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Case Report

Role of Oral Physician in Diagnosis of Hyperparathyroidism

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Abstract

Oral physician has an important role in diagnosing patients with systemic diseases which can save the patient's life, one such systemic disease which is diagnosed on incidental findings of oral manifestations is hyperparathyroidism. Parathyroid hormone plays an important role in the metabolism of calcium and phosphorus; influencing the mineralization of bone and teeth. Parathyroid disorder may lead to hyper or hypo secretion of hormone, which results in various oral manifestations. Common oral manifestations in patients with hyperparathyroidism (HPT) are brown tumor, loss of bone density, soft tissue calcification, and dental abnormalities. Dental management of patients with HPT involves a higher risk of bone fracture, whereas in hypo parathyroidism the caries control is the main concern. It is the important that the dentist be aware of the risks and difficulties that may arise during the dental management of these patients.

Earlier the diagnosis better is the treatment. As rightly said mouth is mirror of the body many diseases are diagnosed with oral and maxillofacial manifestations which can be the initial or the only signs of the disease. Thus, emphasizing the role of oral physician in diagnosis and further management of the patient.

Keywords: Hyperparathyroidism; Oral Physician; Oral Manifestations

Introduction

Parathyroid consists of four small glands (3 mm wide × 6 mm long × 2 mm thick), with dark brown in color, which are paired and located behind the thyroid gland in the neck. Parathyroid glands produce and release parathyroid hormone (PTH), which is involved in regulating the metabolism of calcium and phosphorus [1]. So, it plays an important role in tooth and bone mineralization, increases the bone resorption, stimulates formation of active metabolite of Vitamin D in the kidneys, which promotes the intestinal absorption of calcium and decreases renal reabsorption of phosphate. Normal serum PTH is about 10- 65 ng/L [2].

Management of medically compromised patients is challenging, which requires early diagnosis and prompt treatment [2].

The present case report is of a hyperparathyroid patient whose condition was diagnosed based on the oral manifestation of the disease alone. [2].

Case Report

A 18 years old male patient reported to the department of Oral Medicine and Radiology, with chief complaint of pain and swelling in the mandibular right posterior teeth region. Patient visited a local dentist for the complaint and for which an intra oral periapical radiograph (IOPAR) was made and a diagnosis of periapical infection made in the mandibular right first molar. There was a past dental history of restoration with the same tooth. Though he did not have any known significant medical history, the patient he complained of tiredness, lethargy. Occasional bone pain and mild state of confusion. Family and habit history were not contributory.

Physical examination shows normal vital signs. General physical examination showed no significant findings. Mild tenderness was palpable over the right mandibular body region.

Upon intra-oral examination (Figure 1) a restoration was noted in the mandibular right first molar, with a slight tender swelling in the buccal vestibule. IOPAR showed a radiopaque restoration in the crown of the tooth with discontinuity of the lamina dura and a diffuse periapical radiolucency in the second premolar and molar region. (Figure 2). The surrounding bone also showed areas of altered trabeculae. The lamina dura of the adjacent second molar was also indistinct. The orthopantomogram (OPG) showed (Figure 3) generalized loss of lamina dura in all the teeth. The inferior cortex of the mandible was thin on both the sides. There was generalized rarefaction of bone with irregular radiolucent lesion in the mandibular right quadrant in the periapical region of the mandibular right second premolar till the second molar. The outlines of the inferior alveolar nerve canal were not traceable clearly. There was no significant root resorption noted. The mandibular left first molar was missing and the third molars in all four quadrants were in their normal stages of development. The hand- wrist radiograph was taken which showed signs of subperiosteal erosion (Figure 4). Cone-beam computed tomography (CBCT) examination (Figure 5) showed, generalized altered bony trabeculae with ground glass appearance, bi- cortical expansion of the mandible. Focal lytic area was seen in the mandibular right body.

Figure 1: Intra oral photograph.

