CASE REPORT

Undetected hypothyroidism: A rare dental diagnosis

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ABSTRACT

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 thyroid hormone. Childhood hypothyroidism known as cretinism is characterized by thick lips, large protruding tongue (macroglossia), malocclusion and delayed eruption of teeth. Neonatal screening for congenital hypothyroidism is not performed in all countries and not every affected patient might be determined by neonatal screening alone. The dentist by detecting the early signs and symptoms of hypothyroidism can refer the patient for medical diagnosis and treatment and avoid potential complications of treating patients with uncontrolled disease. Herein, we present a case of undetected hypothyroidism in a 13-year-old female patient based on dental features by oral medicine specialists.

Key words: Childhood hypothyroidism, dental anomalies, dental diagnosis, oral manifestations

INTRODUCTION

The endocrine system is responsible for hormonal secretion and is closely related to the central nervous system, as it diversifies its functions through the hypothalamus and pituitary.[1] The thyroid gland is a bilobular structure that lies on either side of the trachea.[2-4] Thyroid activity is controlled by the hypothalamic-pituitary-thyroid axis.[4,5] Thyroid-releasing hormone (TRH), secreted by the hypothalamus, induces the secretion of thyroid-stimulating hormone (TSH) by the anterior pituitary, which in turn stimulates thyroid hormone synthesis and secretion by the thyroid gland.[4]

Thyroid dysfunction is the second most common glandular disorder of the endocrine system (after diabetes mellitus) and is increasing, predominantly among women.[2,3,5-7] An estimated 15% of the general population have abnormalities of thyroid anatomy on physical examination and an unknown percentage of these do not complete a diagnostic evaluation.[2,3,6] It has been suggested that the number of people affected may be twice as many as the undetected cases. This explains that the patients with undiagnosed hypothyroidism or hyperthyroidism can be seen on the dental chair, where routine treatment has the potential to result in adverse outcomes.[2,6]

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Hypothyroidism is defined by a decrease in thyroid hormone production and thyroid gland function.[1,2,6] Hypothyroidism can occur as a congenital or acquired condition.[1,8,9] Neonatal screening programs in many areas of the world show that hypothyroidism is present in 1 of every 4000 newborns.[8,10] The incidence of hypothyroidism is 10 times higher than average in iodine-deficient areas.[8]

The hypothyroidism can be divided into 3 main categories:

- Primary hypothyroidism due to permanent loss or atrophy of thyroid tissue
- Goitrous hypothyroidism (hypothyroidism with compensatory thyroid enlargement due to impairment of hormone synthesis); and
- Secondary hypothyroidism due to insufficient stimulation of a normal gland (hypothalamic or pituitary disease or defects in the TSH molecule).[6,8]

Primary and goitrous hypothyroidism patients account for 95% of all cases. Most infants with permanent congenital hypothyroidism have thyroid dysgenesis: ectopic, hypoplastic or thyroid agenesis. The acquired form may follow thyroid gland or pituitary gland failure.[8] Radiation of the thyroid gland (radioactive iodine), surgical removal and excessive anti-thyroid drug therapy are responsible for the majority of these cases of acquired hypothyroidism.[2,8]

Subclinical hypothyroidism is a common, well-defined condition that often progresses to overt disease.[8] Insufficient levels of thyroid hormone cause symptoms such as slower metabolic rate; weight gain; lethargy; intolerance to cold, dry and cool skin; puffiness of the face and eyelids.[2,7,11] The blood pressure appears to be normal, but the heart rate is slow.[2,3] Classification (cretinism against myxedema) by age of onset is also important, because the clinical presentations will vary substantially.[4] Childhood hypothyroidism known as cretinism is characterized by thick lips, large protruding tongue (macroglossia), malocclusion and delayed eruption of teeth.[2]

