Melanotic Neuroectodermal Tumor of Infancy of the Upper Arm

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Abstract

Objective: To present a case of a 6-month-old infant with melanotic neuroectodermal tumor of infancy (MNTI) in the upper arm. Clinical Presentation and Intervention: A 6-month-old female presented with a well-circumscribed lesion of the upper arm at the Children’s Hospital Zagreb. A biopsy was performed and microscopy revealed 2 cell populations consisting of small neuroblastic cells and larger melanin-containing epithelial cells. An excisional biopsy performed 1 month later confirmed the initial diagnosis of MNTI, but the tumor had increased in size since the initial biopsy. After complete surgical excision the patient recovered well with no recurrence. Conclusion: The MNTI located in the upper arm was diagnosed on first biopsy and surgically excised completely. The patient recovered without recurrence in a follow-up of 2.5 years.

Keywords

Melanotic neuroectodermal tumor · Infancy · Upper arm

Introduction

Melanotic neuroectodermal tumor of infancy (MNTI) is a rare and benign tumor of neural crest origin that occurs in early infancy [1, 2]. The lesion most commonly presents in children less than 1 year of age with no gender predilection [1]. Clinically, the tumor presents as a solitary, rapidly growing, expansile painless mass. The majority (90%) of MNTI present in the head and neck region, most commonly maxilla, although other locations have been described including the skull, mandible, and brain, as well as extracranial sites such as long bones, mediastinum, soft tissues of extremities, and genital organs [1, 2]. Almost 500 cases of MNTI have been reported [3]. Although a benign lesion, it can cause major deformities due to its rapid growth. The reported rate of recurrence is approximately 15%, while the rate of malignant transformation is 6.8% [1, 2, 4]. We present a rare case of a 6-month-old infant with MNTI of the upper arm.

Significance of the Study

- In this case, the melanotic neuroectodermal tumor of the upper arm was diagnosed on first biopsy and surgically excised completely because of its potentially aggressive and recurrent nature. Correct and early diagnosis is crucial because of its therapeutic implications.
Case Report

An otherwise healthy, 6-month-old female presented with a well-circumscribed firm lesion of the upper arm at the Children’s Hospital Zagreb. Incisional biopsy of the tumor was performed, and 2 specimens (0.4 and 0.5 cm in largest diameter) were sent to the Department of Pathology, School of Medicine, University of Zagreb, for histopathological examination. Histologically, the tumor was biphasic in nature, composed partly of alveolar clusters and nests of small round cells with hyperchromatic nuclei, and of large oval cells with scant intracytoplasmic pigment (arrow). A background of fibromyxoid stroma was present. Immunohistochemistry was performed, which showed positivity for neuron-specific enolase (NSE) within the small cell component (c) and HMB-45 positivity in nests of epithelioid tumor cells with intracytoplasmic pigment (d). NSE. ×100. HMB-45. ×400.

Fig. 1. a, b Microscopic features of initial biopsy showing a biphasic tumor composed partly of nests of small round cells with hyperchromatic nuclei, and of large oval cells with scant intracytoplasmic pigment (arrow). a HE. ×200. b HE. ×400. Immunohistochemistry demonstrating NSE positivity within small cell component (c) and HMB-45 positivity in nests of epithelioid tumor cells with intracytoplasmic pigment (d). c NSE. ×100. d HMB-45. ×400.

pan cytokeratin (PAN-CK). Other immunohistochemical results were negative for EMA, CD31, CD99, desmin, myogenin, myoglobin, SMA, S100, vimentin, LCA, CD3, and CD20. The tumor was tested with a conventional reverse transcription polymerase chain reaction (RT-PCR) for specific gene fusions (EWS-ex7/FLI-1-ex6, EWS-ex7/FLI-1-ex5, and PAX/FKHR), all of which were negative. Hence, a diagnosis of MNTI was made. Complete surgical excision of the tumor was performed approximately 1 month later, where gross examination of the 6-cm skin specimen revealed a well-circumscribed gray tumor measuring 4 cm in largest diameter, which had significantly increased in size since the initial biopsy (Fig. 2). Final microscopic examination of the excision specimen confirmed the initial diagnosis of MNTI. The patient recovered well after complete surgical excision, with no recurrence in a follow-up period of 2.5 years. No additional treatment was given other than active surveillance.
Discussion

In this case report, the patient recovered well after complete surgical excision with no recurrence 2.5 years later. MNTI was first described in 1918 by Krompecher as a congenital melanocarcinoma [1, 2, 5]. The lesion usually involves the head and neck region of children less than 1 year of age [5]. However, only a few cases of MNTI of the extremities have been reported in the literature, 4 in the lower extremity (thigh) and 2 in the upper extremity (arm and forearm) [5–9]. The 2 cases of MNTI located in the upper extremity were also treated by complete surgical excision, with no recurrence 3 months after surgery in one of the cases (right forearm) [6], while in the other (right upper arm), follow-up and outcome were unknown [9].

Although generally accepted to be neural crest in origin, this neoplasm has been reported under various names, including pigmented ameloblastoma, retinal anlage tumor, melanotic progonoma, melanotic adamantinoma, and pigmented epulis of infancy [1, 7]. Clinically, MNTI presents as a fast-growing, locally aggressive, painless mass with variable pigmentation [1, 2, 7].

Histology reveals a characteristic dual population of small neuroblastic cells and larger melanin-containing epithelial cells. The second cell population aids in differentiating MNTI from other small, blue, round cell tumors [7, 10]. Immunohistochemistry plays a key role in the differential diagnosis. Expression of neural/neuroectodermal markers such as synaptophysin and CD99 are noted in Ewing sarcoma/primitive neuroectodermal tumor, although CD99 positivity is cytoplasmic in MNTI instead of membranous, as is the case in Ewing sarcoma. Melanin pigment and the expression of epithelial markers, as well as HMB-45 positivity, help in establishing a diagnosis of MNTI. Neuroblastoma shows CD99 negativity and the presence of neurosecretory granules. In our case, histological examination demonstrated the aforementioned biphasic cell population, along with immunohistochemical tumor cell reactivity for NSE and HMB-45, suggesting neuroblastic and melanocytic differentiation.

Recent recommendations in the treatment of MNTI include complete surgical excision with wide tissue margins. Treatment involving chemotherapy and radiotherapy has been described as controversial [4]. Recurrence is estimated at 15% with possible causes being incomplete removal, seeding during surgery, or multicentricity of the primary tumor [1].

Conclusion

The MNTI in this patient, located in the upper arm, was diagnosed on first biopsy and surgically excised completely. The patient did not receive additional treatment and is without recurrence after a follow-up period of 2.5 years.

Disclosure Statement

The authors have no conflicts of interest to disclose.

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