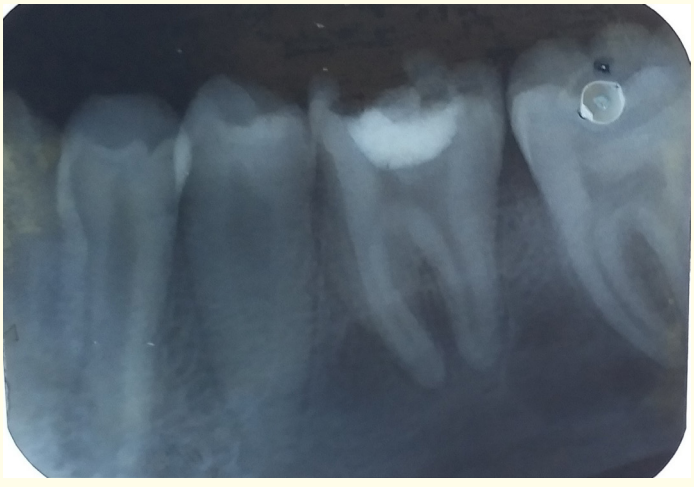

Figure 2: Intra oral periapical radiograph showing deep restoration with periapical rarefaction.

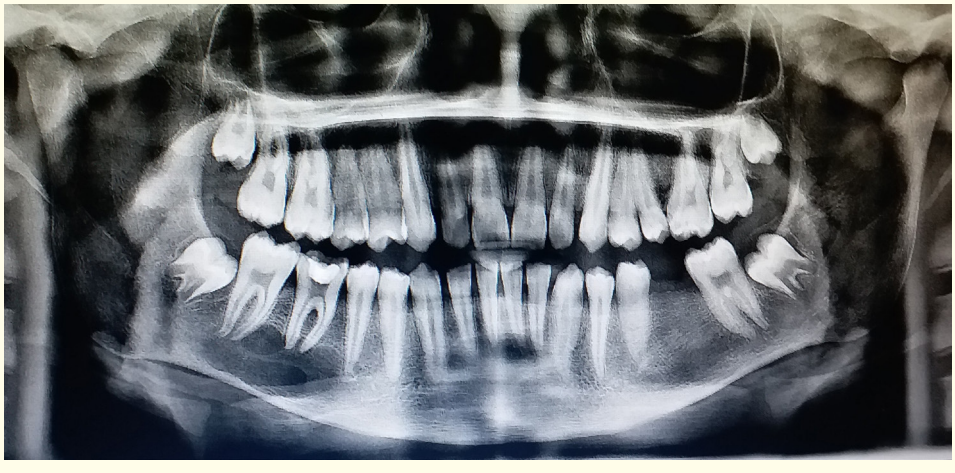

Figure 3: Orthopantomograph findings.

Figure 4: Hand wrist radiograph showing sub periosteal erosions.

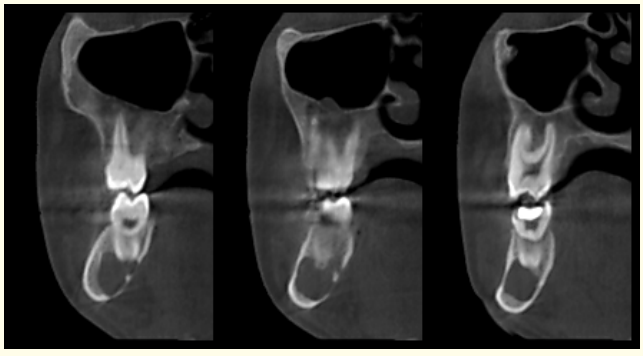

Figure 5: Advanced imaging by CBCT appreciating the changes.

The lamina dura around all the teeth were not traceable.

Thus, considering the radiographic findings of generalized rarefaction of bone with loss of lamina dura and focal lytic areas in the mandible, a diagnosis of hyperparathyroidism was made with a differential Diagnosis of Fibrous Dysplasia, Paget's disease and biochemical investigations were carried out for confirmation of the same.

Table 1 shows the reports of the investigations and were indicated a hyperparathyroidism status. There was a marked increase of parathormone level (277.1 pg/ml), a normal calcium level and alkaline phosphatase (Table 1-3) Provisional diagnosis was confirmed as hyperparathyroidism. Thus, the diagnosis of hyperparathyroidism was confirmed.

Test	Patients value	Normal Values	Interpretation
Serum Calcium	10.6	8.-11 mg/dl	Normal
Alkaline phosphates	155	53-155 IU/L	Borderline
Parathormone	277.1	14-72 pg/mL	Increased

Table 1: Parathyroid Function Test report.

