

Hyperparathyroidism Manifesting As Invasive Cervical Resorption: A Rare Case Report

¹Dr Aruna V P, Postgraduate Student, Government Dental College, Thiruvananthapuram

²Dr Sam Joseph V G, Professor and HoD, Government Dental College, Alappuzha

³Dr Anulekh Babu, Associate Professor Government Dental College, Thiruvananthapuram,

⁴Dr Aparna Mohan E, Former Senior Resident Government Dental College, Alappuzha,

⁵Dr Gayathri P, Postgraduate Student, Government Dental College, Thiruvananthapuram

⁶Dr Shima Mohan M, Postgraduate Student, Government Dental College, Thiruvananthapuram

⁷Dr Midhun M J, Postgraduate Student, Government Dental College, Thiruvananthapuram

⁸Dr Kanchana Devi, Post Graduate Student, Government Dental College, Thiruvananthapuram

Corresponding Author: Dr Aruna V P, Postgraduate Student, Government Dental College, Thiruvananthapuram

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Abstract

Many dental lesions have its origin in underlying systemic diseases. One such case is presented here which describes how an underlying Hyperparathyroidism was detected in the course of diagnosis of external cervical resorption and also the successful management of the resorptive lesion of class 4 type. Invasive cervical resorption (ICR) is a severe but rare pathological complication, and an aggressive form of external root resorption which affects both vital and pulpless teeth. External root resorption has been frequently associated with systemic disorders like renal diseases, hyperparathyroidism, rickets etc. An association of external cervical resorption and hyperparathyroid state with elevated levels of PTH was found in this case report. The dental manifestations of the disease lead to the early

diagnosis and treatment of the disease. The class 4 resorptive lesion was successfully managed. This article describes a cases of class 4 ICR diagnosed by using cone-beam computed tomography and treated with an external approach with sodium hypochlorite irrigation and calcium hydroxide dressing.

Keywords: Hyperparathyroidism, invasive cervical resorption, external root resorption,CBCT.

Introduction

Invasive cervical resorption (ICR) is a severe but rare pathological complication, and an aggressive form of external root resorption which affects both vital and pulpless teeth.(1) The aetiology of ICR is poorly understood, and it is assumed that there must be damage to the periodontal ligament (PDL) and cementum, in

combination with a stimulating factor that can induce and maintain the activity of clastic cells (2). The various stimulating factors include dental trauma, orthodontic treatment, intracoronal bleaching, periodontal therapy, and idiopathic etiology. (3). Several systemic abnormalities have been associated with external root resorption, including Paget's disease, hypophosphatemia, hyperparathyroidism, bone dysplasia, Papillon- LeFèvre syndrome, renal disease, liver disease and Ehlers- Danlos syndrome Type VIII(4)

According to Heithersay (5)ICR can be clinically classified into 4 types:

1. A small invasive resorptive lesion in the cervical area with little penetration into the dentin
2. A well-defined invasive lesion penetrating deeply into the dentin, close to the pulp, but without reaching the radicular dentin
3. A deep resorptive lesion invading the dentin and affecting both the coronal dentin and the coronal third of the root
4. A large invasive resorption extending beyond the coronal third of the root

The clinical features of ICR may vary notably from a small defect in the gingival margin to a pink coronal discoloration of the tooth (6). It expands first coronally and thereafter apically, encircling the root canal. The pulp usually remain unperforated and healthy because of the presence of a non-mineralized predentin layer(7).

However, in most advanced cases, the root canal may be perforated and additional resorption channels may be created. These channels burrow deep into the dentin and later interconnect more apically with the periodontal ligament through communicating channels(7).

The radiographic features of such lesions vary from being well-defined to an irregularly bordered, mottled radiolucency, sometimes overlying the outline of the pulp

space, with the canal contours staying distinct (8). Cone-beam computed tomography (CBCT) is a three-dimensional imaging technique which was found to be superior to periapical radiographs in the diagnosis of external root resorption. (9).

