Melanotic Neuroectodermal Tumor of Infancy: A Rare Case Report

Joyce Sequeira, Vinayakrishna Kolari, Sham Bhatt, Pallavi Sabarad, Shruti Gona Rao
Departments of Oral and Maxillofacial Surgery, 1Pedodontics and Preventive Dentistry and 2Oral Pathology, Yenepoya Dental College, Mangalore, Karnataka, India

ABSTRACT

Melanotic neuroectodermal tumor of infancy (MNTI) is a very rare neoplasm of infants seen in the oral cavity at or around birth. It shows rapid expansile growth which necessitates proper diagnosis and management. A 6.5-month-old female child reported with a swelling in the maxillary anterior alveolus, which was rapidly increasing in size and was asymptomatic. Radiographic examination showed a diffuse osteolytic radiolucent lesion in the anterior maxillary region and displacement of the developing primary tooth buds. Ultrasonography report revealed well-defined cystic lesion with calcifying foci within and with no internal vascularity. Wide surgical excision under general anesthesia was performed. Histopathological report revealed a nonencapsulated mass composed of a dual population of small round blue cells and larger melanin-containing epithelial cells in a dense cellular fibrous stroma. Tumor is seen to entrap mature bony trabeculae and soft tissue on the whole favoring a diagnosis of MNTI. Early recognition and regular follow-up is the key to successful treatment.

KEYWORDS: Alveolus, Benign tumor, maxilla, melanotic neuroectodermal tumor of infancy, melanotic neuroectodermal tumor

INTRODUCTION

Melanotic neuroectodermal tumor of infancy (MNTI) is an uncommon osteolytic pigmented neoplasm that primarily affects the jaws of newborn infants.[1] This tumor is known to have various synonyms in the literature such as retinal anlage tumor,[2] congenital melanocarcinoma,[1] and pigmented congenital epulis.[3] The majority (90%) arises in the head and neck, and generally, in the anterior region of the maxilla, but it can also occur at other locations including the skull, mandible, brain, and epididymis.[4] It has almost equal predilection for males and females.

They clinically appear as soft swellings in the maxilla and radiographically similar to cysts, expansile and causing the displacement of the underlying tooth buds. The final diagnosis of this tumor is done only after the histopathological examination. In this case report, we are presenting a rare case of MNTI, its surgical management and also in detail about the histopathological variations of the tumor.

CASE REPORT

A 6.5-month-old female child had reported to the Department of Pedodontics, Yenepoya Dental College with a swelling on the right side of the anterior alveolus in the premaxillary region for 2½ months. History of slow-growing painless swelling for 2½ months which was initially small in size and attained the present size during the time [Figure 1]. No history of trauma, pus discharge, foul smell, or bleeding.

On clinical examination, a solitary diffuse swelling which was slightly bluish seen predominantly on the right side of the anterior alveolus of approximately 2.5 cm × 2 cm in size crossing the midline of about 0.5 cm on to the left side [Figure 2]. The swelling was nontender with no surface erythema or ulceration.

Radiographically, tooth buds of the right central incisor, lateral incisor, canine, and left central incisor were appreciated. It appeared as a radiolucent, hypodense area with displaced tooth buds in relation to the right central incisor, lateral incisor, and canine suggestive of eruption cyst [Figures 3 and 4].

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Sequeira J, Kolari V, Bhatt S, Sabarad P, Rao SG. Melanotic neuroectodermal tumor of infancy: A rare case report. Indian J Dent Sci 2018;10:105-8.
Ultrasonography report revealed a well-defined cystic lesion noted in the upper jaw of size about 2 cm × 1.8 cm on the right side of the maxilla with calcifying foci within and no evidence of internal vascularity which was suggestive of an eruption cyst.

**Surgical procedure**

Under general anesthesia following the aseptic conditions, the patient was painted and draped. Alveolar crestal incision is given, mucoperiosteal flap reflected, and a well-encapsulated dark solid tumor was identified. The tumor was removed in total along with the associated teeth buds (right central incisor, lateral incisor, canine, and left central incisor) [Figure 5]. The resected tumor was firm, spherical, and grayish to black. Cavity was thoroughly curetted and hemostasis achieved. Mucoperiosteal flap was repositioned and closed with 3-0 Vicryl sutures in vertical mattress fashion.

