Neuroblastoma in early childhood: A rare case report and review of literature

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Abstract

Neuroblastoma is an extremely rare pediatric neoplasm whose prognosis becomes poor and poor as the age advances. It can be sporadic or nonfamilial in origin. It is primarily a tumor of abdominal origin from where it metastasis to lymph nodes, liver, intracranial and orbital sites, and central nervous system. There is no standard dental treatment protocol for the management of neuroblastoma due to its poor survival rate and rarity. However, dental treatment may follow the protocol of preventive and restorative. Surgicals should be performed under supervision as it may trigger metastasis. We report a rare case of neuroblastoma in a 3-year-old child presenting classical oral manifestations such as bilateral palatal swelling, rolled border ulcer on the posterior part of hard palate adjacent to primary molars, and bilateral proptosis.

Keywords: Displaced teeth, hard palate, neuroblastoma, preventive, proptosis

Introduction

Neuroblastoma is the third most common neurogenic, extracranial solid tumor of infancy and childhood emerging anywhere along the peripheral sympathetic nervous system.[1] It was first described by Dr. Rudolf Virchow as a "glioma" in the abdominal cavity.[2] In 1910 Dr. Homer-Wright presented it as primitive neural cells tumor within the bone marrow.[3,4] The prevalence of neuroblastoma is approximately 1/7000 live births.[5] In Northern America and the United Kingdom, the prevalence is approximately 1/650 and 1/100 live births, respectively,[6,7] whereas in African-American children, the incidence is 8.5/million.[8,9] However, according to the recent survey, African-American children in the United States are at a higher risk compared to European-American children.[10] Neuroblastoma may be sporadic or nonfamilial in origin. Although its etiology is not well understood, but the recent genome and family-based studies have improved the understanding of genetic susceptibility to neuroblastoma.[10-14] It mostly originates from the adrenal gland, nerve tissues of the neck, chest, abdomen, or pelvis.[6,7]

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Nearly, 50% of the neuroblastomas are diagnosed in children younger than 5 years of age.[4] Till date, no case of neuroblastoma of palate in patient <3 years of age is reported. The present case report highlights the classical oral and clinical manifestations of a rare case of neuroblastoma of the oral cavity in a 3-year-old male child.

Case Report

A 3-year-old boy reported to our department with the chief complaint of swelling and bleeding from the maxillary left posterior region since 1 month. History revealed fever and bilateral swelling of eyes since 1 month, for which the child has underwent medication from local doctors. The parent's medical history was insignificant. He was the second child of a healthy nonconsanguineous parent.

General examination revealed weak, thin built boy with bilateral proptosis [Figure 1] having difficulty in speech, eating, and swallowing since 1 month. No abnormalities of hand and feet were observed. Intraoral examination revealed soft, fluctuant, tender bilateral diffuse bluish swelling of posterior part of hard palate adjacent to the primary molars. Primary maxillary left molars were displaced buccally [Figure 2]. A single ulcer with rolled borders was seen extending from the distal part of the maxillary left primary second molar to the tuberosity area. Tooth bud of the permanent maxillary left first molar was displaced occlusally [Figure 2].

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Panoramic radiograph showed the radiolucent lesion of approximately 4 cm × 3 cm in size on the left side of maxilla extending from the maxillary left primary canine and to the tuberosity area [Figure 3]. Tooth bud of the permanent maxillary left first molar and maxillary left second primary molar was displaced occlusao-posteriorly and occlusally, respectively. Hanging teeth appearance was seen with maxillary primary left molars and maxillary permanent left first molar. An ill-defined radiolucent lesion was also seen in the maxillary right posterior region extending from maxillary primary right molars to maxillary permanent right first molar. The developing tooth bud of maxillary permanent right first molar and maxillary primary right second molars was displaced distally and occlusally [Figure 3].

