A Pigmented Nodule on Leg in a Child

Dear Editor,

Deep penetrating nevi are rare melanocytic neoplasms with deep dermal and subcutaneous involvement. It closely mimics malignant melanoma as it shares few clinical and histopathological features with melanoma. However, its differentiation from melanoma is crucial, considering its benign nature and a favorable prognosis. We hereby present a case of deep penetrating nevus in a young child.

A 7-year-old male presented with a blackish nodular lesion on his left leg since birth. He had recently noticed an increase in the size of the lesion and had been experiencing pain for the past 2 months. Upon examination, a well-defined pigmented nodule measuring 1.5 cm × 1 cm, with raised margins and a rough surface, was observed on his left shin [Figure 1a]. Dermoscopy unveiled a symmetrical lesion featuring a central pigmented area with surrounding graying-white structureless regions [Figure 1b]. Histopathological analysis of excisional biopsy showcased a distinctly demarcated wedge-shaped lesion situated within the dermis, extending its apex into the subcutaneous tissue. The cellular composition of the lesion is comprised of epithelioid to spindle-shaped cells organized in nests and fascicles. These cells were characterized by nuclei exhibiting fine chromatin and prominent nucleoli [Figure 2]. No instances of mitosis, atypia, or necrosis were observed, and the application of the Masson trichrome stain did not reveal the presence of Kamino bodies. Immunohistochemistry testing yielded positive results for the Human melanoma black-45(HMB-45) stain [Figure 3]. Considering the clinical presentation of a prominently pigmented nodule and the histopathological findings revealing a collection of cells that extended deeply into the dermis, the patient was diagnosed with a deep penetrating nevus. The child has been under follow-up for the last 1 year, and no recurrence has been observed.

Deep penetrating nevus frequently emerges as a solitary, darkly pigmented papule, often observed in areas like the head, neck, and shoulder region.[1] It primarily affects individuals in their second to third decades, with lesions commonly arising before the age of 50.[2] Congenital cases have also been documented. While a solitary papule represents the most prevalent presentation, instances of multiple nevi arranged linearly have also been noted.[1] These lesions typically appear in shades of black, blue, dark brown, or gray, and sometimes a combination of these hues.

Histologically, deep penetrating nevi are characterized by well-circumscribed, wedge-shaped lesions with their base in the epidermis and extend into the reticular dermis or subcutaneous tissue when viewed at lower magnifications.

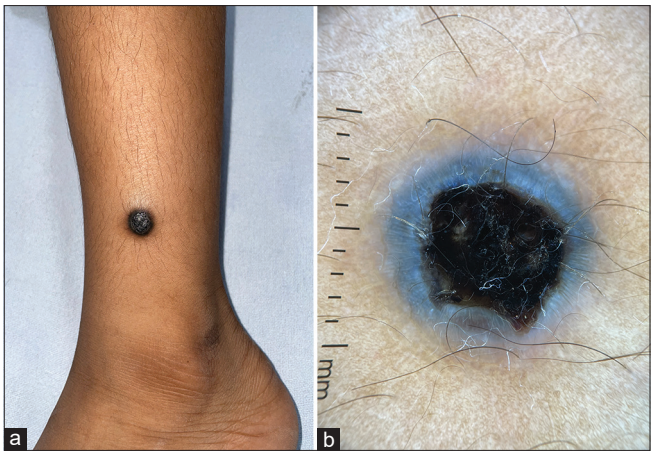

Figure 1: (a) A distinct pigmented nodule measuring 1.5 cm × 1 cm, featuring raised margins and a rugged surface, located on the lateral aspect of the left shin. (b) Dermoscopy unveils a symmetrical lesion with a central pigmented area, encircled by a radial arrangement of graying-white structureless regions (Dermlite 4, 10×)

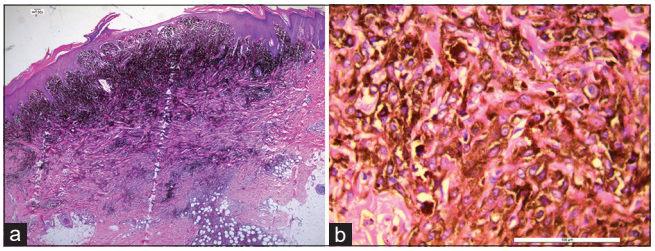

Figure 2: (a) Histopathological image displaying a well-demarcated, wedge-shaped lesion positioned within the dermis, its apex extending into the subcutaneous tissue (hematoxylin and eosin, 40×). (b) At higher magnification, the lesion's cellular composition becomes apparent, consisting of epithelioid to spindle-shaped cells organized into nests and fascicles. These cells are characterized by nuclei exhibiting fine chromatin and prominent nucleoli (H & E, 100x)

