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Case Report

Primitive Neuroectodermal Tumor of Maxilla: A Case Report

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Abstract

Primitive neuroectodermal tumours (PNETs) are a type of small round cell tumours which develop from migrating embryonal cells of the neural crest. These are commonly seen in infancy and early childhood. Peripheral primitive neuroectodermal tumours (pPNETs) have rare occurrence in head and neck region. PNET tumour of maxilla is a rare entity in literature. Hence, no clear guidelines exists for management these tumours. We report a case of PNET tumour of maxilla in a 15 year old female who presented with a maxillary swelling and the patient was treated with surgery followed by chemo radiation.

Keywords: pPNET; Ewing's Sarcoma; CD99; MIC2; EWS-FLI1; pPNET tumor of Maxilla

Introduction

Primitive neuro ectodermal tumour (PNET) consists of small round cells, develops primarily in the central nervous system and soft tissue of children and young adults and belongs to the Ewing sarcoma type of tumours. Hart and Earle described the condition to describe medulloblastoma like conditions in the cerebellum [1]. These tumours have a neuro ectodermal origin [2,3]. PNET tumours outside the central nervous system is called peripheral primitive neuro ectodermal tumour (pPNET) [4] which was initially described by Dehner as a separate entity [5]. These pPNET tumours though histologically have similar picture with that of the Ewing's sarcoma, behave far more aggressively than the Ewing's sarcoma [6,8]. PNET outside the central nervous system is extremely rare and has been reported in mediastinum, retroperitoneum, pelvic trunks, or extremities of children and adolescents [9]. Management of such lesions in the maxilla and jaw is a question in view of the rarity of incidence. We did a literature search and found that only a few case have been reported in literature yet [4,10]. We present a child of 15 years age who presented to us with a maxillary swelling involving the left maxilla, which was later diagnosed as peripheral PNET tumour of maxilla.

Case Report

A 15 year old girl presented to our OPD of dept. of otolaryngology and head and neck surgery with complaints of left cheek swelling for the last 3 months which was insidious in onset and was gradually progressive in nature. She was complaining of pain in the lesion and in the face with difficulty in chewing. She also complained of watering from the left eye for the last 2 months. There was no history of any other swelling elsewhere in the body or neck and the swelling never regressed in size. There was no suggestive family history and there was no history of bleed, pathological fractures, dental complaints, any other systemic complaints. Detailed head and neck and systemic examination revealed huge swelling in the left malar region involving the left cheek, with obliteration of left naso-facial groove, blunting of infra orbital rim and pushing the lower eye lid upwards and the ala of the nose and cartilaginous nose to the opposite side. Oral examination revealed left upper alveolar swelling from left upper canine to 2nd molar tooth. There was obliteration of the gingiva-labial and gingiva-buccal sulcus with the swelling protruding into the sulcus from incisors to 2nd molar. Nasal cavity examination revealed pinkish mucosa covered bulge in the left nasal cavity. The swelling was

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bony hard in consistency, non-tender with absence of compressibility or pliability along which was not bleeding on touch. (Figure 1)

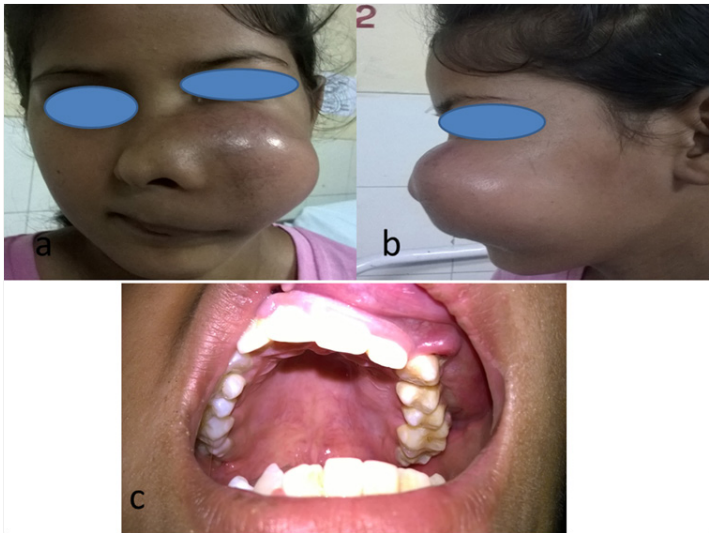

Figure 1: a and b: Anterior and lateral views of the patient showing the lesion.

c: Intraoral view, showing non-displaced teeth line with bulge in the alveolus and gingiva buccal and gingiva-labial grooves.

