

Patients with Parathyroid Disorders: Oral Manifestations and Dental Management

Abstract: Parathyroid hormone secreted by the parathyroid glands has a key role in the regulation of calcium and phosphorus metabolism and plays an essential role in tooth and bone mineralization. Disorders of the parathyroid glands most frequently result in abnormalities of serum calcium and can induce various oral and/or extra-oral manifestations. Therefore, a sound understanding of these conditions is essential for the dental practitioner, with emphasis on alerting signs, clinical and radiological findings and mandatory communication with patient's physician.

Keywords: Dentistry; hyperparathyroidism; hypoparathyroidism; management; oral manifestations; parathyroid gland.

1. Introduction

The parathyroid glands, located behind the thyroid gland, are part of the endocrine system. They are generally four, though additional glands have been found in up to 13% of autopsies [1]. Microscopically, the parathyroid glands are composed of two different types of cells, the chief cells and the oxyphil cells. While the functions of the oxyphil cells are not completely understood, the chief cells, which are smaller and more numerous, control the secretion of parathyroid hormone (PTH) [2]. PTH has a key role in the regulation of calcium and phosphorus metabolism [3, 4]; it enhances the bone resorption, consequently releasing the calcium in the bloodstream, augments the formation of the active form of Vitamin D in the

kidneys, thereby promoting the absorption of calcium in the intestine and lastly, it decreases renal phosphate reabsorption [2, 4].

Parathyroid disorders include either hyperparathyroidism (increase of PTH secretion) or hypoparathyroidism (decrease of PTH secretion). They can induce various oral and/or extra-oral manifestations [5], accordingly, the dental practitioner must be aware of these findings to be able to correctly diagnose and treat the patient.

The aim of this article is to review the parathyroid disorders and their implications in dentistry.

2. Parathyroid disorders

2.1. Hyperparathyroidism

Hyperparathyroidism affects approximately 0.05 to 0.1% of the general population with an incidence of 1/400 in women and 1/1000 in men usually in their middle age [6]. It is classified into 3 types: a) primary, b) secondary, and c) tertiary.

Primary hyperparathyroidism is usually caused by an adenoma of the gland (85% of cases) leading to a PTH hypersecretion and consequently to hypercalcemia and hypophosphatemia [4, 5]. This condition is normally asymptomatic but it can result in bone disease, renal calculi, or neuromuscular symptoms [7].

Secondary hyperparathyroidism is generally due to increased quantities of hormones via stimulation of parathyroid glands in order to correct abnormally low levels of serum calcium in various conditions such as chronic kidney disease, intestinal malabsorption syndrome, decreased Vitamin D production [4, 5].

Tertiary hyperparathyroidism results from chronic secondary hyperparathyroidism.

Table 1 summarizes the typical signs and symptoms of hyperparathyroidism / hypercalcemia [7, 10-12].

| Organ | Signs and symptoms |
|------------------------|---|
| Kidney | Polydipsia, polyuria, kidney pain |
| Gastrointestinal tract | Anorexia, constipation, epigastric pain, nausea, vomiting |

| | |
|-----------------------|---|
| Cardiovascular system | Angina, dyspnea, palpitations, syncope |
| Neuromuscular system | Anxiety, confusion, depression, fatigue, forgetfulness, impaired vision, insomnia, lethargy, weakness |
| Skeleton | Joints and bones pain, fractures |

Table 1: Signs and symptoms of hyperparathyroidism / hypercalcemia

Diagnosis of primary hyperparathyroidism is based on presented signs and symptoms, an elevated PTH, and a high serum calcium level [7, 13]. In the secondary type of the disease, the serum calcium level can be low or normal [14].

2.2. Hypoparathyroidism

Hypoparathyroidism commonly occurs after surgery in the neck region leading to the glands' damage and it can also be caused by an autoimmune destruction of the glands or developmental defects [7, 8].

Table 2 summarizes the typical signs and symptoms of hypoparathyroidism / hypocalcemia [7, 9, 15-17].

| Organ | Symptoms |
|-----------------------|--|
| Cardiovascular system | Dyspnea, edema, palpitations, syncope |
| Neurologic system | Headache, impaired vision, neuropsychiatric symptoms |
| Neuromuscular system | Labial and perioral numbness, paresthesia of finger and/or toes, myalgia, muscular spasm, laryngospasm or bronchospasm |
| Ectodermal tissues | Alopecia, loss of axillaries and pubic hair, roughness of body hair, nails deformities... |

Table 2: Signs and symptoms of hypoparathyroidism / hypocalcemia

Diagnosis of hypoparathyroidism is based on existing signs and symptoms, low serum levels of calcium and PTH, and a high serum level of phosphorus.

3. Oral manifestations of parathyroid disorders

The most common oral manifestation associated with hyperparathyroidism is the brown tumor. This lesion develops in any of the three types of hyperparathyroidism and is characterized by an extensive bone resorption, which is replaced by fibrovascular tissue and giant cells with abundant hemorrhage and hemosiderin deposition [18]. In the oral cavity, it usually occurs at the level of the mandible, especially in the premolars and molars region; it is rare in the maxilla [4, 18]. Radiographically, it shows as well-defined uni- or multilocular radiolucencies with a widespread loss of the lamina dura and changes in the pattern of the trabecular bone of the jaw. Chronic lesions normally induce an important expansion of cortical bone, and roots resorption and displacement [4].

Table 3 summarized additional oral manifestations of hyperparathyroidism

| Oral manifestations of patients with hyperparathyroidism |
|---|
| <ul style="list-style-type: none"> - Brown tumor - Decrease in bone density - Teeth mobility and/or drifting - Indistinct pain of the jaw - Sensitive teeth - Soft tissue calcifications - Dental abnormalities (development defects, alterations in dental eruption...) - Obliteration of pulp chamber by pulp stone - Sialolithiasis |

Table 3: Oral manifestations of hyperparathyroidism

For hypoparathyroidism, the most common oral manifestations are enamel hypoplasia and delayed dental eruption. Additionally, oral chronic candidiasis, tongue and/or lips paresthesia and facial twitching can occur [8].

4. Dental management of patients with parathyroid disorders

Dental management of patients with parathyroid disorders does not necessitate any special consideration. However, some recommendations have been implemented in order to avoid any risk associated with these conditions.

As a matter of fact, it is essential to know that a high bone fracture risk exists in patients with hyperparathyroidism and consequently the practitioner must take into consideration specific precautions in surgical treatments. Moreover, it is mandatory to correctly diagnose a brown tumor and adequately treat it; in some cases, spontaneous regression of the lesion occurs after surgical treatment of the glands; however, in other cases the tumor does not regress and must be removed surgically [18, 19].

Furthermore, the dental practitioner must be aware of the susceptibility of the patients to caries because of dental abnormalities such as enamel hypoplasia [4].

5. Conclusion

Even though the majority of the oral manifestations occurring in patients with parathyroid disorders are not specific, the dental practitioner must be aware of these conditions, with emphasis on alerting signs along with clinical and radiological findings. In addition, a communication with the patient's physician for further medical investigation may be of crucial for the success of the treatment.

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