examination, Spark's nevi demonstrate a combination of Spitzoid cytologic features (large epithelioid or spindled melanocytes with large nuclei and abundant cytoplasm) and Clark's nevus architecture (elongated rete ridges, bridging of nests, and papillary dermal fibrosis).[2] Ko et al[1] proposed histopathologic criteria that include a size <1 cm, horizontal orientation with symmetric outline and sharp circumscription, uniform Spitzoid cytology, and presence of nests of uniform size and shape. Although the nevi demonstrate features that may pose concern for malignancy, the natural history of Spark's nevi is benign, and no cases of recurrent lesions or metastasis have been reported. To date, there is minimal literature describing Spark's nevi, therefore more extensive characterization of these rare neoplasms is prudent. Herein, we present a case of Spark's nevus visualized with dermatoscopy and the first report of reflectance confocal microscopy (RCM) of a Spark's nevus.

Abbreviations used:

RCM: reflectance confocal microscopy
PLA: pigmented lesion assay

CASE

A 68-year-old man who presented to the Oregon Health & Science University Skin Imaging and Technology Center for a full body skin examination, with a personal history of melanoma (0.29 mm Breslow) on the left earlobe (2018) and melanoma in situ of the left cheek (2020). During the examination, we noted a 5-mm dark pigmented macule with sharp borders the right lower back with an unknown duration. On dermatoscopic examination, central polymorphous globules and peripheral reticular network were observed, as well as a blue-white veil and an inverse pigment network (Fig 1, *A*). On RCM (VivaScope 1500; Caliber Imaging and Diagnostics, Inc), at the level of the epidermis, an atypical enlarged honeycombed pattern with high numerosity of pleomorphic dendritic pagetoid cells was observed. At the level of the dermoepidermal junction, an atypical clod pattern with multiple enlarged nonedged papillae, inflammatory cells and a high numerosity of pleomorphic dendritic melanocytes organized in bundles were present (Fig 1, *B-D*).

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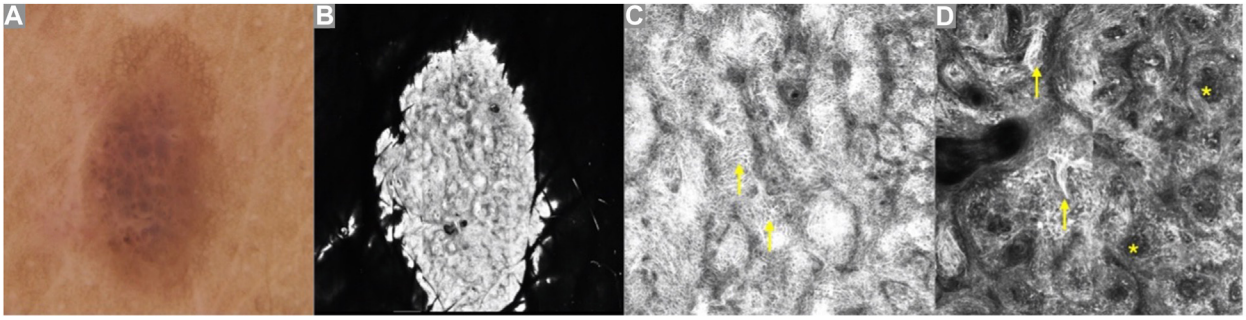

Fig 1. A, Pigmented skin lesion located on the lower back with central polymorphous globules, peripheral reticular network, blue-white veil and inverse network. **B**, Reflectance confocal microscopy (RCM) image overview (6 × 6 mm), location epidermis. **C**, RCM image (0.5 × 0.5 mm), location epidermis. Atypical honeycombed pattern with presence of high numerosity of pleomorphic dendritic pagetoid cells (*arrows*). **D**, RCM image (0.5 × 0.5 mm), location dermoepidermal junction. Atypical clod pattern with presence of multiple stretched nonedged papillae (*asterisks*), inflammatory cells and high numerosity of pleomorphic dendritic melanocytes organized in bundles (*arrows*).