Disorder of the parathyroid gland may cause either hypersecretion or hyposecretion of PTH. It has diverse oral and extraoral manifestations. Hyperparathyroidism (HPT) is more of concern for an oral physician. HPT is of three types according to the etiology as primary, secondary, and tertiary. Primary type occurs due to tumor of a gland or hyperplasia leading to increased secretion of PTH causing hypercalcemia and hypophosphatemia. Secondary type occurs due to stimulation of parathyroid glands to produce increased amounts of hormones to correct abnormally low serum calcium levels in different physiologic or pathologic conditions such as renal failure, intestinal malabsorption syndrome, decrease of Vitamin D production, thus resulting in parathyroid hyperplasia. Tertiary-type occurs due to long-standing secondary HPT. This case report involves diagnosis of external cervical resorption and which inturn helped a way to detect an underlying systemic disease- secondary hyperparathyroidism, at an early stage and clinical management of resorptive lesion.

Case Report

A 16-year-old male presented with complaint of pain in his maxillary anterior teeth (11) since 2 months. The medical history was noncontributory. Extra oral examination revealed no abnormality. Intraoral examination revealed no morphological alterations. The periodontal probing was within the normal limits at all sites except at distopalatal surface and the tooth was tender on percussion. Pulp sensibility testing with Endo-Frost (Roeko, Langenau, Germany) gave a negative response.

An intraoral periapical radiograph of maxillary anterior teeth region revealed a diffuse radiolucent area on the distal cervical aspect extending from the coronal third to the middle third of the external root surface of #11. The radiopaque outline of the canal was clearly distinct through the radiolucent area. OPG revealed multiple teeth with obliteration of root canal, widening of lamina dura and periapical radiolucencies.

Since ICR was suspected, a limited field of view CBCTscan (ProMax 3D Max, NewTom GiANO) was performed to determine the real extent of the lesion. CBCT revealed a radiolucency in the cervical third of the coronal portion on palatal side. The lesion seemed to enter through the lingual aspect of the tooth, extending into the middle third of the root. External root resorption was seen in apical third with blunting of root apex. Diffuse periapical radiolucency with non-corticated border in the periapical region was observed. Pulp chamber and root canal was obliterated in #21 and #12. From the CBCT results diagnosis of pulp necrosis with Heithersay- class **4 ICR** was made for #11.

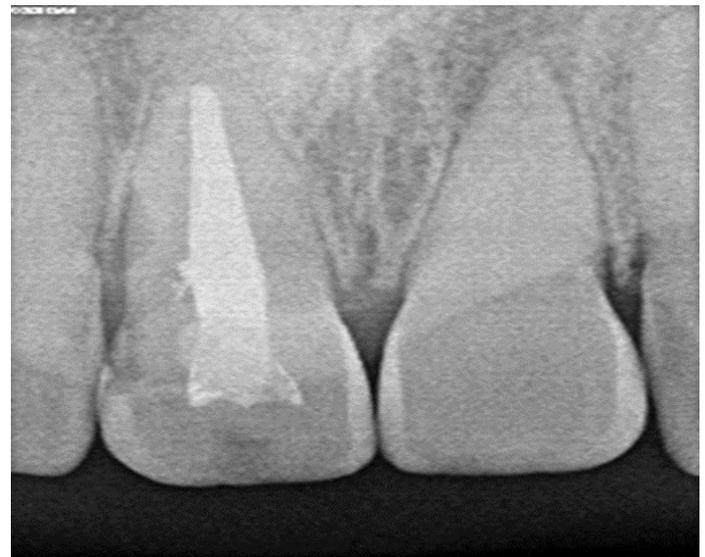
Since there was no significant dental history with relation to the clinical and radiographic findings a systemic pathology was suspected, patient was sent for blood chemistry evaluation. Blood chemistry of the patient showed elevated PTH level (142.3 picogram/ml) signifying hyper parathyroid state. Serum calcium was within normal limits (9.4 mg/dl). Patient was referred to department of endocrinology regarding the elevated PTH levels. Ultrasonography investigation of abdomen showed a normal study and ruled out morphological alterations in kidneys. The medications for hyperparathyroidism was started from endocrinology department.