The gross specimen received in the Department of Oral and Maxillofacial Pathology of Yenepoya Dental College comprised a firm, well-circumscribed mass, measuring 2.5 cm × 2 cm. The cut surface was grayish-white in color with black pigmented areas [Figure 6].

**Histopathology**

Gross appearance – the gross specimen showed was firm and well circumscribed. The cut surface of the specimen was grayish to white with black pigmentation.

Microscopic examination (hematoxylin and eosin) showed non-encapsulated mass composed of dual population of small round blue cells and larger melanin-containing epithelial cells in a dense fibrocellular stroma. The epithelial cells are larger with vesicular nuclei and abundant cytoplasma containing melanin granules, which are arranged in alveolar and tubular pattern with a few of them encircling the small round cells which are predominantly arranged in nests and sheets having small hyperchromatic nucleus with scanty to fibrillary cytoplasm. The tumor is seen to entrap bony trabeculae. Mitotic activity is scanty. No necrosis was seen.

Immunohistochemistry (IHC) revealed positive staining of cytokeratin (CK), homatropine methylbromide 45 (HMB 45) [Figure 7], and neuron-specific enolase (NSE) markers [Figure 8].
Both the neuroblast cells and epithelial cells express NSE strongly. Only epithelial cells express HMB 45 (cytoplasmic) and CK (both membranous and cytoplasmic). Neuroblastic cells are negative for CK(cytokeratin) and HMB 45 staining. Neuroblast and epithelial cells are positive for NSE(non specific esterase) staining. Epithelial cells are positive for CK and HMB 45 staining.

Hence, histopathological differential diagnosis given was MNTI or malignant melanoma.

Finally, IHC positivity for HMB 45, NSE in the present case indicated that the tumor cells are melanocytic and neuroblastic origin and thus helped in confirming the final diagnosis as MNTI.

**DISCUSSION**

MNTI, as mentioned is an uncommon and very rare benign tumor of infants. As per the literature, it was first described in 1918, there have been approximately 250 cases of MNTI reported in the world literature.\[^{5}\] It favors the maxillary sites of about 90%, but cases were reported where the predominance was in skull, mandible, epididymis, and brain.\[^{6}\] There were cases reported with both MNTI and also submucosal cleft.\[^{7}\]

About 90% of the MNTIs are diagnosed before 1 year of age, with mean age being 4.3 months.\[^{8}\] some cases were reported in older children also, but there was no predilection for head and neck regions especially oral cavity. The variety of synonyms for this tumor such as pigmented congenital epulis, congenital melanocarcinoma, retinal anlage tumor or melanotic progonoma, melanotic epithelial odontoma, and melanotic progonoma leads to its ambiguous histogenesis.\[^{9}\]

Patients typically present with aggressively growing masses in the jaws without any subsequent ulceration or pain. Even though the name suggests melanoma, clinically there will be no significant change in the color of the lesion in about 90% of the cases.\[^{10,11}\] Since the lesion affects the maxilla in most of the cases, locally, there will be displacement of the underlying tooth buds and mild difficulty in feeding accounts to its rapid growth.

MNTI are mostly benign seen in infants in and around the birth, but because of its rapid, expansible, and destructive growth, it may severely obstruct the infant’s airway causing breathing difficulties. The tumor presents with fairly high chances if recurrence and subsequent malignant transformation if not detected and treated with time.\[^{8}\] A review by Cutler,\[^{12}\] demonstrated the malignant behavior of MNTI in only about 1.9% although it has increased to 6% in recent reviews of literature.

Among the treatment options for MNTI’s surgical excision is the foremost and has a mainstay with proven efficacy and...
known to be the best modality of the choices. Enucleation and curettage of the adjacent tissue with a minimum margin of 5 mm is recommended.\[12,13\] The preoperative and diagnostic imaging gives a picture of delineating margins in most of the cases, so preservation of the surrounding vital structures and organs during surgical procedure is important. Adjuvant chemotherapy and radiation are ineffective in controlling recurrences where total excision has not been achieved, and their role is therefore extremely limited.\[14,15\] Few authors have thought its importance in the recurrence cases where the surgical treatment has failed in complete eradication of the tumor. In such cases, adjuvant chemotherapy and radiation have little evidence of providing added benefit.