Based on the clinical and radiographic features, a provisional diagnosis of malignancy was made. A complete blood profile and bone marrow aspiration cytology were advised. The complete blood profile was within normal limits. However, bone marrow smear showed round tumor cells arranged in cohesion clusters and sheets having hyperchromatic nuclei. Ferrous arrow showed rosette formation. These features were suggestive of malignant round cell tumor. During this period, the crown of the permanent maxillary left first molar exfoliated. To more accurately depict the lesion cone beam computed tomography (CBCT) of maxilla was planned. Coronal view of left side of maxilla (CBCT) showed a lesion of diameter 4 cm × 3 cm with an irregular border and bony expansion [Figure 4]. Three dimensional CBCT image showed a marrow-destroying mass on the left side of the maxilla of approximately 4 cm × 3 cm in size and buccally displaced primary maxillary left molars [Figure 5]. After 2 days, patient reported with exfoliated primary maxillary left second molar.

The patient was referred to a medical college for further subtyping of malignant round cell tumor and to rule out the metastasis to other parts of the body. Immunohistochemistry, ultrasonographic-guided fine-needle aspiration from the right suprarenal area, magnetic resonance imaging of the orbital plane, and multislice spiral CT of the abdomen were advised. Ultrasonographic-guided fine-needle aspiration from the right suprarenal mass confirms the presence of malignant small round cell tumor: Possibly neuroblastoma. Magnetic resonance imaging of the orbital plane and contrast study reveals multiple well-defined heterogeneous, lobulated, altered, signal intensity mass lesions of varying sizes involving bilateral orbit, bilateral maxillary sinuses, and surrounding soft tissue suggesting metastasis. Multislice spiral CT of the abdomen showed well-defined lobulated heterogeneously enhancing mass lesion in relation to the superomedial aspect of the right kidney with few calcification and encasement of abdominal vessels with skeletal metastasis suggesting neuroblastoma. Due to lack of facility of immunohistochemistry of the malignant round cell tumor was not possible. Patient and parents were explained regarding malignancy and complexity of dental treatment. The patient was then referred to the Government Medical College for further management.

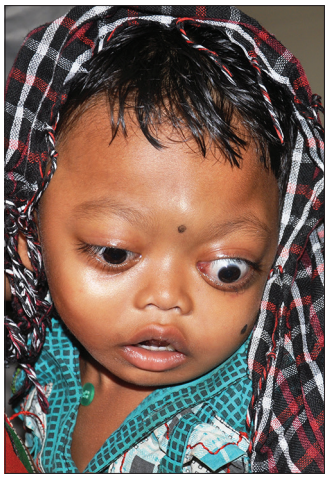

Figure 1: Extraoral photograph showing bilateral proptosis

Discussion

The presentation of medically compromised conditions in the dental office is a great challenge to the dental health-care providers. Various medically compromised conditions are identified early in children and demand special attention right from the birth. Neuroblastoma is one among the thousands of such conditions diagnosed so far which is characterized by rapid metastasis leading to proptosis and abdominal distension.

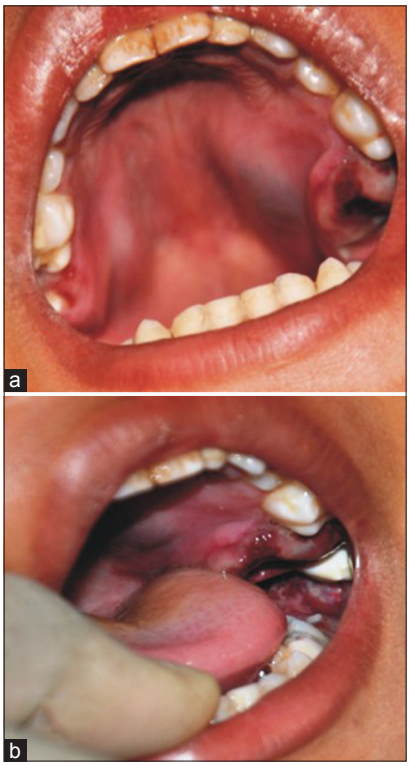

Figure 2: Intraoral photograph showing: (a) Bilateral bluish swelling of posterior part of hard palate (b) rolled borders ulcer

