

Oral manifestations of thyroid disorders and its management

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ABSTRACT

The thyroid is the major regulator of metabolism and affects all of the bodily functions. Thyroid dysfunction is the second most common glandular disorder of the endocrine system which may rear its head in any system in the body including the mouth. The oral cavity is adversely affected by either an excess or deficiency of these hormones. Before treating a patient who has thyroid disorder, the endocrinologist needs to be familiar with the oral manifestations of thyroid dysfunctions. The patient with a thyroid dysfunction, as well as the patient taking medications for it, requires proper risk management before considering dental treatment by the dentist. Thus, communication of dentist with endocrinologist must be bidirectional, to maintain patient's oral and thyroid health.

Key words: Dental management, hyperthyroidism, hypothyroidism, oral manifestations

INTRODUCTION

The thyroid gland is a bilobular structure that lies on either side of the trachea. Thyroid dysfunction is the second most common glandular disorder of the endocrine system and is increasing, predominantly among women.^[1] Up to 5% of the female population has alterations in thyroid function,^[2,3] and up to 6% may have clinically detectable thyroid nodules on palpation.^[4] An estimated 15% of the general population has abnormalities of thyroid anatomy on physical examination, and an unknown percentage of these do not complete a diagnostic evaluation. It has been suggested that the number of people affected may be twice as many as the undetected cases.^[2] This means patients with undiagnosed hypothyroidism or hyperthyroidism are seen in the dental chair, where routine treatment has the potential to result in adverse outcomes.^[4]

The oral health care professional should be familiar with the oral and systemic manifestations of thyroid disease so he or she can identify any complication and assess the level to which the condition is controlled [Table 1]. If a suspicion of thyroid disease arises for an undiagnosed patient, all elective dental treatment should be put on hold until a complete medical evaluation is performed. Patients with history of thyroid diseases should be carefully evaluated to determine the level of medical management, and they

Table 1: Common oral manifestations of patients with thyroid gland disorders

Hypothyroidism	Hyperthyroidism
<ul style="list-style-type: none">• Salivary gland enlargement• Compromised periodontal health - delayed bone resorption• Macroglossia• Glossitis• Dysgeusia• Delayed dental eruption• Enamel hypoplasia in both dentitions, (being less intense in the permanent dentition)• Anterior open bite• Micrognathia• Thick lips• Mouth breathing	<ul style="list-style-type: none">• Increased susceptibility to caries• Increased susceptibility to periodontal disease• Enlargement of extraglandular thyroid tissue• Burning mouth syndrome• Accelerated dental eruption• Maxillary and mandibular osteoporosis• Development of connective tissue diseases like Sjogren's syndrome or Systemic lupus erythematosus

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should be treated in a way that limits stress and infection. Consultation with the patient's primary care physician or an endocrinologist is warranted if any sign or symptom of thyroid disease is noted on examination. If an emergent dental procedure is needed in the initial weeks of thyroid treatment, close work-up with the endocrinologist is needed.

HYPOTHYROIDISM

Hypothyroidism is defined by a decrease in thyroid hormone production and thyroid gland function. It is caused by, chronic thyroiditis (Hashimoto's disease), radioactive iodine, surgery and pharmacological agents such as lithium and amiodarone. Insufficient levels of thyroid hormone cause symptoms such as slower metabolic rate, weight gain, lethargy, intolerance to cold, dry and cool skin, and puffiness of the face and eyelids, as well as others. The blood pressure appears to be normal, but the heart rate is slow.

Oral manifestations of hypothyroidism

Childhood hypothyroidism known as cretinism is characterized by thick lips, large protruding tongue (macroglossia), malocclusion and delayed eruption of teeth. Thickening of the lips and macroglossia is due to increased accumulation of subcutaneous mucopolysaccharides i.e., glycosaminoglycans due to decrease in the degradation of these substances. The long-term effects of severe hypothyroidism on craniofacial growth and dental development have also included impaction of the mandibular second molars. This seems to be caused by a dissociation of ramus growth and failure of normal resorption of the internal aspect of the ramus, resulting in insufficient space for proper eruption of these teeth.^[5]

The common oral findings in hypothyroidism include the characteristic macroglossia, dysgeusia, delayed eruption, poor periodontal health, altered tooth morphology and delayed wound healing.^[6] Before treating a patient who has a history of thyroid disease, the dentist should obtain the correct diagnosis and etiology for the thyroid disorder, as well as past medical complications and medical therapy.