Differential diagnosis of MNTI includes various pediatric small round cell neoplasms such as neuroblastoma, Ewing’s sarcoma, peripheral neuroepithelioma, rhabdomyosarcoma, peripheral primitive neuroectodermal tumor, desmoplastic small round cell tumor, malignant melanoma, and lymphoma.\[11\] For the above-mentioned conditions, proper follow-up of the treated cases plays a vital role in the judicious management of the condition.

**Conclusion**

Melanotic neuroectodermal tumors of infancy are very rare but have deleterious effects on the condition of the child ranging from having airway obstruction to malignant transformation. In our case, the clinical, radiological, ultrasonographical, and histopathological findings helped us to arrive at the diagnosis and also the correct treatment plan and postoperative follow-up helped us in confirming the diagnosis cumulatively without any adjuvant chemotherapy and radiotherapy.

**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.

**Financial support and sponsorship**

Nil.

**Conflicts of interest**

There are no conflicts of interest.

**References**

1. Krompecher E. Zur Histogenesis and morphologic of adimantinome and other jaw tumors. Posts Path Anat 1918;64:165-97.
2. Clarke BE, Parsons H. An embryological tumor of retinal anlage involving the skull. Cancer 1951;4:78-85.
3. Lurie HI. Congenital melanocarcinoma, melanotic adamantinoma, retinal anlage tumor, progonoma, and pigmented epulis of infancy. Cancer 1961;14:1090-108.
4. Johnson RE, Scheithauer BW, Dahlin DC. Melanotic neuroectodermal tumor of infancy. A review of seven cases. Cancer 1983;52:661-6.
5. Rustomeyer J, Thieme V, Loeschke S, Bremerich A, Kössling FK. Melanotic neuroectodermal tumor of infancy. Klin Padiatr 2001;213:69-73.
6. Matsunoto M, Sakuma J, Suzuki K, Kawakami M, Sasaki T, Kodama N, et al. Melanotic neuroectodermal tumor of infancy in the skull: Case report and review of the literature. Surg Neurol 2005;63:275-80.
7. Hamilton S, Macrae D, Agrawal S, Bremerich A, Kössling F, et al. Melanotic neuroectodermal tumor of infancy. Can J Plast Surg 2008;16:41-4.
8. Kruse-Lösler B, Gaertner C, Bürger H, Seper L, Joos U, Kleinheinz J, et al. Melanotic neuroectodermal tumor of infancy: Systematic review of the literature and presentation of a case. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2006;102:204-16.
9. Agarwal P, Agarwal V, Raina VK. Melanotic neuroectodermal tumor of infancy: Case report of an unusual tumor. Indian J Plast Surg 2003;36:123-5.
10. Ijiri R, Onuma K, Ikeda M, Kato K, Toyoda Y, Nagashima Y, et al. Pigmented intraosseous odontogenic carcinoma of the maxilla: A pediatric case report and differential diagnosis. Hum Pathol 2001;32:880-4.
11. Gaiger de Oliveira M, Thompson LD, Chaves AC, Rados PV, da Silva Lauxen I, Filho MS, et al. Management of melanotic neuroectodermal tumor of infancy. Ann Diagn Pathol 2004;8:207-12.
12. Cutler LS, Chaudhry AP, Topazian R. Melanotic neuroectodermal tumor of infancy: An ultrastructural study, literature review, and reevaluation. Cancer 1981;48:257-70.
13. Mast BA, Kapadia SB, Yunis E, Bentz M. Subtotal maxillectomy for melanotic neuroectodermal tumor of infancy. Plast Reconstr Surg 1999;103:1961-3.
14. Mirich DR, Blaser SI, Harwood-Nash DC, Armstrong DC, Becker LE, Posnick JC, et al. Melanotic neuroectodermal tumor of infancy: Clinical, radiologic, and pathologic findings in five cases. AJNR Am J Neuroradiol 1991;12:689-97.
15. Woessmann W, Neugebauer M, Gossen R, Blüters-Sawatzki R, Reiter A. Successful chemotherapy for melanotic neuroectodermal tumor of infancy in a baby. Med Pediatr Oncol 2003;40:198-9.