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Giant isolated pigmented neurofibroma in an NF1-negative patient: A rare entity explored

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Abstract

Pigmented neurofibroma (PNF) is an extremely rare variant of neurofibroma, often associated with neurofibromatosis type 1 (NF1). It can be mistaken for other pigmented soft tissue tumors, including pigmented dermatofibrosarcoma protuberans (DFSP), posing diagnostic challenges. We report a case of a 32-year-old male with a slow-growing gluteal mass of 20 years' duration. The patient had no clinical signs or family history of NF1. The excised mass was examined grossly, histologically, and immunohistochemically. Gross examination revealed a 20×20×3 cm, poorly circumscribed, rubbery lesion with brown-black pigmentation. Histology showed a non-encapsulated spindle cell tumor arranged in interlacing bundles with pigmented dendritic and epithelioid cells and occasional Wagner-Meissner bodies. Immunohistochemistry revealed S100 positivity in both pigmented and spindle cells and CD34 expression restricted to the spindle cells. Differential diagnosis included pigmented DFSP, which was ruled out based on histology and immunostaining pattern. Giant isolated pigmented neurofibroma without NF1 stigmata is extremely rare. Recognition of key histological features and accurate immunohistochemical profiling is essential to differentiate it from more aggressive pigmented tumors such as DFSP or melanoma.

Introduction

Pigmented neurofibroma (PNF) is a rare histological variant of neurofibroma characterized by the presence of melanin-containing cells. It accounts for less than 1% of all neurofibromas. While neurofibromas are common in patients with neurofibromatosis type 1 (NF1), PNFs are occasionally encountered in isolation, without the clinical manifestations of NF1.

Isolated PNF can be a diagnostic challenge due to histologic overlap with other pigmented spindle cell tumors such as pigmented dermatofibrosarcoma protuberans (DFSP), melanotic schwannoma, and malignant melanoma. Immunohistochemistry (IHC), especially the use of S100 and CD34 markers, plays a pivotal role in their distinction.

We report a unique case of a giant, isolated PNF in an NF1-negative adult male, with emphasis on

histological, immunohistochemical features, and differential diagnosis.

Case Report

A 32-year-old male presented to the surgery outpatient department with a large, painless mass over the left gluteal region, which had been gradually increasing in size for 20 years. There was no history of trauma, discharge, or ulceration. Clinical examination revealed a soft, non-tender, subcutaneous mass measuring approximately 20×20 cm. No café-au-lait macules, axillary/inguinal freckling, or Lisch nodules were noted. Family history was negative for NF1.

Figure 1:

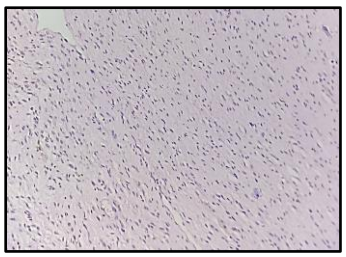

Figure 2: Low-power view (H&E, 20×) showing a non-encapsulated dermal tumor composed of interlacing bundles of spindle cells in a collagenous stroma. Scattered pigmented cells are evident throughout the lesion.

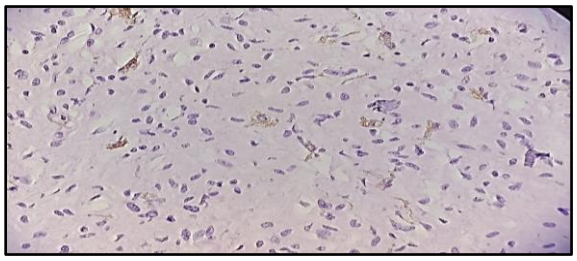

Figure 3: High-power view (H&E, 40×) demonstrating dendritic and epithelioid pigmented cells containing coarse brown-black granules.

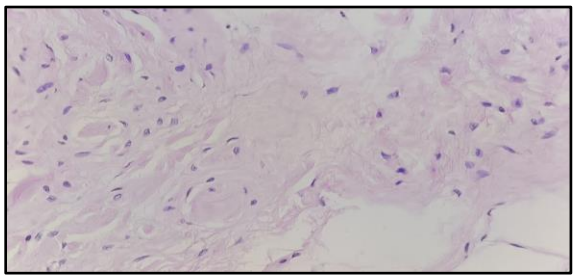

Figure 4: Focus revealing characteristic Wagner-Meissner bodies (H&E, 40×), aiding in the diagnosis of pigmented neurofibroma.

