

Sinonasal Tumour causing Osteomalacia. A case report

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Abstract:

Background: Tumour Induced Osteomalacia is a rare paraneoplastic syndrome and often unrecognized cause of hypophosphatemia with excessive production of fibroblast growth factor 23 (FGF23) leading to chronic hyperphosphaturia. It may be associated with normal or low level of 1,25-dihydroxyvitamin-D.

Case Presentation: A 48 yrs old female presented with chronic low back ache, muscle pain and weakness, bony pain as well as bilateral leg pain. On examination she was found to be suffering from TIO with a sinonasal mass in CT scan. Tumour responsible for this was removed which immediately resulted in normalization of blood parameters and other complaints.

Conclusion: This case is to highlight the importance of keeping this disease in mind while assessing a case of hypophosphatemia to avoid the morbidity or even death.

Keywords: Fibroblast, Hyperphosphaturia, Hypophosphatemia, mesenchymal, Oncogenous Osteomalacia, Sinonasal.

I. Introduction

Oncogenous osteomalacia(OOM), also known as Tumour Induced Osteomalacia is a rare condition associated with phosphaturia, hypophosphatemia and osteomalacia¹. OOM usually occurs in association with other small tumours which makes their discovery difficult². It was Weidner and Santa Cruz³ who first suggested that many of these mesenchymal tumours were histologically polymorphous and termed it as, “phosphaturic mesenchymal tumours (PMT)” along with its four subtypes³. Most common is the mixed connective tissue type(MCT). These tumours are commonly found in extremities, head & neck accounts for only 10% of the total tumours^{2,4}. Out of these, tumours in sinonasal area is very rare and very few cases have been reported till now⁵. This tumour produces peptide hormone like substances called fibroblast growth factor 23 (FGF23) which inhibits renal tubular reabsorption of phosphate and impairs 1,25(OH)²D₃ synthesis leading to hyperphosphaturia and hypophosphatemia with or without reduction in circulating 1,25(OH)²D₃. Surgical excision is the main mode of treatment resulting in drastic improvement in clinical features. Medical treatment is advised only when tumour cannot be localised.

Here we present and describe the clinical and radiological features of an adult female patient diagnosed with this rare phosphaturic mesenchymal tumour in the nasal cavity and the treatment provided.

II. Case Report

A 48 year old female presented to the Medicine dept, later transferred to ENT dept, with low back ache for last 5 years, joint and muscle pain with generalised weakness and bilateral leg pain for last 2 years. She was unable to walk without support.

Upon examination power of both hand was reduced by approximately 50%, bilateral elbow and hip were 4/5, both shoulder were restricted due to pain and trunk could not be assessed due to pain. Muscular tone and deep tendon reflexes were normal.

The initial laboratory tests revealed raised ESR-50 (0-20), raised serum alkaline phosphatase-579U/L (80-240), normal calcium-9.0mg/dl (8.1-10.4), low phosphorus level-1.8mg/dl (2.5-4.5), elevated parathyroid hormone-63pg/ml (7-53), normal vitamin-D -56ng/ml (30-80), reduced tubular reabsorption of phosphate (TRP)-63% (85%-95%) and a reduced tubular maximum for phosphate corrected for glomerular filtration rate (TmP/GFR)-1.13mg (2.72-4.39). Venous sampling of FGF23 was done showing raised levels from right IJV. (Table 1.1)

Radiological images, DOTANOC scan showed increased uptake in the right ethmoidal area (Figure 1). It was followed by CECT & MRI of PNS (Figure 2 & 3 respectively). CT scan showed enhancing mass in the right ethmoid area where as it was iso-intense in T1 and hyper-intense in T2 on MRI. Ultrasonography whole abdomen was normal.

III. Figures And Tables

Site	Right	Left
IJV	2480	1779.5
Subclavian	1915.5	1901
Femoral	1853	1901

Table 1.1: FGF23 value measured from different venous samplings.

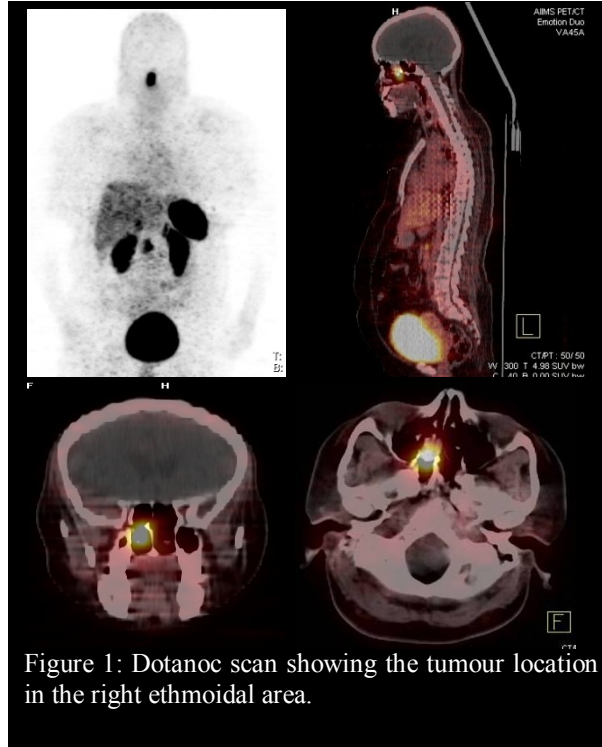


Figure 1: Dotanoc scan showing the tumour location in the right ethmoidal area.

