

Halitosis due to Hypothyroidism of Unknown Cause: Two Case Reports

Nedeni Bilinmeyen Hipotiroidizme Bağlı Ağız Kokusu: İki Vaka Çalışması

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ABSTRACT

Halitosis is a frequent complaint which is estimated to be around 50%-60% of the general population and that carries serious personal and social repercussions. It is estimated that 10%-13% of halitosis causes are extraoral etiology. It originates from the tongue dorsum in patients with a healthy periodontium and good oral hygiene. Most of the causes of halitosis are intraoral origin although many other extraoral systemic etiologies are known. Overt hypothyroidism as a cause of halitosis has never been described in medical literature before. We strongly suggest that hypothyroidism induced hyposalivation gives rise to bacterial overgrowth and eventually halitosis. Two cases with moderate halitosis and overt hypothyroidism who were treated only with thyroxine until achieving euthyroidism are presented in this article. They were both completely recovered from halitosis after 45-50 days and had no complaints after 8 months.

Key words: Hypothyroidism, halitosis, diagnosis

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ÖZET

Ağız kokusu, genel popülasyonun yaklaşık %50-60'ında olduğu tahmin edilen, ciddi kişisel ve sosyal yansımaları olan, sık görülen bir şikayettir. Ağız kokusu nedenlerinin %10-13'ünün ağız dışı etiyoloji olduğu tahmin edilmektedir. Sağlıklı bir periodonsiyuma ve iyi ağız hijyenine sahip hastalarda genellikle dil dorsumundan kaynaklanır. Ağız dışı birçok sistemik etiyoloji bilinmesine rağmen, ağız kokusu nedenlerinin çoğu ağız içi kaynaklıdır. Ağız kokusu nedeni olarak hipotiroidi daha önce tıbbi literatürde tanımlanmamıştır. Hipotiroidizmin neden olduğu hiposalivasyonun bakteriyel aşırı çoğalmaya ve nihayetinde ağız kokusuna yol açtığını düşünmekteyiz. Bu yazıda ötiroidiye ulaşıncaya kadar sadece tiroksin ile tedavi edilen orta derecede ağız kokusu ve aşikar hipotiroidisi olan iki olgu sunulmuştur. Her ikisi de 45-50 gün sonra ağız kokusundan tamamen kurtuldu ve 8 ay sonra hiçbir şikayeti olmadı.

Anahtar Sözcükler: Hipotiroidizm, halitosis, tanı

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INTRODUCTION

Halitosis describes unpleasant, bad breath (1). Halitosis is caused by volatile molecules formed by pathological and non-pathological causes. These volatile components are; sulfur compounds, aromatic compounds, nitrogen-containing compounds, amines, short-chain fatty acids, alcohols, phenyl compounds, aliphatic compounds and ketones (2). In 2003, the International Society for Breath Odor Research classified halitosis and this classification is still used today. According to this classification, halitosis is divided into three main groups; (i) True Halitosis, (ii) Pseudo Halitosis, and (iii) Halitophobia (3).

Studies have reported that halitosis is found in 15-35% of adults and 14.5-40.9% of children (4). There is less information about halitosis in children when compared with adult population (5). Today, many measurement techniques are used to evaluate the level of halitosis, but there is no ideal method yet (6,7). Questionnaires, organoleptic tests, volatile sulfur compounds monitors, chemical and enzymatic tests are the most frequently used methods in research. Questionnaires mostly determine the prevalence of halitosis in the population and factors associated with daily habits, and are frequently used in epidemiological and clinical research because they are simpler to administer and do not require special equipment (8). The etiology of halitosis can be examined in three main groups. 1. Halitosis due to exogenous causes; 2. Halitosis due to endogenous causes 3. Psychogenic (9). Halitosis caused by exogenous causes is temporary and is usually related with the food ingested. Endogenous causes are; consists of oral and extraoral causes. Extraoral aetiologies are consisted with respiratory and gastrointestinal systems (9).

Table 1. Laboratory Findings of the Case 1

Tests	Results	Normal Ranges
S-thyroid stimulating hormone	100 micro IU/ml <	0.47-5.01
Free thyroxine	0.60 ng/ml	0.75-1.85
Free triiodothyronine	1.55 pg/ml	1.68-3.54
Anti-thyroglobulin	50 IU/ml	0.00-2.00
Anti-thyroid peroxidase	140 IU/ml	0.00-7.00
Testesteron	4.5 ng/ml	3.00-10.00
Luteinizing hormone	5.2 m IU/ml	2.00-12.00
Follicle stimulating hormone	6.3 m IU/ml	1.00-2.00
Cortisol	20 µg/dl	5.00-25.00
Sodium	138 mmol/L	136-145
Potassium	4.0 mmol/L	3.5-5.00

Table 2. Laboratory Findings of the Case 2

Tests	Results	Normal Ranges
S-thyroid stimulating hormone	100 micro IU/ml <	0.47-5.01
Free thyroxine	0.68 ng/ml	0.75-1.85
Free triiodothyronine	1.40 pg/ml	1.68-3.54
Anti-microsomal antibody	80 IU/ml	0.00-50.00
Anti-thyroglobulin antibody	100.00 IU/ml	0.00-2.00

