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Anthropometrical parameters are not related with lipid profile in mild to moderate asthma

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Abstract

Recent evidence showed that obesity is related with asthma prevalence. In this study, we investigated the relationship between anthropometrical indexes and lipid profile in adult obese men with asthma. For this purpose, all anthropometrical indexes and lipid profile such as body mass index, total cholesterol (TC), triglyceride (TG), low density lipoprotein (LDL) and high density lipoprotein (HDL) were measured after a overnight fast between 8-9 a.m o'clock in 36 adult obese men with mild to moderate asthma. The bivariate associations' anthropometrical indexes and lipid profile were examined with the Spearman rank correlation analysis in studied subjects. Total cholesterol was positive significant related with abdominal circumference. Although a liner relation was observed between the other parameters of lipid profile with anthropometrical indexes, these relationships did not significant of statistical perspective. These findings are different with the results of some previous studies and we can conclude anthropometrical measurements do not a suitable predictor of lipid profile in asthma patients. This data suggest abdominal obesity is the best predictor of lipid profile in asthmatic patients.

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Introduction

Review of research evidence shows that Overweight and obesity are one of the major causes of life-threatening disease and increased dramatically in industrialized and developing countries and is related to cardiovascular risk factors such as 2 diabete, hypertension, and syndrome metabolic and respiratory diseases such as asthma (Klein *et al.,* 2002). Epidemiologic data indicate that the incidence of asthma is increased in obese patients (Shore *et al.,* 2005). But the mechanisms are unclear. Its major characteristics include a variable degree of airflow obstruction, BHR (bronchial hyper-responsiveness) and chronic airway inflammation (Chung *et al.,* 1999). Body mass index (BMI), which relates weight to height, is the most widely used and simple measure of body size, and is frequently used to estimate the prevalence of obesity within a population. Thus, other anthropometric indices such as waist circumference (WC), waist-to-height ratio (W/Ht), and waist-to-hip ratio (WHR) have been used as alternatives to BMI. Waist circumference is increasingly being accepted as the best anthropometric indicator of abdominal adiposity and metabolic risk. Most of these studies show that the incidence of asthma and increased BMI are frequently related (Tantisira *et al.,* 2003).

Overweight or obese persons reported asthma more often than did thinner persons after adjustment for smoking, education, and physical activity (Nystad *et al.,* 2004). Possible mechanisms for the relationship between asthma and obesity include airway inflammation, mechanical changes associated with obesity, changes in airway hyper-responsiveness, and changes in physical activity and diet (Story*,* 2007). Both lipid profile and body fat have been shown to be the important predictors for metabolic disturbances including dyslipidaemia, hypertension, diabetes, cardiovascular diseases, hyperinsulinaemia etc. It is unknown whether BMI or WHR can predict a lipid profile. While increases in body mass index (BMI) have been associated with the incidence and prevalence of asthma (Tantisira *et al.,* 2003), the mechanisms behind this association are unclear. Although several studies have analyzed the association between serum lipids with anthropometric markers, few, including the present one, support WC as a good predictor of lipid profile. A recent study showed that after adjustment for age, percentage of body fat, smoking, alcohol intake, and physical activity, waist circumference was not significantly related to the ratio of total cholesterol high-density lipoprotein cholesterol, whereas the waist-to-hip ratio was strongly associated among the youngest subjects (Lemos-Santos *et al.,* 2004). Information about the relation between anthropometrical and lipid profile markers in obese individuals with asthma has received limited attention. In this study, therefore, we investigate relationship between anthropometrical markers and lipid profile in asthma patients.

Materials and methods

To determine the relationship of anthropometrical indexes such as abdominal circumference (AC), body mass index (BMI) to lipid profiles (total cholesterol, triglyceride, low density cholesterol, high density cholesterol) in asthma patients, thirty six patients with mild to moderate asthma (BMI ≥ 30 kg/m2) were enrolled in the study by accessible sampling. Asthma severity was determined from spirometric index (FEV1), degree of airway hyperresponsiveness, and amount of medication prescribed. Each participant received written and verbal explanations about the nature of the study before signing an informed consent form. Body weight and height were measured with a standard physician's scale and a stadiometer, respectively when subjects were in a fasting state when the participant had thin clothes on and was wearing no shoes. Abdominal circumference and hip circumference were measured in the most condensed part using a non-elastic cloth meter. Body mass index was measured for each individual by division of body weight (kg) by height (m2). Subjects with a history or clinical evidence of impaired fasting