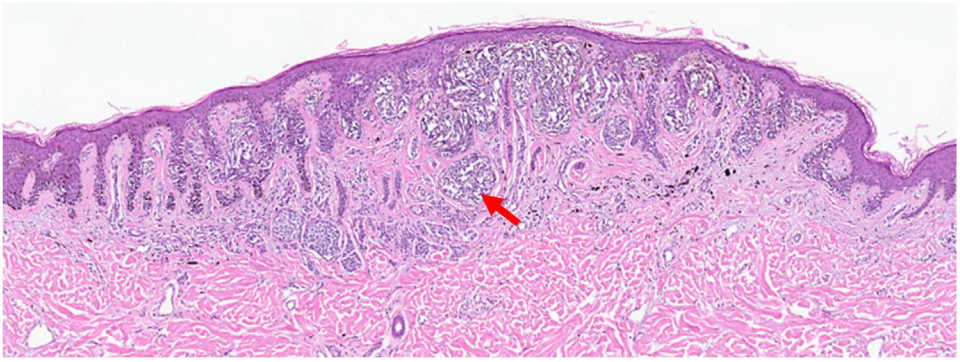

Fig 2. Histopathologic image showing a well-circumscribed compound melanocytic neoplasm with nests of spindled, discohesive melanocytes along the basal layer (*red arrow*), and nests of banal-appearing melanocytes within the papillary dermis, displaying maturation with descent. (Hematoxylin-eosin stain; original magnification: ×3.3.)

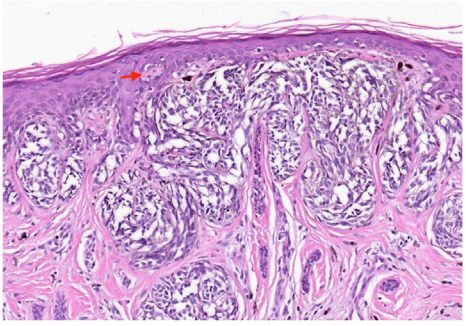

Fig 3. Histopathologic image showing a well-circumscribed compound melanocytic neoplasm with Kamino body present within the epidermis, consistent with findings suggestive of a Spitzoid lesion. (Hematoxylin-eosin stain; original magnification: ×12.4.)

In addition to RCM, a 3-GEP pigmented lesion assay (PLA) noninvasive test (DermTech, DermTech Inc) was performed. The 3-GEP PLA represents a noninvasive method of diagnosing potentially malignant lesions by identifying 3 melanoma-associated genes (LINC00518, PRAME, and TERT) using adhesive patch testing. Results of the 3-GEP PLA test were as follows: LINC00518 positive and both PRAME and TERT negative. Based on suggested clinical use of 3-GEP results, genomic findings were suggestive of malignancy and biopsy was recommended.

Biopsy of the lesion showed a very well-circumscribed compound melanocytic neoplasm characterized by large nests of spindled, discohesive melanocytes along the basal layer at the center of the lesion (Spitz features), with a more lentiginous proliferation of junctional melanocytes at the periphery, and nests of banal-appearing melanocytes in the papillary dermis (Clark's features) (Figs 2 and 3). To the best of our knowledge, this is the first reported Spark's nevus with combined RCM and 3-GEP presentation.

DISCUSSION

There is a paucity of literature describing Spark's nevi, with variability in reported dermatoscopic features.[2-4] Park et al[3] described dermatoscopic presence of brown-to-black globules, diffuse homogenous pigmentation, blue-white structures, and reticular pattern at the periphery, whereas Biondo et al[4] observed atypical pigment network, blue veil and peripheral dots in a case of Spark's nevus. In the largest study to date (n = 12), Cimmino et al[2] reported the presence of a homogenous black pattern in the center and regular pigment network at the periphery in all cases of Spark's nevi. Biondo et al[4] suggested that since Spark's nevi display the histopathologic architecture of Clark's nevi, they can also demonstrate dermatoscopic similarities to Clark's nevus. These findings suggest that Spark's nevus may show dermatoscopic features that are frequently observed in Spitz nevi such as negative pigment network.

To date, combined RCM and 3-GEP PLA findings of Spark's nevi have not been described in medical literature. Interestingly, the RCM findings in our case, including presence of nonedged papillae and a high numerosity of pleomorphic dendritic pagetoid cells, were suggestive of malignant melanoma.[6]

Furthermore, *LINC00518* gene expression was detected using 3-GEP PLA suggesting a potential crossover of this gene expression between melanoma and Spitz nevi, or skin lesions with combined features, and may be a limitation of 3-GEP in this nevus subtype. Recently, Donati et al[5] detected a MAP2K1 mutation in 4 melanocytic lesions with Spark's nevus-like histology findings. Because of its rarity, further exploration into the genetic background of Spark's nevi is warranted.

CONCLUSION

To our knowledge, this is the first description of RCM and 3-GEP findings of Spark's nevus. To improve differentiation of these lesions from melanoma, larger studies are needed to define the clinical, dermatoscopic, RCM (features), and 3-GEP PLA findings.

Conflicts of interest

None disclosed.

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