DISCUSSION

Halitosis is a frequent complaint which is estimated to be around 50-60% of the general population and that carries serious personal and social repercussions. It is estimated that 10-13% of halitosis cases are extraoral etiology (10). In fact most adults waking up in the morning have socially unacceptable bad breath. This problem is transitory and attributed to physiologic causes such as reduced saliva flow during sleep (11). 90 % breath odour problems emanate from oral cavity (1). Periodontal diseases such as acute necrotizing ulcerative gingivitis, severe periodontitis pericoronitis, and other oral infections are the most aetiologies. There are lots of the extraoral etiologies such as acute or chronic sinusitis and nasal passage problems; acute or chronic follicular tonsillitis; metabolic causes (diabetic ketosidosis); liver diseases; renal diseases; anaerobic pulmonary infections and abscesses; various carcinoma and gastrointestinal diseases (12).

CASE REPORT

A 15 years old boy whose clinical findings were halitosis, cold intolerance, lethargy, cramping of muscles, periorbital puffiness, dry hair and skin, pale skin, short stature (144 cm). He suffered from persistent, severe halitosis only, was found to be *Helicobacter pylori* positive and received triple therapy with claritromycin, lansoprazole and metranidazole. After eradication of *Helicobacter pylori*, halitosis disappeared. But after one month he again suffered from halitosis. He was treated again with the same regiment successfully. We examined this bored and desperated boy in our clinic after having three consecutive triple therapy and relaps of halitosis, for the first time. Laboratory results verified the diagnosis of hypothyroidism (Table 1). He received only levothyroxin 25 micro g/day initially. The Daily dose was increased by 25 µg/day at 2 weeks intervals until euthyroidism achieved. After four–five days, s-TSH was 0.978 IU/ml and he had no halitosis anymore and was completely halitosis free after eight months follow up.

A 24 years old man with symptoms of dry mouth and halitosis applied to our clinic. The clinical findings were halitosis, weight gain, dry hair and skin, periorbital puffiness, cold intolerance and lethargy. Laboratory findings of the patient was S-TSH was 100 micro IU/ml <; Free thyroxine was 0.68 ng/ml; Free triiodothyronine was 1.40 pg/ml; Anti-microsomal antibody was 80 IU/ml; Anti-thyroglobulin antibody was 100.00 IU/ml (Table 2). He completely recovered from halitosis after 50 days with thyroid replacement dose of 125 µg/day when euthyroidism achieved, and never relaps again after eight months follow up.

Hypothyroidism was found to be associated with low saliva flow rate (13). Administration of triiodothyronine to thyroidectomized rats increased the density of beta-adrenergic receptors in rat submaxillary gland without significantly changing the density of muscarinic cholinergic receptors. Thyroid hormone appears to regulate beta-adrenergic sensitivity in the rat salivary gland (14). Thyroid dysfunction can diminish normal salivation rate. Submandibular glands are target organs of thyroid hormones and enlarged salivary glands are common in patients with hypothyroidism but this finding is not widely appreciated (15). Hypotiroidism has an effect on submandibular gland and this effect occurs mostly in two major exocrine compartments reducing granular duct and serous acinus volume (16). Thyroxine may cause an increase in the concentration of protein, total calcium and potassium in the saliva. Thyroidectomy may produce a decrease sensitivity to isoproterenol stimulation of the submandibular gland and a diminished density of beta adreceptors giving rise to hyposalivation (17).

There is a good agreement of saliva T4 values with the functional state of the thyroid (18). Assuming that half of the hypothyroid patients have halitosis and considering the estimation about the incidence of extraoral cause (5-10%) in a population (10). We propose that there may be many undiagnosed patients with halitosis and hypothyroidism.

In our cases; both patients were examined by their dentists and otolaryngologist and were found to be normal. No oral or extraoral aetiology were found. Their common and unique problem 'halitosis' were proved by organoleptic measurements. Hypothyroidism may cause halitosis which can easily treated if diagnosed. Additional clinical studies have to be done in order to clear out the relation between halitosis-hypothyroidism and salivary glands and to find out the prevalence of halitosis in hypothyroidism.

CONCLUSION

Hypothyroidism has an effect on salivary glands and this effect occurs mostly in two major exocrine compartments reducing granular duct and serious acinus volume in addition it diminishes the density of beta adrenoceptors leading to hyposalivation. Saliva content is effected by hypothyroidism. These pathophysiological changes are responsible for the dysfunction of salivary glands known as an inability in controlling gram negative anaerobes bacteria overgrowth which give rise to the producing of volatile sulphur compounds. Volatile sulphur compounds and other odorous components lead to halitosis. Hypothyroidism is a very prevalent disease and may occupy a significant place when treating halitosis in the future.

Conflict of interest

No conflict of interest was declared by the authors.

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