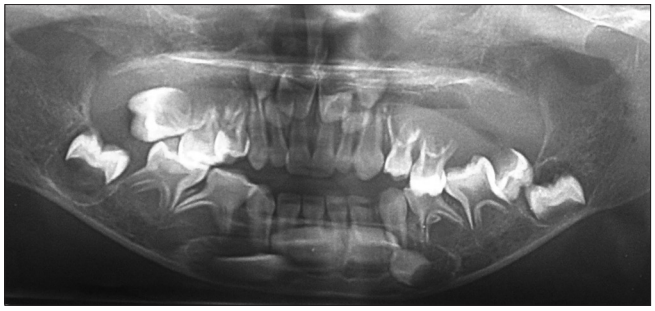

Figure 3: Panoramic radiograph showing radiolucent lesion on the right and left side of maxilla

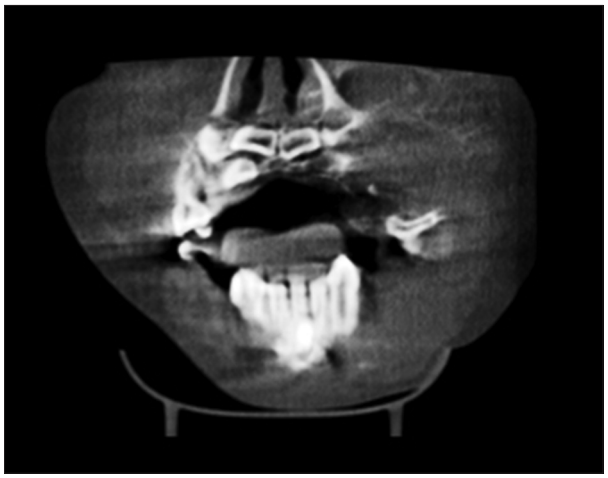

Figure 4: Cone beam computed tomography (coronal view) of maxillary jaw showing a lesion on the left side of maxilla of diameter 4 cm × 3 cm with irregular border and bony expansion

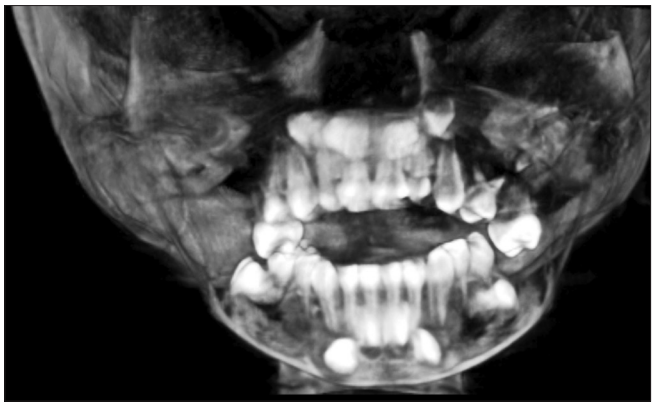

Figure 5: Three dimensional cone beam computed tomography image showing marrow-destroying mass on the left side of maxilla of approximately 4 cm × 3 cm in size and buccally displaced primary maxillary left molars

The clinical presentation of neuroblastoma reflects the tumor's primary location and the extent of metastatic disease, if present. The most common primary for neuroblastoma is abdomen which may metastasize to bone, lymph nodes, liver, intracranial, orbital sites, lung, and the central nervous system.[14] Clinically, the neuroblastoma presents proptosis, periorbital ecchymosis, abdominal distension, bone pain, pancytopenia, fever, anemia, hypertension, paralysis, watery diarrhea, and subcutaneous skin nodule.[15] In children, these signs and symptoms are more severe and widespread (as it metastasize rapidly), whereas in adolescents, there is a greater frequency of metastases to lung or brain.[15-17] In the present case, metastasis was rapid involving abdomen, bilateral orbit, maxillary bone, kidney, and oral cavity.