On radiologic examination with computerised tomographic scanning it was seen to involve the medial and anterolateral wall of maxilla and the alveolar process. It showed hetero-dense lesion with periosteal reaction, evidence of bone expansion, intermittent hypo-dense areas within the tumour mass, Codman's triangle, spiculated (sun burst appearance) and evidence of sclerosis within the tumour (Figure 2).

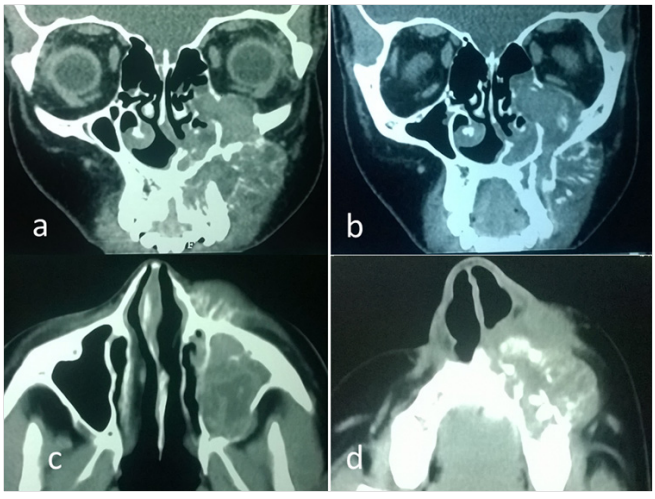

Figure 2: Coronal and axial views of the lesion.

Patient was taken for fine needle aspiration cytology of the lesion which showed multiple small blue round cells were seen (Figure 3).

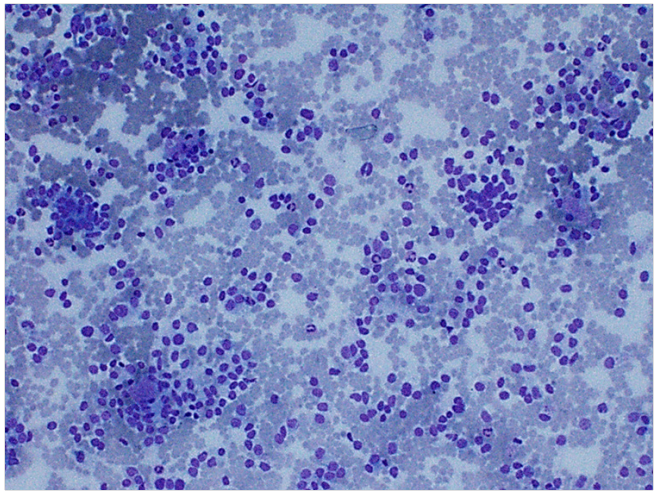

Figure 3: FNA picture showing predominant small blue round cells in the aspirate.

In view the above of radiology and FNA picture, a clinical diagnosis of small round cell tumour was made and she was planned for excision of the lesion and further chemotherapy in the postoperative period.

The patient was taken for excision of the lesion with left maxillectomy and placement of obturator. Complete excision of the tumour could be done. The postoperative specimen showed highly cellular tumour arranged in sheets along with few rosettes which could be seen in the tumour. The cells had stippled chromatin with high nuclear cytoplasmic (N:C) ratio. The tumour showed diffuse and strong membranous CD99 positivity (Figure 4).

