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A clinical study on obesity and hypothyroidism and its relation to insulin resistance

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Abstract

Obesity is a state of excess of adipose tissue body mass index (BMI) (Weight/Height^2 in Kg/M^2) is most widely used method to gauge obesity (1). BMI >30 is most commonly used as threshold for obesity in men and women. Obesity has become major public health problem in developed and developing countries.

Aim: To access the obesity and to study the states of hypothyroidism and Insulin resistance.

Materials and Methods: We examined 60 Females, The age group between 20 years and 50 years and whose body mass index is more than 30 Kg/M^2 and studied for 1 year i.e. From 2015 Feb to 2016 Jan. Subjects who are on thyroid preparations Lithium, Amiodarone and Corticosteroid were excluded in this study blood samples were collected to assess fasting blood sugar, T_3 , T_4 , TSH, HOMAIR and fasting Insulin.

Results: In 14 subjects only TSH is elevated. 24% were having subclinical Hypothyroidism. The mean age is 29.8 ± 6.32 years Insulin resistance is seen in 38% subjects. Insulin resistance is seen in 21% of subjects whose thyroid function test are normal.

Conclusion: As obese person are more pore to develop diabetes, hypertension, coronary artery disease it is necessary to investigate Insulin resistance and Thyroid profile is obese person. In our study Insulin resistance is seen in 38% of obese subjects.

Keywords: Obesity, hypothyroidism, dyslipidemia, insulin resistance and subclinical hypothyroidism

Introduction

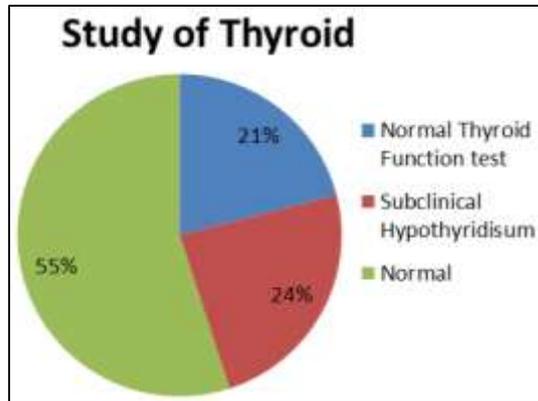
Thyroid disease is very common in females. Hypothyroidism one of the important cause of obesity 4-6 times common than males. It is associated with infertility in females and dyslipidemia canary artery disease and pericardial effusion [2]. Subclinical hypothyroidism and overt Hypothyroidism are important risk factors for Insulin resistance [4-5].

Different studies have shown the association between Hypothyroidism, obesity and Insulin resistance and metabolic syndrome is usually precede development of type 2 Diabetes mellitus. Type 2 Diabetes is associated with increased plasma insulin concentration hyperinsulinemia. This compensatory response by pancreatic beta cell occurs due to decreased sensitivity of target tissues to insulin [8]. A part from obesity other causes of Insulin resistance are excess growth hormone. Excesses glucocorticoids, Polycystic Ovarian disease, and Mutation of Insulin receptor [9]. Bakker *et al.* [11] Chubb *et al.* [12] Evaluated Insulin resistance augments the effect of hypothyroidism on lipids and explained the mechanism between the thyroid function and insulin resistance in diabetic dyslipidemia.

Table 1

Total No of subjects	Normal Thyroid Factors	Subclinical Hypothyroidism	Normal
60	30(21%)	14(24%)	55%

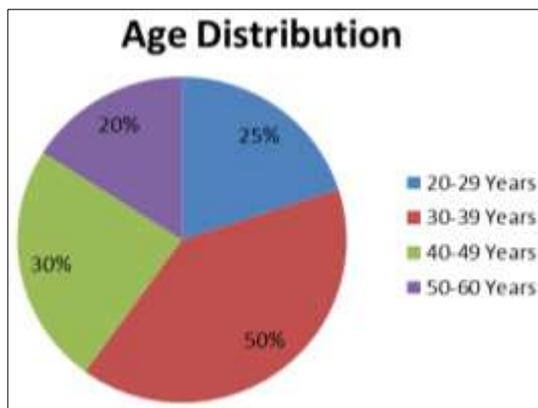
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Materials and Methods: In our study 60 Female subjects were selected who BMI is more than 30 Kg/M2 with the age group 20-60 years. Subjects with known diseases of endocrine system and who are on drugs like Lithium, Amiodarone, Corticosteroids and thyroid hormone preparations after through clinical examination blood samples were collected after overnight fasting of more than eight hours. Fasting blood glucose, fasting insulin level were estimated by radio immunoassay (RIA) Method. HOMA-IR [14] was used to evaluate insulin resistance (Fasting Serum) Insulin ($\mu\text{u/ml}$) fasting plasma glucose ($\text{mmol/L}/22.5$). And T_3 , T_4 , TSH were also estimated. Subclinical hypothyroidism is defined as normal T_4 and T_3 and TSH is $> 4.5\mu\text{IU/L}$.

Table 2

Age	Percentage
20-29 Years	15-25%
30-39 Years	30-50%
40-49 Years	17-30%
50-60 Years	13-20%



Results: 60 subjects were including in this study. 29.8 ± 6.32 is mean age of participants. Subclinical hypothyroidism is seen in 24% i.e 14 subjects. Insulin resistance is seen in 38% subjects 21% subjects are having insulin resistance in whom T_3 , T_4 , TSH were normal. Insulin resistance is estimated by HOMAIR. P.value = 0.6 and odds ratio is 0.668 with 94% confidence interval exuding from 0.18 to 2.07.

Table 3

Base on TSH	Subclinical	Normal	P value
TSH $\mu\text{IU/L}$	>4.5	<4.5	$p > 0.05\text{ns}$
No	1(24%)	46	-
Age(Years)	30.12 ± 5.4	28.30 ± 8.13	Ns
HOMAIN	6/13(42%)	9/37 23%	Ns

Discussion

Insulin resistance is most important feature of type 2 diabetes mellitus. Decreased ability of action of insulin on target tissues especially on muscle and liver it results from combination of genetic susceptibility and obesity [15]. The metabolic syndrome or syndrome, The insulin resistance syndrome are terms used to includes insulin resistance, hypertension dyslipidemia (low HDL and High triglycerides) central obesity type 2 diabetes and accelerated cardiovascular disease. Study conducted by M.Sigh *et al* shows complex inter play between thyroid hormonal status and insulin levels in the pathogenesis of insulin resistance.

We found the potential linkage between insulin resistance and thyroid hypofunction is obese females the study conducted by Hafey *et al* shows pcos women associated with high BMI suggest obesity may present a link between IR and thyroid hypofunction is women. 2 different syndromes of server insulin resistance have been described

1. Type A effects young women and characterized by severe hyperinsuleamia obesity and features of hyperandrogenisum.
2. Type B effects middle aged women characterized by severe hyperinsuleamia, hyperandrogenisum and auto immune disorders.

Conclusion

Obesity, Thyroid dysfunction is usually associated insulin resistance. So care has to be taken in women obesity, thyroid dysfunction regarding insulin resistance.

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