Intraoral examination revealed classical oral manifestations of metastasis that include diffuse soft fluctuant-bluish swelling on the left and right side of the posterior palate, bleeding ulcer, buccal displacement of primary teeth and exposure of tooth bud of permanent maxillary left first molar, and exfoliation of tooth buds of permanent maxillary left first molar and primary maxillary left second molar through ulcer. Literature review showed many primary site neuroblastomas spreading to others parts of the body, but none of these patients below 3 years of age presented oral metastasis.[18-20] Because oral manifestations are usually observed in older age. Oral metastases can grow rapidly causing pain, difficulty in chewing, dysphagia, disfigurement, and intermittent bleeding, leading to poor quality of life. In some cases, metastases are discovered after a recent dental extraction at the site.[21]

Neuroblastomas have a very broad spectrum of clinical behavior which ranges from spontaneous regression to maturation of a benign ganglioneuroma, or aggressive disease with metastasis leading to death.[21] As per the international classification of neuroblsatoma, the prognosis of childhood neuroblastoma is based on the patient's age at diagnosis. The best prognosis is awarded to newborn followed by infant and toddler. The children over age five are subjected to poor prognosis.[21] Based on this tool, the prognosis of our patient will be 50% or less. Till date, the management of patients with neuroblastoma remains complex and difficult. In low-risk patient, surgical resection is the baseline treatment in conjugation with chemotherapy. For high-risk pediatric patient's combination of aggressive surgical resection, high-dose chemotherapy with stem cell rescue, radiation therapy, and biologic/immunologic therapy have been recommended. Nevertheless, most high-risk patients eventually relapse and die of their disease.[22]

The clinical and radiographic features presented in this case present report are not pathognomonic for neuroblastoma as other lesions such as Ewing's sarcoma, osteogenic sarcoma, histiocytosis X, and osteomyelitis can have similar clinical and radiographic features. Therefore, for accurate diagnosis emphasis should be made on fine-needle aspiration cytology and immunohistochemistry.

As no standard dental treatment guidelines are available for patients with neuroblastoma, the approach should be mainly interdisciplinary and symptomatic. The treatment needs

may include restorations of decayed and malformed teeth, maintenance of excellent oral hygiene, use of topical fluoride daily, oral prophylaxis, and regular dental checkup. Extraction and minor oral surgical procedures such as frenectomies should be performed under supervision as it may trigger metastasis. In the present case, patient oral prophylaxis and topical fluoride therapy were given. However, further follow-up was not possible as the patient was not referred back from medical.

Conclusion

Dental health-care providers should be aware of the oral manifestations of neuroblastoma which help them in early diagnosis and early referral. As there is no standard dental treatment protocol, the dental treatment should follow the sequence of preventive and restorative, whereas minor surgical should be performed under supervision as it may trigger metastasis.

