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# Relation of Obesity and Hypothyroidism: A Case Report

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**Abstract:** Obesity, as a health problem is characterized by increased adipose tissue. There is several genetical and environmental reasons for increased adipose tissue. However, various pathological processes seem coincident with obesity or they are results of obesity. One of these pathological process is hypothyroidism. This case was presented to give attention to obesity and hypothyroidi coincidence.
**Keywords:** Hypothyroidi, obesity, treatment.

## INTRODUCTION

Obesity is a health problem that characterised with increased fatty tissue in the body [1]. Also body mass index (BMI) between 30 – 30,9 defines as obesity and BMI above 40 defines as morbid obesity. Prevalance of obesity is increasing markedly for several years. It is reported that one third of adults who between 20- 70 years of age are obese in the United States of America. Prevalance of obesity progressively increases between 20- 50 years of age. However its prevalance decreases 60-70 years of age [2,3,4].

Also; hypothyroidi is one of disorders that family physicians are commonly encountered with in primary care. The National Health and Nutrition Examination Survey showed that one 300th person in United States of America (USA) suffered from hypothyroidism [5,6]. A multicentre and etiologic study that conducted in India, reported that prevalance of hypothyroidism was 10.95% and also prevalance of subclinic hypothyroidism was 8.02% among adults [7].

Various studies show relation between subclinic hypothyroidism or elevated thyroid stimulating hormone (TSH) levels and obesity. This relation, not only showed on adults, also was detected in several studis in a large proportion of obese children, with elevated TSH levels [8,9,10]. However; Oh et al. detected that there is a relationship between elevated TSH levels and metabolic syndrome [11]. This case was presented to take attention to the relation between obesity and hypothyroidi or elevated TSH levels.

## CASE REPORT:

Sixty three years old women was referred to obesity outpatient clinic. She requested help for loosing weight. She said, she had been gaining 8 kg within 3 years. She had no history of smoking and drinking alcohol. But; she mentioned about an irregular dietary regime and she had nervous personality. There was hypothyroidi and using levothyroxin medication in her medical history. Moreover, she wasn't using her drug (levothyroxin) regularly. Additionally she said that when she was using her drug for some months regularly she could loose weight.

In physical examination; her height was 150 cm, weight was 83.2 kg, weist circumference was 113 cm, body mass index (BMI) was 36.9 and blood pressure was systolic 110 mmHg and diastolic 70 mmHg. Examiation of other body systems was normal.

Fasting blood glucose was 107 mg/dL, total cholesterole was 230 mg/dL, low density lypoprotein (LDL) 144 mg/dL, triglyceride 175 mg/dL, high density lypoprotein (HDL) 51 mg/dL and TSH level was 6.73 IU/mL in her laboratory tests. Other biochemical parameters, complete blood count, urine analyses were in normal range. Electrocardiography was in normal sinus rythm.

Dietary regime (1400 kcal/day) and exercise suggestions had given and refferring to endocrinology outpatient clinic and reorganization of levothyroxin treatment and using her drug regularly had suggested to her. After 15 days from first visit she came to second visit and her weight was 82,5. When she was referred outpatient clinic after 1,5 months from her first visit; her weight was measured as 81,7 kg. Thus; she lost 1500 gr within 1,5 months. Also her TSH level was 1.56 IU/mL in this 3th visit. In her continuing visit her weight was 82,5 kg and she gained 700 gr weight. Also

TSH level was elevated and it detected as 43.2 IU/mL. Diet and exercise suggestions had reminded to her and dose of levothyroxin elevated to 50 mcg. After a month she referred for following visit. Her weight was 82 kg and she lost 500 gr. In this visit, her TSH level reduced again and it was 7.38 IU/mL. Her follow up still continuing.

## DISCUSSION

There are several studies about effects of thyroid functions and TSH levels on obesity but there is no concensus on this relation yet. However it is a common opinion that there is relation between hypothyroidism and obesity. When anamnesis of the case considered, it can be seen that she had gained 8 kg weight when hypothyroidism occured. However Altunoglu et al. reports that in their study in 2007, there is no significant relation between thyroid hormone levels and obesity [12]. But in 2009 Karakurt and his collegues showed that obesity is related with TSH level and this relation is independent from thyroid functions. So they reported that TSH level is an independent risk factor of obesity from thyroid functions [13]. However; it is known that, elevated TSH level is decreasing the resting energy expenditure. So if person who have elevated TSH level don't reduce her/him food and calori intake, this condition will result with gaining weight in long term [12,14]. So it can be said that, TSH resistance have occured on obese patients like insulin resistance [12,15]. In Michalaki et al. study, they reported that there is significant relation between TSH level and fasting insulin level and insulin level. But in their study they found no significant relation between TSH level and leptin level, BMI or mass of fat tissue. On the other hand; in the same study they reported that subclinic and clinic hypothyroidism is more frequent in patients with morbid obesity and FT3, FT4 and TSH levels are higher in patients who have morbid obesity [16]. Kok et al conducted a study on 11 premenapausal and obese women and they showed their TSH levels reduced significantly when these patient lost weight result from limiting calori intake. Nevertheless; according to Kok et al. leptin may has role on reduced TSH level [17]. In one study conducted on obese-hyperthyroidic patients and obese-hypothyroidic patients reported that there is correlation between leptin level and TSH level for euthyroid cases and both leptin level and TSH level shows positive correlation with amount of adipose tissue. In the same study significantly increased leptin levels detected on both hypothroidic patients and obese but euthhyroidic patients. It is reported that leptin levels reduced when hypothyroidism treated so according to this study hypothyroidism is a cause of elevated leptin levels reversibly [18].

A study that conducted on patients who have elevated TSH levels and normal TSH levels showed that central obesity is significantly more frequent on patient group who have elevated TSH levels [11]. Grandone and her collegues conducted a study on 938 patients about childhood obesity and they reported In all the 938 patients there was positive correlation between baseline TSH and BMI z-score and between fT3 and BMI z-score, adjusted for age, gender and pubertal stage [8].

In a study for subclinic hypothyroidism prevalance on morbid obese patients and results of surgical treatment of obesity by Roux- en- Y Gastric ByPass showed that obesity is related with elevated TSH levels and after surgical treatment of obesity TSH levels reduced for all subclinic hypothyroidism cases. But this effect of surgical treatment independent from reduced BMI. So researcher reported that additional benefit of loosing weight is recovery of subclinic hypothyroidi and surgical treatment of obesity may be beneficial for obese patients who have subclinic hypothyroidism [19].

## CONCLUSION

As a result; there is no concensus on relation of hypothyroidism and obesity but these two condition accompanying to each other frequently. Regulation of TSH levels on obese patient may make a contribution to reducing amount of adipose tissue or obesity improvement can be prevented on hypothyroidic patients by reducing their daily calori intake. Obesity and elevated TSH level or subclinic hypothyroidi may have a relation. Additionally TSH resistance have not reported definitely but it is hypothesis that TSH resistance may occur on obese patients and it can be result of elevated TSH level. But there are needing more number of studies and more large scaled studies to show relation between obesity and hypothyroidi or TSH resistance definitely.

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