

ORIGINAL ARTICLE

ASSOCIATION BETWEEN CHRONIC IDIOPATHIC URTICARIA AND BODY MASS INDEX

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Background: Chronic idiopathic urticaria (CIU) is defined as recurrence of transient and itchy maculopapular rash with or without angioedema for >6 weeks duration. No cause is identified in about 40% of the general population. Autoimmunity can be a contributing factor in CIU. Increased Body Mass Index (BMI) is associated with autoimmune thyroid disease and may have autoimmune basis. This study was carried out to determine any association between BMI and CIU. **Methods:** This case control study was conducted in Physiology department at Dow University of Health Sciences Karachi from Jan 2007 to Jan 2008. A total number of 90 patients were enrolled and divided into 3 groups of 30 each. Group 1 consisted of diagnosed cases of CIU, Group 2 consisted of diagnosed cases of hypothyroidism, and Group 3 comprised of normal age and sex matched group. CIU disease activity was assessed by history of patients, physical examination and laboratory findings (complete blood count, IgE levels, food allergy tests). Diagnosis of hypothyroidism was made by history, physical examination and laboratory criteria: Serum T4<4.5, FT3 <1.8, TSH >4 μ IU/ml, anti-thyroglobulin antibodies <1:10=Negative, >1:10=Positive, Anti-microsomal antibodies <1:100=Negative, >1:100=Positive. BMI was calculated from height (m) and weight (Kg) of the subjects. **Results:** Body mass index was significantly raised in Group 2, but BMI was normal in chronic urticaria patients. No significant association was found between CIU and BMI. **Conclusion:** No statistically significant association exists between CIU and increased BMI.

Keywords: Chronic idiopathic urticaria, Body mass index, Metabolic syndrome, Hypothyroidism

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INTRODUCTION

Chronic idiopathic urticaria (CIU) is a common allergic and inflammatory skin disorder.¹ It is defined as daily itchy wheals with or without angioedema for more than 6 week.^{1,2} According to current EAACI/GA(2)LEN/EDF/WAO guidelines,² Chronic urticaria (CU) is defined as physical, spontaneous, autoimmune or idiopathic. Irrespective of aetiology, the underlying mechanism for pathogenesis of CIU is not clear, but the central event is supposed to be cutaneous mast cell activation leading to release of inflammatory mediators like histamine, proteases, leukotrienes and tumour necrosis factor. In 45% of the CIU patients, evidence is reported for autoimmune cause, while in others aetiology remains idiopathic.³

It has been hypothesized that specific circulating autoantibodies against IgE receptors (Fc epsilon RI alpha receptors) or dermal mast cell bound IgE activate mast cells leading to degranulation and release of cytokines.^{1,4} It has also been postulated that altered thyroid functions and antithyroid autoantibodies (Antimicrosomal and antithyroglobulin antibodies) play a key role in pathogenesis of CU. But exact pathogenic mechanism remains unclear.^{5,6}

According to National Cholesterol Education Program's Adult Treatment Panel III, metabolic syndrome is defined as combination of central/abdominal obesity, abnormal lipid profile, glucose

intolerance and hypertension.⁷ Studies have shown that in patients with metabolic syndrome, systemic proinflammatory and procoagulant state occurs. It is manifested by increased levels of cytokines for example interleukin-6, tumour necrosis factor, and C reactive protein.⁸ In Chronic idiopathic urticaria, similar proinflammatory and procagulant state occurs irrespective of cause.⁹

Body mass index (BMI), (weight in Kilograms divided by square of height in meter)¹⁰ is an assessment tool for obesity, one component of metabolic syndrome. Increased BMI is a good marker of central obesity. There is considerable evidence that obesity is characterised by chronic low-grade inflammation and in obese persons, pro-inflammatory cytokines and acute phase proteins are increased.⁷ Obesity can result in alterations in immune responses too. Although majority of chronic urticaria patients have underlying autoimmunity and systemic inflammation, there is no report of association between CU and increased body mass index.

The objective of present study was to test a hypothesis that a statistically significant association exists between increased BMI and CIU.

METHODS

This case control study was conducted in Physiology Department, Dow University of Health Sciences Karachi from Jan 2007 to Jan 2008. Sampling

technique was non-probability and convenient. Informed consent was obtained from patients. Patients were selected from Civil Hospital, Jinnah Postgraduate Medical Centre and Aga Khan University Hospital, Karachi.

A total number of 90 female patients were enrolled in our study and divided into 3 groups of 30 each. Group 1 consisted of diagnosed cases of CIU. Group 2 consisted of diagnosed cases of hypothyroidism, and Group 3 comprised of normal healthy age and sex matched group. CIU disease activity was assessed by history of patients (wheals, daily or almost daily, for at least 6 weeks duration), Physical examination (Physical appearance, site and duration of wheals), and laboratory findings (blood count, IgE level, Food allergy tests).

The diagnosis of hypothyroidism was made by medical record, history (Cold intolerance, weight gain, hoarse husky voice, puffy face, hair loss), Physical examination (slowness of mental functions, delayed reflexes), and following laboratory criteria: Serum T4<4.5 µg/dl, FT3<1.8 pg/ml, Serum TSH>4 µIU/ml, Anti-thyroglobulin antibodies<1:10= Negative, >1:10= Positive, Anti-microsomal antibodies <1:100= Negative, >1:100= Positive.