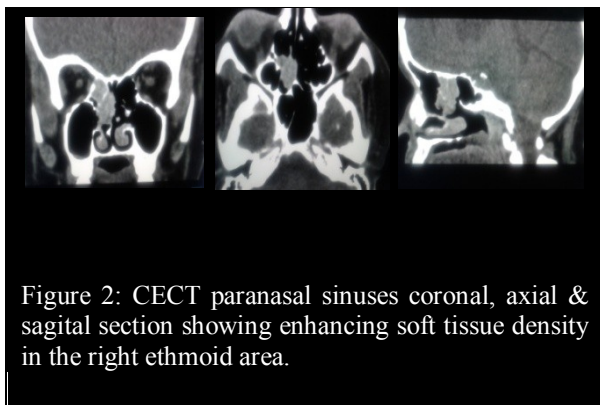


Figure 2: CECT paranasal sinuses coronal, axial & sagittal section showing enhancing soft tissue density in the right ethmoid area.

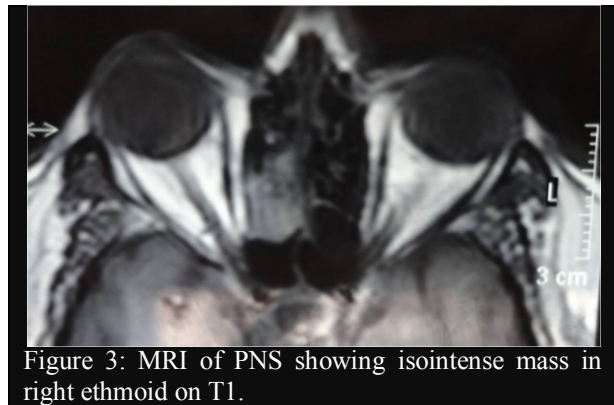


Figure 3: MRI of PNS showing isointense mass in right ethmoid on T1.

Patient underwent endoscopic surgical excision of the mass. Intraoperatively the mass was found to be vascular and situated in right ethmoid area. Nasal pack was removed after 2 days and on the 3rd day serum phosphate started improving (3.1mg/dl) along with the symptoms of the patient. On follow-up patient was doing well without requirement of phosphate or calcium supplementation.

Based on histopathological report a final diagnosis of Phosphaturic Mesenchymal Tumor (Poorly differentiated Mesenchymal tumor with uncertain malignant potential) was made.

IV. Discussion

Oncogenic osteomalacia (OOM) or tumour-induced osteomalacia (TIO) is a rare condition characterized by phosphaturia, hypophosphatemia and osteomalacia with remission of these abnormalities after resection of the tumor. In 1987, Weidner and Santa Cruz described the distinctive features of TIO-associated tumors and coined the term “phosphaturic mesenchymal tumours, mixed connective tissue variant (PMTMCT)”³. PMT with the mixed connective tissue is the most common variant observed, while the minority consists of the other three remaining histopathological subtypes (an osteoblastoma-like tumour, a nonossifying

fibroma-like tumour and an ossifying fibromalike tumour)^{3,6}. These tumours commonly occurs in extremities, paranasal sinuses involvement is seen only in 6.2% of cases^{5,7}.

These tumours may be very small in size and located at obscure site sometime even making radiological localization difficult. As a result there is usually a delay in diagnosis, as long as 15 years has been reported⁸. Moreover the initial presentation is usually vague and medical presentation instead of anatomical⁹. There are various modalities for tumour localization such as routine radiographs, ultrasonography, CECT, magnetic resonance imaging (MRI), whole body technetium scan and octreotide scintigraphy^{10,11}. Other newer modality are ⁶⁸Ga-DOTANOC PET/CT¹², which was done for the present case.

Clinically patients with tumour in sinonasal area may present with nasal obstruction and proptosis assisting in tumour location⁵ but some cases may not have any sign or symptoms in relation to tumour location making it difficult for localizing the tumour, as in the present case which was diagnosed after 5 year .

Recently serum FGF23 level has been investigated as a biomarker for TIO. Increased serum FGF23 with low 1,25-dihydroxy D3 and hypophosphatemia is considered to be useful for detection of TIO. In addition, it is also used to monitor the response to successful surgical excision¹³.

The most accepted protocol for the treatment of PMT is complete surgical removal of the tumour, which dramatically improves the tumour associated symptoms and resolves the biochemical abnormalities^{2,4}. Patients where tumours cannot be localized, medical treatment with calcium and vit-D supplementation can improve the symptoms. Sometime parenteral phosphate therapy may also be required. However, medical therapy is usually associated with complications like hypercalcemia, hypercalciuria, renal failure and secondary or tertiary hyperparathyroidism^{4,13}. In the present case, tumour was surgically removed following which improvement in serum phosphate was noted on the third day of surgery.

V. Conclusion

This case needs to be highlighted due to its rare location in the paranasal sinuses which may make it difficult for localization. This tumour as well as location in the paranasal sinuses should be kept in mind while assessing a case of osteomalacia with hypophosphatemia to avoid morbidity or even death.

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