	Calcium	Phosphate	Alkaline phosphate	Urea
Primary without bone lesion With bony lesion	Increased Increased	Decreased Decreased/Normal	Normal Increased	Normal Normal/Increased
Secondary Hyperparathyroidism Due to Renal failure Due to Malabsosorption	Normal/Decreased Normal/Decreased	Normal /Increased Decreased	Normal/Increased Increased	Increased Normal
Tertiary hyperparathyroidism with bone lesion without bone lesion	Increased Increased	Normal/Decreased Decreased	Increased Normal	Normal/Increased Normal/Increased

Table 2: Showing biochemical changes in different types of hyperparathyroidism.

Discussion

Hyperparathyroidism (HPT) was first described by von Recklinghausen in 1891, who reported patients with a condition called osteitis fibrosis cystica [4]. It affects 0.05-0.1% of general population. The prevalence is 1 in 400 female and 1 in 1000 male [2] usually affecting middle aged person [5]. The term hyperparathyroidism was coined by Henry Dixon and colleagues [6]. It was realized that HPT has an effect on multiple system of the body such as renal system, skeletal system, early effect on bone such as subperiosteal erosions and loss of lamina dura [7]. Diagnosis is usually made by increased levels of Serum parathyroid hormone (normal range 14-72pg/ml), Alkaline phosphatase (normal range 53-155 IU/L) and normal levels of calcium (normal range 8-11mg/dl) [3].

Parathyroid hormone plays a crucial role in maintaining bone health and calcium and phosphate metabolism. The primary function of the parathormone is to maintain serum calcium levels in the body. Primary hyperparathyroidism is a condition when an underlying neoplasm such as a parathyroid adenoma result in increased production of parathormone. Parathormone in turn mobilizes calcium from the bone into the blood resulting in altered bony architecture. Secondary hyperparathyroidism is a sequela of conditions such as chronic renal failure or severe prolonged Vitamin D deficiency. Kidneys play an important role in the production of 1, 25 dihydroxy cholecalciferol which is the physiologically active form of Vitamin D that aids in the absorption of calcium from the intestine. Thus, chronic kidney disease or severe vitamin D deficiency which causes reduced serum calcium levels, stimulates excessive production of parathormone resulting in secondary hyperparathyroidism. [10]

Tertiary hyperparathyroidism is a condition that occurs when an excess of parathormone is secreted by parathyroid glands, usually after longstanding secondary hyperparathyroidism.[11]

Increased osteolytic activity due to high levels of parathormone results into formation of osteolytic lesions in the jaw bones. These are giant cell tumors which are known as brown tumor (osteitis fibrosa cystica) due to the brown color of the cross section of the cut surgical specimen due to high hemosiderin content. [12] These are rare tumors that appear in the late stage of the disease affecting women more often than men. [13] Though brown tumor are solitary, Chirihan Ayadi et al have reported a case of multiple brown tumors. [13]

Jackson and Frame in 1972 have described a tetrad of findings in hyperparathyroidism which include 'bones, stones, abdominal groans, psychic moans with muscle overtones. Bone pain may be caused due to the changes described above. Prolonged hypercalcemia may lead formation of nephrolithiasis (renal stones) which have been reported by PV Wanzari eat al [14] While symptoms of vomiting, peptic ulcers lead to abdominal pain, CNS manifestations cause mood changes and psychic disturbances. Hypercalcemia also leads to muscular pain and discomfort. In the present case also, the patient complained of lethargy, bone pain and mild state of confusion. The bony changes are more likely to occur in the mandible (40.8%) than the maxilla (29.4%). In many cases (29.8%) there may be involvement of both the jaws. [15]

Other findings reported in patients with hyperparathyroidism include anorexia, bloating, constipation, weight loss, pruritus, polyuria, nocturia, polydipsia. [16] Subperiosteal bone resorption is a striking feature of this disease and commonly seen in the middle phalanx, distal radius, humerus, and clavicle.[16] Similar resorption of the middle phalanx was noted in the present case as well.

The oral physician plays important role in the detection of HPT [3]. Occasionally, the first sign of the disease may be a cyst in the jaw. The disease should be considered by the dentist whenever single or multiple radiolucency's are observed on radiographs of the jaw. It is important for an oral physician to be aware of the various oral and extra oral findings so that the disorder can be diagnosed correctly followed by a precise and prompt treatment. There is higher risk of bone fracture, before providing endodontic treatment [9].

Conclusion

This case report emphasizes the role of oral manifestation in the diagnosis of systemic diseases. The role of an oral physician and radiologist in identifying these changes will help in early diagnosis and timely management of these conditions.

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