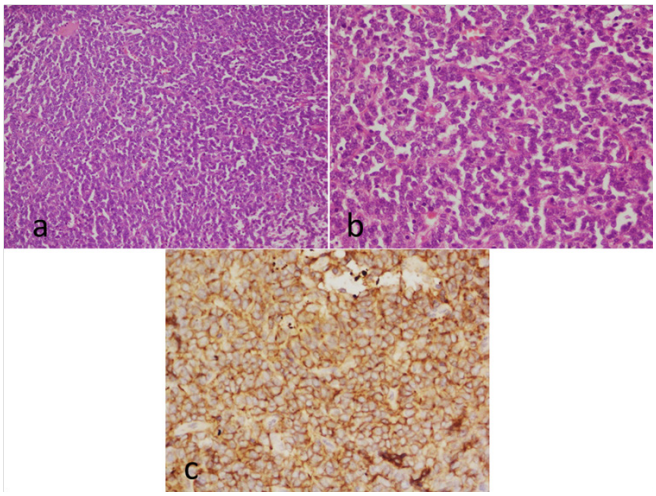

Figure 4: a: Histological examination showing a highly cellular tumor arranged in sheets (HE, x100).

b: The tumor cells have high N: C ratio, stippled chromatin and few rosettes are also seen (HE, x200).

c: The tumor cells show diffuse, strong membranous CD99 positivity (IP, x400).

EWS-FLI1 fusion transcript was detected by RT-PCR. With this a diagnosis of primary primitive neuro ectodermal tumour was made. This patient was taken for vincristine, doxorubicin, ifosfamide and etoposide based chemotherapy regimen.

The patient is under our follow up since last 9 months and is doing well.

Discussion

The differentials for a maxillary swelling in an adolescent child include inflammatory and neoplastic lesions. Inflammatory lesions basically include odontogenic infections and complications of sinusitis. Neoplastic lesions can be of odontogenic and non-odontogenic types. Odontogenic lesions includes odontoma, ameloblastoma, ameloblastic fibroma, myxoma and odontogenic keratocysts and non odontogenic tumours include benign lesions like giant cell granulomatous lesion, fibrous dysplasia, ossifying fibroma and benign neuro ectodermal tumours and malignant lesions include rhabdomyosarcoma, lymphoma, Langerhans'-cell histiocytosis and PNET/Ewing's sarcoma lesions.

In our case there was no tenderness, erythema, purulent nasal discharge, cough, fever and normal white cell counts. So we ruled out infectious lesions from the differentials. Simple naso-palatine type of developmental cysts were ruled out from the diagnosis as these lesions are not associated with bone absorption or sclerosis and does present with a single cystic lesion with central hypo-dense areas. Lesions like globule maxillary cysts and incisive canal cysts does present with anterior maxillary swellings in children but they are much slow growing compared to our case where there is a short history of 3 months. These present with gross sclerosis and marked displacement of teeth along with large cystic spaces in radiology. In our case there was not much displacement of teeth and large cystic spaces in radiology were not there hence we ruled out these lesions.

As there are teeth and supporting structures in the jaw, many of the odontogenic lesions do appear in the maxilla and present as such swellings in young adults. Odontoma was ruled out as they don't grow this big and radiologic investigations show aggregation of tooth structures. Ameloblastomas can present as anterior maxillary swellings in children less than 15 years of age but the absence of multilocular appearance, evidence of tooth resorption, bone destruction, expansion of the bony cortex, nonhomogeneous tissue density with both solid and cystic areas or a combination of these changes makes this an unlikely diagnosis in our case [11]. Other lesions like ameloblastic fibroma and adenoameloblastoma can present with similar bony swelling in anterior maxilla in this age group and can be differentiated on the basis of histology and radiology showing cystic lesions with displacement of tooth [12]. Odontogenic myxoma also presents with anterior maxillary swelling. They are multi loculated and vary in their CT scan appearance and show gross displacement of tooth without evidence of resorption of roots [13,14]. Another cyst of the odontogenic type is a slowly growing odontogenic keratocyst (OKC) that can cause considerable bone loss in the jaws and is associated with high recurrence rates. OKCs involve mandible (mostly posterior part) two to four times as often as maxilla (canine) seen mostly in second through fifth decades. The odontogenic keratocyst is distinguished clinically by aggressive behaviour and pathologically by a very thin cyst wall that contains "daughter" cysts. Radiologic examination reveals a uni locular, expansile cyst with a thin sclerotic border with erosion of the roots at times [15]. Radiology of our case even goes against the possibility of diagnosis of OKC.