Neonatal cretinism is characterized by dwarfism; overweight; a broad, flat nose; wide-set eyes; thick lips; a large, protruding tongue; poor muscle tone; pale skin; stubby hands; retarded bone age; delayed eruption of teeth; malocclusions; a hoarse cry; an umbilical hernia; mental retardation.[1,8,9] All of these characteristics can be avoided with early detection and treatment.[8]

However, the most common reason for a delayed diagnosis of congenital hypothyroidism is the fact that in many countries, like in our country (India), neonatal screening is not established yet.[10] Considering the high incidence of congenital hypothyroidism, availability of low cost therapy and a robust screening test like TSH, it is highly desirable to start a screening program nationwide to prevent the most preventable cause of mental sub-normality.[12] Congenital hypothyroidism is such an important Public Preventive Program of International significance and the whole world is looking at India as to why they are not conducting the screening test, still as a country?[13] Therefore, 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.[2] On the other hand, the dentist by detecting the early signs and symptoms of hypothyroidism can refer the patient for medical diagnosis and treatment and avoid potential complications of treating patients with uncontrolled disease.[8]

Here, we are presenting a case of dental diagnosis of undetected hypothyroidism in a 13- year-old female patient by oral medicine specialists.

CASE REPORT

A 13-year-old female patient came to the out-patient Department of Oral Medicine and Radiology with chief complaint of malaligned teeth. The girl was the first child of non-consanguineous healthy parents. Prenatal and post-natal histories were insignificant. She was overweight and of short stature [Figure 1]. She gained abnormal weight after 9 years of age. She was having hoarseness of voice. Extraoral examination revealed that she had dry and cool skin; stubby hands [Figure 2]; poor muscle tone; puffy face [Figure 3]; a broad, flat nose and thick lips [Figures 3 and 4].

Intraoral examination revealed a large, protruding tongue (macroglossia) [Figure 4]; delayed shedding of deciduous teeth; delayed eruption of permanent teeth and malocclusion. There were over-retained deciduous canine, first and second molars in all four quadrants of the jaw. Regarding permanent teeth, only central and lateral incisors and first molars were erupted in all four quadrants. Malocclusion was evident as spacing between maxillary and mandibular central incisors [Figure 4]. Radiographic examination confirmed over-retained deciduous and unerupted permanent teeth (i.e. retarded dental age in PA skull) [Figure 5] and retarded bone age (in PA skull and hand-wrist radiographs) [Figure 5 and 6].

The provisional diagnosis of hypothyroidism was made and accordingly hormonal assay was advised. The T3 and T4 levels were found to be decreased (0.07 ng/ml and 0.6 µg/dl, respectively) and TSH was increased (153.46 mU/ml). Thus, diagnosis of primary hypothyroidism was confirmed. Patient's parents were informed about her systemic condition that required immediate attention rather than oral condition and patient was referred to the endocrinologist. Patient was prescribed thyroxine sodium tablets (thyronorm) 50 µg two times a day. After five months of treatment, the patient's T3, T4 and TSH levels improved (0.86 ng/ml, 5.6 µg/dl and 14.60 mU/ml respectively). Patient lost weight [Figures 7 and 8] and her facial appearance [Figure 7] and stubby hands also improved [Figure 8]. Patient was to be evaluated every six months for hormone levels, but being young, she had to be on the same dosage of medication for long. Following a thorough oral and periodontal examination, a treatment plan was developed that included oral hygiene instructions, mechanical debridement and orthodontic correction.