As for dental treatment, Root canal therapy for #11, and surgery for sealing the resorptive defect was planned. Written informed consent was obtained from the patient.

Rubber dam was placed. Under local anesthesia, access cavity was prepared on lingual surface. After working length determination of both the teeth, chemo mechanical preparation was done and irrigation was performed with 5 ml of 2.5 % NaOCl for #11. The tooth was obturated using lateral condensation technique. The periodontal reparative surgery was performed immediately after the completion of root canal treatment. A full mucoperiosteal flap was reflected to remove granulomatous tissue which was excavated from the resorptive area. The excavated tissue was sent for biopsy in department of oral pathology. The resorptive area was treated with 90 % trichloroacetic acid for 30 s and the resorptive area was filled with biodentine (Septodont, Saint-Maur-des-Fosses, France) and contoured properly and allowed to set for 15 min to achieve initial setting and relative hardness. After radiographic confirmation, the flap was repositioned and sutured. The biopsy report revealed moderately collagenous stroma exhibiting proliferation of plump fibroblasts, moderate diffuse inflammatory cells with moderate vascularity with focal areas of calcification. The Report concluded that the periapical pathology is suggestive of hyperparathyroid like lesion. Based on the clinical, biochemical, radiological and histological findings actually are indicative of a systemic disease etiology behind the ECR. Clinical examinations were performed for treated teeth after 6 months. The patient was completely asymptomatic and probing depth was within normal limits. Healing of periapical lesion was noted indicating that repair of resorption defect was successfully performed with biodentine.



The initial periapical radiograph. A large radiolucent area with well-delimited borders at the cervical region of tooth #11 was observed. The root canal walls appeared preserved.

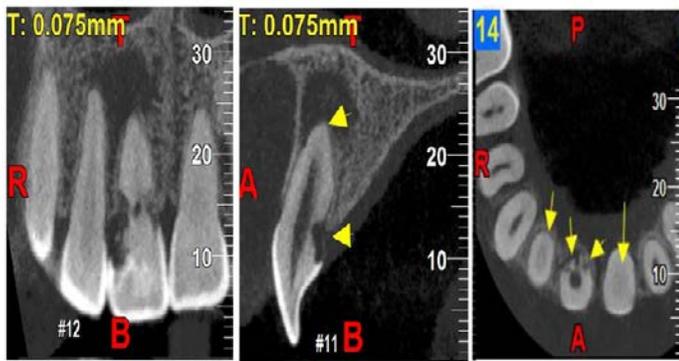


Review radiograph after 6 months.

Discussion

The present case report describes a case of class 4 invasive cervical root resorption treated by using surgical external approach which was diagnosed to have a systemic disease etiology. The etiology of ICR is poorly understood, and this has led to the use of multiple terms to describe it. In the present case, the patient did not give any history that could be linked to predisposing factors, but the blood chemistry revealed hyperparathyroid state. The proposed theory of pathogenesis involves predisposing root conditions and perpetuating bacterial factors. It is hypothesized that an initial physical injury to the root surface or the presence of natural cementum defects may predispose to resorption by altered host tissues modified by a bacterially driven stimulus(7).

Intraoral manifestations of hyperparathyroidism are obliteration of pulp chamber by pulp stone, alterations in dental eruption, loosening and drifting of teeth, resorption of teeth, malocclusions, spacing of teeth, partial loss of lamina dura, periodontal ligament widening, teeth become sensitive to percussion and mastication, floating teeth, delay or cessation of dental development, brown tumor, generalized bone rarefaction of jaw, soft tissue calcifications, caries, and hypercalcemia may result in



CBCT image with limited FOV - Transversal and sagittal views of the resorptive lesion in CBCT imaging.