The BMI was calculated as a ratio of the weight in Kg and square of height of patient in meters. The values of BMI for adults 20 years and older are:¹¹ BMI <18.5= underweight, 18.5–24.9= normal, 25–29.9= overweight, and ≥30= obese.

Data analysis was performed using SPSS-10. Age and BMI were presented in Mean±SD and analysis of variance (F-test) was applied to compare them among the three groups (chronic idiopathic urticaria, hypothyroid and control group). Pearson's correlation was computed to measure relationship of BMI with T3 and T4 levels. Scatter plot with regression equation was also made to present this relationship, and $p<0.05$ was taken as significant.

RESULTS

Mean age of total patients was 37±13.07 (25–60 years). Mean BMI of hypothyroid patients was significantly higher than those of chronic urticaria and control groups (20.19±0.61 vs. 20.41±0.37 vs. 22.70±1.42, $p<0.001$) (Table-1).

Significantly inverse correlation was observed ($r= -0.569$, $p=0.001$) between body mass index and T3 level (Figure-1). The same pattern of relationship of BMI with T4 thyroxin (µg/dl) was observed (Figure-2).

Table-1: Body mass index among control, chronic urticaria, hypothyroid groups (n=90)

	Control	Chronic urticaria	Hypothyroid	p
BMI	20.19±0.11	20.41±0.37	22.70±1.42	<0.001

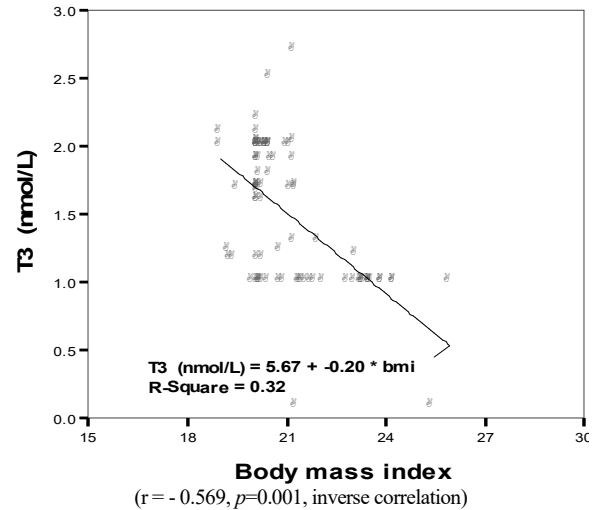


Figure-1: Relationship of T3 thyroxine (µg/dl) with body mass index

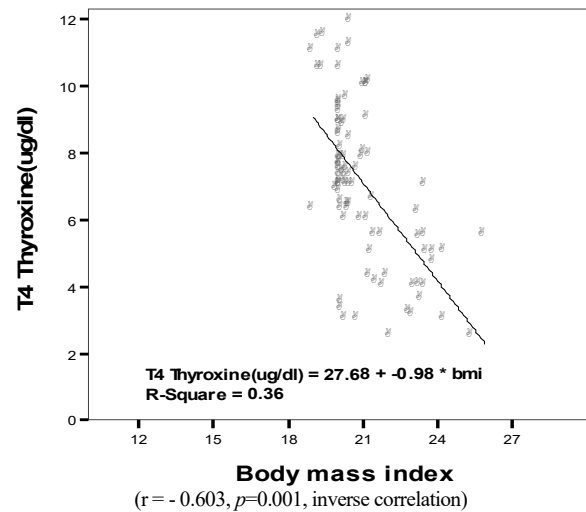


Figure-2: Relationship of T4 thyroxine (µg/dl) with body mass index

DISCUSSION

Regarding the association between chronic urticaria and autoimmune thyroid disease, a considerable amount of statistical information is available from the past two or three decades.^{6,7} No data is available for association between chronic urticaria and increased BMI, although increased BMI is associated with autoimmune thyroid disease especially Hashimoto's thyroiditis (decreased T3, T4 levels and elevated levels of Thyroid Stimulating Hormone, TSH).¹²

Metabolic syndrome is a cluster of interconnected metabolic derangements with central obesity, dyslipidemia and insulin resistance as the key elements.¹³ There is considerable evidence that obesity is characterised by chronic low-grade inflammation.^{8,14} Moreover, circulating levels of inflammatory markers for example cytokines, Interleukin-6, acute phase

reactants and tumour necrosis factor are increased in obese patients.¹⁴ It has also been hypothesised that obesity results in decreased immunological tolerance to antigens, and therefore, shifting balance towards Thelper 2 profile. However, till now no study has shown authentic evidence whether obesity or other metabolic derangements are associated with CIU.

In our study, though BMI was elevated in hypothyroid patients with or without chronic urticaria ($p < 0.001$), it was normal in patients having chronic idiopathic urticaria compared to control and hypothyroid groups.

In one of the studies¹⁵ it was found out that waist circumference significantly correlated with triglycerides, tumour necrosis factor alpha levels and Thelper 2 levels among patients with chronic urticaria. Obesity may be associated with increased disease activity in CU patients.

Some researches^{6,7} have highlighted role of thyroid autoantibodies in pathogenesis of chronic idiopathic urticaria but underlying mechanism remains unclear. In our study, BMI was found to be elevated in hypothyroid patients with or without urticaria and there was an inverse relationship with thyroid hormones (T3 and T4).

CONCLUSION

No statistically significant association is found between chronic idiopathic urticaria and increased body mass index although pathogenesis and autoimmune aetiology in both conditions overlap.

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