DISCUSSION

Up to 5% of the female population have alterations in the tshyroid function.[2] In some of these cases, hypothyroidism develops and others hyperthyroidism results. Hypothyroidism occurs in about 1% to 2% of the general population.[8] It is 5 to 6 times more common than hyperthyroidism.[8,11] It is caused by chronic autoimmune thyroiditis (Hashimoto's disease), radioactive iodine, surgery and pharmacological agents such as lithium and amiodarone.[2,3,6,8] However, some cases appear with no identifiable cause as in our case.[2,8]

Babies who are born with underactive thyroid function have a disorder known as congenital hypothyroidism.[10] Congenital hypothyroidism occurs with an incidence of 1:3000-4000.[4,5,10] But in our country (India), the incidence is still higher (nearly 1:1000).[10,13] The usual cause of this condition is the failure of the thyroid gland to develop during gestation.[10] At birth,

Figure 1: Overweight, short-stature patient

Figure 2: Stubby hands of the patient

Figure 3: Puffy face; a broad, flat nose and thick lips

Figure 4: Thick lips, macroglossia and spacing between incisors

Figure 5: Photograph of PA skull radiograph showing over-retained deciduous and unerupted permanent teeth

Figure 6: Photograph of hand-wrist radiograph showing retarded bone age

the infants look normal and then slowly over period of weeks, the clinical features of hypothyroidism appear.[4,10] However, in our case the patient gained abnormal weight after 9 years of age and it was diagnosed to be primary hypothyroidism. The accumulation of subcutaneous fluid (intracellularly and extracellularly) is usually more pronounced in patients with primary (thyroid) hypothyroidism than in those with pituitary (suprathyroid) hypothyroidism.[8]

Figure 7: Five month post-treatment photograph showing loss of excessive weight and puffy face

Figure 8: Five month post-treatment photograph showing improvement in stubby hands

Congenital hypothyroidism is characterized by dwarfism, overweight, a broad, flat nose, wide set eyes, thick lips, a large, protruding tongue, poor muscle tone, pale skin, stubby hands, retarded bone age, delayed eruption of teeth, malocclusions, a hoarse cry, an umbilical hernia and mental retardation.[2,4,8,10] Most of these features were present in our patient. Thickening of the lips and macroglossia is due to increased accumulation of subcutaneous mucopolysaccharides i.e., glycosaminoglycans because of 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 as was present in our patient. 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.[2]

Replacement therapy with thyroxine (levothyroxine sodium) is the standard approach for the treatment of hypothyroidism.[6,9,10,11] Thyroxin (T4) is converted to the more metabolically active triiodothyronine (T3) in the peripheral tissues. This returns patients to a biochemical euthyroid state, with normal levels of TSH concentration and serum-free T4 (FT4).[11] Once the euthyroid state is achieved, the patient's TSH and FT4 levels are followed for periods of six months to one year.[6,10] In our patient, improvement in levels of T3, T4 and TSH was noted within 5 months of treatment with thyroxine.

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.[2] 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.[2,6] Once the hypothyroid patient is under good medical care, no special problems are presented in terms of dental management, except for dealing with the malocclusion and enlarged tongue if present.[10] Our patient had come with chief complaint of malaligned teeth, but suspecting hypothyroidism, we first referred her to the endocrinologist and once the thyroid disease was under control, we planned our dental treatment.

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 diseases of thyroid gland. As the thyroid is extremely sensitive to radiation, one way the dental professional can protect the thyroid gland is to use a thyroid collar while taking patient X-rays. Patients with history of thyroid diseases should be carefully evaluated to determine the level of medical management and they should be treated in a way that limits stress and infection. If an emergency dental procedure is needed in the initial weeks of thyroid treatment, close workup with the endocrinologist is needed.[2] Regular communication of the dentist with the endocrinologist is a critical component of safe and optimal treatment of thyroid patients. 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. The endocrinologist must be aware of oral manifestations of the disease and dentists must be updated on thyroid control medications to help them to maintain patient's oral health.[2]

CONCLUSION

The dentist may be the first to detect early signs and symptoms of thyroid disorders. 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. In some cases, this may be life saving, whereas in other cases, the quality of life can be improved and complications of certain thyroid disorders be avoided. Before treating a patient who has any thyroid disorder, the endocrinologist also needs to be familiar with the oral manifestations of thyroid dysfunctions.

Thus, communication of the dentist with the endocrinologist must be bidirectional, to maintain patient's oral and thyroid health.

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