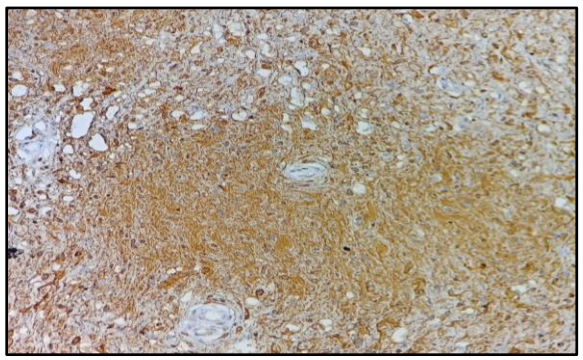

Figure 5: Immunohistochemistry for S100 showing diffuse strong positivity in both spindle cells and pigmented cells (S100, 40×).

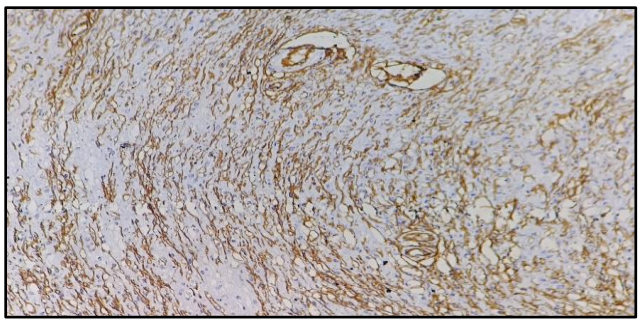

Figure 6: Immunohistochemistry for CD34 highlighting spindle cells with fingerprint-like focal positivity, while pigmented cells remain negative (CD34, 40×).

Gross

Wide excision yielded multiple skin and subcutaneous tissue fragments, the largest measuring 20×20×3 cm. The mass was rubbery, poorly circumscribed, with glistening grey-white cut surface and focal brown-black pigmentation. (Figure 1)

Microscopic examination

Hematoxylin and eosin-stained sections revealed a non-encapsulated, poorly circumscribed lesion composed of interlacing fascicles of spindle cells with elongated, wavy nuclei and eosinophilic cytoplasm in a collagenous stroma. Scattered pigmented cells with dendritic to epithelioid morphology containing brown-black granular pigment were seen. Occasional Wagner-Meissner bodies were identified. There were no atypical mitoses or necrosis. (Figure 2, 3, 4)

Immunohistochemistry

The spindle cells showed diffuse S100 positivity with focal fingerprint-like CD34 positivity, consistent with Schwann Ian origin. The pigmented cells were positive for S100 but negative for CD34, ruling out pigmented DFSP. (Figure 5,6)

Discussion

Pigmented neurofibroma is an infrequent histological variant of neurofibroma marked by melanin-laden dendritic or epithelioid cells intermixed with Schwannian spindle cells. While originally termed "storiform neurofibroma" due to its histologic resemblance to Bednar tumor (pigmented DFSP), immunohistochemistry has proven crucial in making the correct distinction.[1]

According to one report, the key to diagnosis lies in the dual positivity of both pigmented and non-pigmented cells for S100 protein, and CD34 positivity limited to the spindle cell component. In contrast, pigmented DFSP displays a tight storiform growth pattern with only the pigmented dendritic cells being S100 positive, while the main tumor cell population lacks this marker[1]. Their study emphasized that S100 expression in both components should direct pathologists toward a neurofibroma diagnosis.

Additionally, the presence of Wagner-Meissner bodies, as observed in our case, is supportive of neural origin and has not been described in pigmented DFSP. Other studies have also confirmed the benign nature of PNF with rare recurrences and no malignant transformation reported in isolated cases.[6]

Another study described a pigmented (melanotic) diffuse neurofibroma in a patient with NF1, noting pigmentation so intense it mimicked malignant

melanoma intraoperatively. They highlighted the shared neural crest origin of Schwann cells and melanocytes, suggesting either aberrant melanocytic differentiation of Schwann cells or incorporation of melanocytes into the tumor.[6] These findings support the notion that melanin pigmentation in neurofibroma is biologically plausible and not necessarily indicative of malignancy.

Importantly, their case also demonstrated strong immunoreactivity for S100 and Melan-A in the pigmented cells, with a low Ki-67 index, aiding in the distinction from melanoma. The present case similarly exhibited benign histology and immunophenotype, but without expression of melanocytic markers (Melan-A, HMB-45), confirming a true pigmented neurofibroma.

In summary, PNFs must be distinguished from mimickers like Bednar tumor, melanotic schwannoma, and melanoma through a combination of morphology and immunoprofile. Awareness of this rare variant is crucial, especially in large, pigmented tumors in NF1-negative patients, to prevent misdiagnosis and overtreatment.

Conclusion

This case illustrates a rare presentation of a giant isolated pigmented neurofibroma in an NF1-negative patient. Histological analysis, supported by immunohistochemistry, remains the cornerstone for diagnosis and for distinguishing this tumor from other pigmented spindle cell neoplasms with malignant potential. Early recognition and complete excision are critical to prevent local recurrence and avoid overtreatment.

Source of Funding

None.

Conflict of Interest

None.

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