HYPERTHYROIDISM

Hyperthyroidism is a condition caused by unregulated production of thyroid hormones. It is characterized by tremor, emotional instability, intolerance to heat, sinus tachycardia, marked chronotropic and ionotropic effects, increased cardiac output (increased susceptibility to congestive heart failure), systolic heart murmur, hypertension, increased appetite and weight loss.^[7]

Oral manifestations of hyperthyroidism

The oral manifestations of thyrotoxicosis, includes increased susceptibility to caries, periodontal disease, enlargement of extraglandular thyroid tissue (mainly in the lateral posterior tongue), maxillary or mandibular osteoporosis, accelerated dental eruption^[8] and burning mouth syndrome.

Burning mouth syndrome, a condition that causes a burning pain in the mouth, and Sjogren's syndrome, a condition that causes dry mouth, are more common in people with thyroid disease.^[4]

In Graves disease, on extra-oral examination the thyroid may be enlarged or noticeably palpable. The enlarged gland may be more visually noticeable when the patient is in a supine position in the dental chair. But in more severely enlarged thyroids, the bulge in the neck is noticeable even when the patient is sitting upright or standing.

ROLE OF ENDOCRINOLOGIST

Physicians who treat children and adults with thyroid disorders could be a good referral source of patients whose oral health care needs may not be satisfied adequately. Thus, treating patients with thyroid disorders also represents an opportunity to expand a dentist's referral base.

Regular communication of dentist with endocrinologist is a critical component of safe and optimal treatment of thyroid patients. Communication must be bidirectional. The endocrinologist must be apprised of oral manifestations of the disease, and dentists must be updated on thyroid control medications to help them to maintain patient's oral health.

ROLE OF DENTIST

Obtaining an understanding of thyroid dysfunction is of significant importance to the dentist for two reasons. First, the dentist may be the first to suspect a serious thyroid disorder and aid in early diagnosis. Thus, as part of a health care team, the dentist plays an important role in detecting thyroid abnormalities. The second reason is to avoid possible dental complications resulting from treating patients with the thyroid disorders. Modifications of dental care must be considered when treating patients who have thyroid disease.

One way the dental professional can protect the thyroid gland is to use a thyroid collar while taking patient X-rays. The thyroid is extremely sensitive to radiation, and excessive radiation exposure is a known risk factor for various thyroid conditions.

Patients who have thyroid disease present a treatment challenge to dentists. Awareness of the condition and current stage of treatment is important in understanding the possible modifications needed for dental treatment. Length and current state of therapy are important in understanding the metabolic control of patients. The main complications of patients with hyperthyroidism and hypothyroidism are associated with cardiac comorbidity. Consultation with the patient's primary care physician or an endocrinologist is warranted if any sign or symptom of thyroid disease is noted on examination.

Stress reduction, awareness of drug side effects or interactions, and vigilance for appearance of signs or symptoms of hormone toxicity are among the responsibilities of the oral health care provider. Dental professionals have a responsibility to be aware of the different dimensions of the disease and treatment that could affect a patient whose medical history reflect thyroid problems.

Many signs and symptoms of thyroid disease are observable during examination of the orofacial complex. Furthermore under or over activity of the thyroid gland can cause life-threatening cardiac events. Consequently, the dental practitioner must be knowledgeable about thyroid pathophysiology and the treatment of thyroid conditions. Dental treatment modification may be necessary for dental patients under medical management and follow-up for a thyroid condition. If a suspicion of thyroid disease arises for an undiagnosed patient, all elective dental treatment should be postponed until a complete medical evaluation is performed.^[4] A medically well-controlled patient will have no contraindications to have dental treatment.^[9]

DENTAL MANAGEMENT OF HYPOTHYROIDISM

Hemostasis - Patients with long standing hypothyroidism may have increased subcutaneous mucopolysaccharides due to decrease in the degradation of these substances. The presence of excess subcutaneous mucopolysaccharides may decrease the ability of small blood vessels to constrict when cut and may result in increased bleeding from infiltrated tissues, including mucosa and skin. Local pressure for an extended time will probably control the bleeding from the small vessels adequately.^[10]

Susceptibility to infection - Patient with hypothyroidism may have delayed wound healing due to decreased metabolic activity in fibroblasts. Delayed wound healing may be associated with an increased risk for infection because of the longer exposure of the unhealed tissue to pathogenic organisms. Hypothyroid patients are not considered to be

immunocompromised.