Clinical photograph of palatal view tooth #11 shows the resorptive lesion after surgical exposure. The resorptive defect sealed with biodentine.

sialolithiasis, mandibular tori, patient may complain of vague jaw bone pain(10). In the current case the patient presented with resorption and obliteration of pulp chamber, calcification of multiple teeth.

The diagnosis of ICR is usually difficult because ICR is frequently asymptomatic. At times the patient may aid the diagnosis by referring to a sensitive area along the gingiva of the affected tooth corresponding to the resorptive entry point. Radiographically, class 1 and class 2 lesions may look like carious lesions, whereas class 3 and class 4 lesions resemble internal resorption, although unlike internal resorption, the contour of the root canal remains visible because of the integrity of the predentin layer(7).

One of the main drawbacks of 2-dimensional radiographs is that it is extremely difficult to determine the real extent of the ICR and therefore, cone-beam computed tomographic (CBCT) imaging is extremely useful to diagnose ICR and to plan adequate treatment of these lesions¹. In fact, CBCT imaging reveals the real extension of the lesion and helps to determine the best way to access the cavity. Moreover, it is possible to segment the CBCT images in order to make a 3-dimensional (3D) digital reconstruction of the tooth and digitally plan the most conservative approach to restore the tooth(9).

The treatment of invasive cervical root resorption presents a challenge for clinicians. Different approaches have been described in several case reports for the treatment of invasive cervical root resorption. Meister et al advocated a surgical approach, with the exposure of the resorption defect and local osteotomy (11).

Beertsen et al³ described a new treatment that consisted of mechanical debridement supported by systemic antibiotics and dietary consultation. Nikolidakis chose a treatment that involved the removal of the pathological tissue from the defect and the restoration of the resorption cavity(12). Heithersay studied his recommended surgical approach for

ICR treatment. His technique included subgingival curettage and the chemical removal of the resorptive tissue by using 90% trichloroacetic acid (TCA)(8).

Trichloroacetic acid is applied to the resorptive cavity to promote coagulation necrosis of the invasive tissue by penetrating smaller, more inaccessible recesses and resorptive channels. Care should be taken when using trichloroacetic acid because of the potential irritation it may inadvertently cause to the surrounding soft tissues. Single-tooth isolation or split dam techniques are needed to prevent inadvertent contact of trichloroacetic acid with the adjacent tissues. In the case of difficult isolation, 3%–5% sodium hypochlorite may be used similarly to trichloroacetic acid(1). Because the decalcification caused by trichloroacetic acid on dentin could affect adhesion, some authors recommend refreshing the adhesive surface with a bur¹. Although there is a dearth of evidence-based research on the topic, this issue should be taken into consideration (13).

In both surgical and nonsurgical approaches, endodontic treatment is considered when the resorptive defect is in close proximity to the pulp and there is a high risk of pulpal exposure during resorptive tissue removal.

The material used for sealing the cavity opening remains controversial. No material is known to fulfill the ideal requirements for a cavity, usually within the biological width, where chronic periodontal problems may occur. In terms of biocompatibility with gingival tissues, the use of materials such as Biodentine (Septodont, Saint-Maur-des-fosses, France) or glass ionomer is better than composite resin¹, which may also form a long epithelial attachment(14). Moreover, the surface roughness of Biodentine or glass ionomer promotes plaque retention.

Other products (eg, mineral trioxide aggregate) should be avoided in the esthetic zone given their propensity for staining teeth. Nanohybrid composite resins might not be

compatible for periodontal tissues, but when well-polished, these composite resins reduce plaque formation (compared with Biodentine or glass ionomer) and might produce a successful clinical outcome(15).

Conclusion

Many dental lesions have its origin in underlying systemic diseases. One such case is presented here which describes how an underlying Hyperparathyroidism was detected in the course of diagnosis of external cervical resorption and also the successful management of the resorptive lesion of class 4 type.

Careful clinical observation of dental lesions and right investigations will help in diagnosing previously undetected systemic diseases and the presented case describes how.

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