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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Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Kushner BH, Kramer K, LaQuaglia MP, Modak S, Cheung NK. Neuroblastoma in adolescents and adults: The Memorial Sloan-Kettering experience. Med Pediatr Oncol 2003;41:508-15.
2. Berthold F, Simon T. Clinical Presentation. In Cheung, Nai-Kong V.; Cohn, Susan L. Neuroblastoma: Springer. 2006. p. 63–85.
3. Rothenberg AB, Berdon WE, D'Angio GJ, Yamashiro DJ, Cowles RA. Neuroblastoma-remembering the three physicians who described it a century ago: James Homer Wright, William Pepper, and Robert Hutchison. Pediatr Radiol 2009;39:155-60.
4. Podda MG, Luksch R, Polastri D, Gandola L, Piva L, Collini P, *et al.* Neuroblastoma in patients over 12 years old: A 20-year experience at the Istituto Nazionale Tumori of Milan. Tumori 2010;96:684-9.
5. London WB, Castleberry RP, Matthay KK, Look AT, Seeger RC, Shimada H, *et al.* Evidence for an age cutoff greater than 365 days for neuroblastoma risk group stratification in the Children's Oncology Group. J Clin Oncol 2005;23:6459-65.
6. Howlader N, Noone AM, Krapcho M, Neyman N, Aminou R, Waldron W, editors. SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations). Bethesda, MD: National Cancer Institute; 2012.
7. Gurney JG, Ross JA, Wall DA, Bleyer WA, Severson RK, Robison LL. Infant cancer in the U.S.: Histology-specific incidence and trends, 1973 to 1992. J Pediatr Hematol Oncol 1997;19:428-32.
8. Stiller CA, Parkin DM. International variations in the incidence of neuroblastoma. Int J Cancer 1992;52:538-43.
9. Henderson TO, Bhatia S, Pinto N, London WB, McGrady P, Crotty C, *et al.* Racial and ethnic disparities in risk and survival in children with neuroblastoma: A Children's Oncology Group study. J Clin Oncol 2011;29:76-82.
10. Maris JM, Mosse YP, Bradfield JP, Hou C, Monni S, Scott RH, *et al.* Chromosome 6p22 locus associated with clinically aggressive neuroblastoma. N Engl J Med 2008;358:2585-93.
11. Capasso M, Devoto M, Hou C, Asgharzadeh S, Glessner JT, Attiyeh EF, *et al.* Common variations in BARD1 influence susceptibility to high-risk neuroblastoma. Nat Genet 2009;41:718-23.
12. Diskin SJ, Hou C, Glessner JT, Attiyeh EF, Laudenslager M, Bosse K, *et al.* Copy number variation at 1q21.1 associated with neuroblastoma. Nature 2009;459:987-91.
13. Wang K, Diskin SJ, Zhang H, Attiyeh EF, Winter C, Hou C, *et al.* Integrative genomics identifies LMO1 as a neuroblastoma oncogene. Nature 2011;469:216-20.
14. DuBois SG, Kalika Y, Lukens JN, Brodeur GM, Seeger RC, Atkinson JB, *et al.* Metastatic sites in stage IV and IVS neuroblastoma correlate with age, tumor biology, and survival. J Pediatr Hematol Oncol 1999;21:181-9.
15. Citak C, Karadeniz C, Dalgic B, Oguz A, Poyraz A, Okur V, *et al.* Intestinal lymphangiectasia as a first manifestation of neuroblastoma. Pediatr Blood Cancer 2006;46:105-7.
16. Bourdeaut F, de Carli E, Timsit S, Coze C, Chastagner P, Sarnacki S, *et al.* VIP hypersecretion as primary or secondary syndrome in neuroblastoma: A retrospective study by the Société Française des Cancers de l'Enfant (SFCE). Pediatr Blood Cancer 2009;52:585-90.
17. Mahoney NR, Liu GT, Menacker SJ, Wilson MC, Hogarty MD, Maris JM. Pediatric horner syndrome: Etiologies and roles of imaging and urine studies to detect neuroblastoma and other responsible mass lesions. Am J Ophthalmol 2006;142:651-9.
18. Pellegrino M, Gianotti L, Cassibba S, Brizio R, Terzi A, Borretta G. Neuroblastoma in the elderly and SIADH: Case report and review of the literature. Case Rep Med 2012;2012:952645.
19. Ueda Y, Omasa M, Taki T, Okabe R, Cho H, Shoji T, *et al.* Thymic neuroblastoma within a thymic cyst in an adult. Case Rep Oncol 2012;5:459-63.
20. Argani P, Erlandson RA, Rosai J. Thymic neuroblastoma in adults: Report of three cases with special emphasis on its association with the syndrome of inappropriate secretion of antidiuretic hormone. Am J Clin Pathol 1997;108:537-43.
21. Shimada H, Umehara S, Monobe Y, Hachitanda Y, Nakagawa A, Goto S, *et al.* International neuroblastoma pathology classification for prognostic evaluation of patients with peripheral neuroblastic tumors: A report from the Children's Cancer Group. Cancer 2001;92:2451-61.
22. Yalçin B, Kremer LC, Caron HN, van Dalen EC. High-dose chemotherapy and autologous haematopoietic stem cell rescue for children with high-risk neuroblastoma. Cochrane Database Syst Rev 2013;8:CD006301.