Non odontogenic benign lesions like fibrous dysplasia [16] and ossifying fibroma have characteristic ground glass appearance in radiology and giant cell granulomas [17] have a non-specific radiologic appearance and can be diagnosed on histology. FNAC from our lesion showed multiple small blue round cells. Hence odontogenic or benign non odontogenic differentials for maxillary swellings were not probable diagnoses in our case. In view of the aggressive short history in our case malignant lesions were a clinical possibility. The radiology also led us to believe that we might be dealing with a malignant lesion in the girl. Malignant lesions which present like this include rhabdomyosarcoma, lymphoma, Langerhans'-cell histiocytosis and PNET/Ewing's sarcoma lesions. Langerhans cell histiocytosis presents with variable radiologic findings including lytic areas within the bone along with almost all the patients presenting with pain as an associated feature [18]. Our patient only complained of occasional pain which was not much disabling for her and radiology did not show any well-defined lytic areas. In view of the small round cell in FNA we had differentials [19] such as lymphoma, rhabdomyosarcoma, undifferentiated carcinoma, olfactory neuroblastoma, leiomyosarcoma and pPNET-Ewing sarcoma for the diagnosis of our case. Among the above diagnoses we kept pPNET-Ewing's sarcoma as the possible diagnosis and went ahead with surgical excision and post op histopathology in view of the suggestive radiologic evidences that we had for the lesion.

Ewing tumour families of pPNET are primitive, small, round cell tumours (SRCTs) of the bone and soft tissue. Peripheral primitive neuroectodermal tumours of the maxilla are extremely rare disease entities [4]. PNET tumours in head and neck usually occur in the first and second decade of life [2]. PNET tumours and Ewing's sarcoma are considered as a part of the same family of tumours due to cytogenetic studies showing similar abnormalities in Ewing's sarcoma and PNET cells: mainly the t (11; 22) (q24; q12) translocation. The rearrangement results in the translocation of the 3' portion of Fli 1 gene from chromosome 11 to 5' portion of Ewing

sarcoma gene EWS on chromosome 22 resulting in a chimeric EWS-FLI1 RNA encoding for the pathognomonic fusion protein [20]. EWS-FLI1 fusion transcript can be detected in 80–90% of the PNET-Ewing's sarcoma family by RT-PCR [21,22].

Pathologically, PNETs are believed to represent a transition between neoplastic Schwann cells, neuroblasts, and perhaps paraganglionic elements [23]. These PNET tumour/Ewing's sarcomas show monotonous sheets of small round cells with cytoplasmic glycogen with neural differentiation with rosette formations. Both these tumours have overlapping histological features and they both show diffuse strong cell membrane expression of CD99 (Mic2) glycoprotein and most importantly the common pathogenic translocation [24]. These tumours does look like neuroblastoma in histology, however they are usually non-secretory.

There is lack of extensive literature to reach at a consensus for deciding the treatment of these lesions. However, early surgical excision followed by multi agent chemotherapy and radiotherapy to address any residual and to prevent loco regional recurrence is considered as the standard treatment modality for dealing with these tumours [2,3,9,10]. The patient in our case also received chemo radiotherapy in the post-operative period.

Conclusıon

pPNET/Ewing's sarcoma of maxilla is a rare entity. It should be in the differentials of acute maxillary swelling in children and adolescents along with high level of clinical suspicion for early intervention in order to avoid delays as PNET tumours are aggressive in nature and any delay can be detrimental for the patient.

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