Patients who have hypothyroidism are susceptible to cardiovascular disease from arteriosclerosis and elevated LDL. Before treating such patients, consult with their primary care providers who can provide information on their cardiovascular statuses. Patients who have atrial fibrillation can be on anticoagulation therapy and might require antibiotic prophylaxis before invasive procedures, depending on the severity of the arrhythmia.^[11] If valvular pathology is present, the need for antibiotic prophylaxis must be assessed.

Drug actions and interactions - Patients who have hypothyroidism are sensitive to central nervous system depressants and barbiturates, so these medications should be used sparingly.^[6,12]

It has been found that recent exposure to a surgical antiseptic that includes iodine (such as Povidone) can increase the risk of thyroiditis or hypothyroidism. Patients with underlying thyroid antibodies and a tendency toward autoimmunity appear to be at more risk.^[13]

Drug interactions of l-thyroxine include increased metabolism due to phenytoin, rifampicin and carbamazepine, as well as impaired absorption with iron sulfate, sucralfate and aluminum hydroxide. When l-thyroxine is used, it increases the effects of warfarin sodium and, because of its gluconeogenic effects; the use of oral hypoglycemic agents must be increased. Concomitant use of tricyclic antidepressants elevates l-thyroxine levels.^[14] Appropriate coagulation tests should be available when the patient is taking an oral anticoagulant and thyroid hormone replacement therapy.

DENTAL MANAGEMENT OF HYPERTHYROIDISM

Hemostasis - Patients with hyperthyroidism may have elevated blood pressure and heart rate on the basis of the effects of thyroid hormone on sympathetic nervous system activity. Patients with high arteriolar pressures may require increased attention and a longer duration of local pressure to stop bleeding. Hyperthyroid patients who are on warfarin sodium have increased metabolism of this drug, leading to alteration in previously therapeutic coagulation indices.^[10]

Anti-thyroid drugs namely propylthiouracil (PTU) has anti-vitamin K activity and can cause hypoprothrombinemia and bleeding that poses a risk for hemorrhage. Thus, patients taking PTU must be carefully evaluated before surgery or invasive dental treatment.^[4]

Susceptibility to infection - Thionamides may cause a very rare reaction of agranulocytosis (0.5% of patients) that can result in oral infections and inadequate wound healing. These post-operative complications could be prevented if clinicians carefully follow precautions stated with thionamides.

Drug actions and interactions – Combination analgesics containing acetylsalicylic acid (ASA) are contraindicated in patient with hyperthyroidism because ASA interferes with the protein binding of T_4 and T_3 , thereby increasing their free form. This may worsen the symptoms of thyrotoxicosis.^[15]

NSAIDs should also be used with caution in the patients who have hyperthyroidism and who take β -blockers, as the former can decrease the efficiency of the latter.^[16] Pain, however, can complicate cardiac functions in patient who have hyperthyroidism and symptomatic disease, and alternative pain medications need to be instituted.^[4]

Patients who have hyperthyroidism have increased levels of anxiety, and stress or surgery can trigger a thyrotoxic crisis. Epinephrine is contraindicated, and elective dental care should be deferred for patients who have hyperthyroidism and exhibit signs or symptoms of thyrotoxicosis.^[17]

Fluoride was used as a drug to treat hyperthyroidism because it reduces thyroid activity quite effectively. This is due to the ability of fluoride to mimic the action of thyrotropin (TSH). Excess fluoride correlates with the other thyroid-related issues such as iodine deficiency. Fluorine and iodine, both being members of the halogen group of atoms, have an antagonistic relationship. When there is excess of fluoride in the body it can interfere with the function of the thyroid gland. Thus, fluoride has been linked to thyroid problems. Patient who wish to avoid the effect of fluoride on their thyroid can utilize fluoride free toothpaste such as Carifree, an oral neutralizer gel.^[18]

CONCLUSIONS

Dental treatment modifications may be necessary for dental patients who are under medical management and follow-up for a thyroid condition even if there are no comorbid conditions. Stress reduction, awareness of drug side effects or interactions, and vigilance for appearance of signs or symptoms of hormone toxicity are among the

responsibilities of the oral health care provider.

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