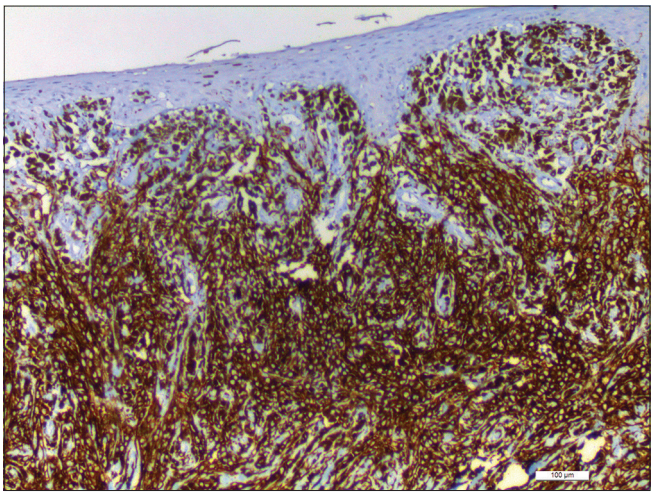

Figure 3: Immunohistochemistry assessment of the tissue reveals positive staining with the HMB-45 marker (immunohistochemistry, 100×)

Higher magnification reveals numerous epithelioid-shaped melanocytes exhibiting pleomorphic, vacuolated nuclei with smudged chromatin. Additionally, the presence of melanophages can also be observed.[2] Low-grade cytologic atypia and random nuclear pleomorphism are not uncommon. Clinically, a dome-shaped, darkly pigmented papule displaying well-defined borders and lacking mitosis upon histopathological examination generally indicates a benign nature. The occurrence of local lymph node spread is exceedingly rare, affecting fewer than 2% of patients.[3]

Differential diagnoses include melanoma, cellular blue nevus, pigmented epithelioid melanocytoma, and spitz nevus. Penetrating nevus, though benign, can resemble malignant melanoma due to shared clinical and histological features. Recognizing distinctive clinical and histologic traits is essential for differentiation. Melanoma lesions lack well-defined borders and are asymmetrical, unlike penetrating nevi. Histologically, the epidermis overlying the deep penetrating nevus typically lacks a pagetoid spread and displays minimal or no junctional component. If present, the junctional component is discrete, inconspicuous, and well-demarcated.[4] Melanoma, however, shows a more striking pattern of epidermal involvement and the presence of atypical cells and pagetoid spread in the epidermis. Ulceration is more commonly associated with melanoma than deep penetrating nevus.[4] Melanoma exhibits irregular dermal penetration, while penetrating nevi show well-defined wedge-shaped lesions. Mitosis, epithelioid cells, reactive stroma, and plasma cells favor melanoma diagnosis. Higher magnification reveals hyperchromatic nuclei and coarse granular chromatin in melanoma cells. Both penetrating nevi and melanomas stain positive for HMB-45 and S-100, limiting their utility in differentiation.[5]

Cellular blue nevi can present as black nodules, reaching sizes up to 3 cm. Dermoscopy shows a homogenous steel-blue pigmentation, usually in a diffuse "structureless" pattern. Histopathologically, cellular islands often penetrate the subcutaneous tissue. They exhibit a characteristic dumbbell-shaped architecture, comprising bundles of poorly pigmented melanocytes with pale cytoplasm, alongside the deeply pigmented dendritic melanocytes typical of common blue nevi.[5,6] Spitz nevi manifest as macules or papules, ranging in color from pink to dark brown and measuring less than 1 cm. These lesions exhibit hyperplastic epidermis and are marked by characteristic Kamino bodies, accompanied by nests of large epithelioid and/or spindle cells.[5] Although Kamino bodies can be seen in melanomas and other melanocytic nevi, a clear-cut aggregate of these globules is more suggestive of spitz nevi.[7] Melanocytic nests in spitz nevi may show maturation with depth and break up into single melanocytes with decreased cellular and nuclear size at the dermal base of the lesion. Other characteristic epidermal features of spitz nevi include artifactual clefting around the nests, symmetrical epidermal hyperplasia, and focal, centrally located pagetoid spread.[7] In deep penetrating nevus, the dermal component penetrates deep into the dermis and subcutaneous fat; however, a decrease in melanocyte size and pigmentation and the size of melanocytic nests, or "maturation," does not occur with increasing depth.[4]

Pigmented epithelioid melanocytoma is a rare melanocytic tumor that shows features of an atypical epithelioid blue nevus and a low-grade animal-type melanoma. As compared to deep penetrating nevus, it is more likely to show regional lymph node spread, low-grade mitotic activity, abundant melanophages, dendritic cells, and infiltrative borders.[8]

Penetrating nevus presents a unique challenge in diagnosis due to its potential resemblance to melanoma. Despite this, it is important to recognize its benign nature and favorable prognosis. Complete surgical excision is considered the optimal treatment, and recurrence following excision is exceedingly rare.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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