glucose or diabetes, orthopedic abnormalities, recent myocardial infarction, congestive heart failure, active liver or kidney disease, growth hormone deficiency or excess, neuroendocrine tumor, anemia were excluded. All subjects were non-smokers and had not participated in regular exercise/diet programs for the preceding 6 months. In addition, exclusion criteria included inability to exercise and supplementations that alter carbohydrate-fat metabolism. After anthropometric measurements, blood samples were taken between 7:00 and 8:00 a.m. after 10 to 12 hours overnight fast in order to measuring total cholesterol, triglyceride, low density cholesterol, high density cholesterol. Total cholesterol, HDL cholesterol, LDL cholesterol and triglycerides were measured using the colorimetric enzymatic method by Kobas Auto-analyzer (German).

Statistical analysis

Statistical analysis was performed with the SPSS software version 15.0. For the descriptive statistics after having checked the normality of the variables using the Kolmogorov-Smirnov test. The bivariate associations between above mentioned variables were examined with the Spearman rank correlation analysis in studied subjects. Significance was accepted at $P < 0.05$.

Results

We found no relation between all parameters of anthropometrical and lipid profile in studied patients. Total cholesterol were only significant positively correlated with abdominal circumference ($p = 0.000$, $r = 0.86$, Fig 1), although we did not observed any correlation between abdominal circumference with the other markers of lipid profile ($p \geq 0.05$). There were no correlations between BMI with total cholesterol in studied patients ($p = 0.232$, $r = 0.14$).

Discussion

Main finding of our study was significant positive relation between abdominal circumference and total cholesterol. A number of studies have also shown that high WC values precede the onset of morbidity due to diabetes and coronary heart disease (Chan *et al.,* 1994; Hartz *et al.,* 1983). Obesity increases the prevalence, incidence, and possibly severity of asthma, while weight loss in the obese improves asthma outcomes (Hersoug *et al.,* 2007). Visceral adipose tissue is the body fat depot most strongly related to the metabolic abnormalities of obesity. Various biological mechanisms (immunologic and inflammatory, hormonal, genetic, nutritional, mechanical, and others related to physical activity) have been put forth to explain the relationship (Castro-Rodríguez*,* 2007). The results of a recent study suggested weight loss in asthma patients is associated with improved respiratory symptoms and lung function (Maniscalco *et al.,* 2008). However, the mechanisms underlying the effect of large body mass changes on asthma would require further studies. Obesity increases the prevalence, incidence, and possibly severity of asthma, while weight loss in the obese improves asthma outcomes (Shore*,* 2007).

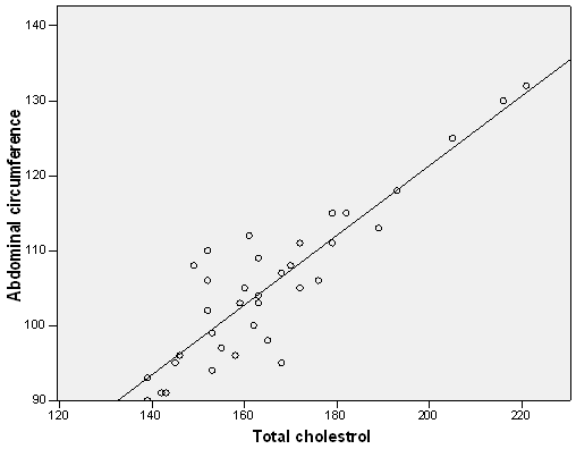

Fig 1. the correlation pattern between abdominal circumference and total cholesterol in asthma patients

Cross-sectional and prospective cohort studies of humans have shown a modest overall increase in asthma incidence and prevalence in the obese, although body mass index does not appear be a significant modifier of asthma severity (Beuther *et al.,* 2006). Additionally, Ghabashi et colleagues suggested

that, although obesity was prevalent in asthmatic patients, BMI did not correlate with any of the spirometric variables (Ghabashi *et al.,* 2006). On the other hand, the utility WC in predicting obesity-related health risk factors has been recognized by the National Heart, Lung, and Blood Institute of the National Institutes of Health, whose guidelines indicate that the health risk factors increase in a graded fashion and this scientific references suggest those with high WC values are at greater health risk than those with normal WC values. In other study, asthma cases slowed low levels of serum cholesterol, triglyceride, LDL and VLDL compared to the control group, while HDL-C were higher than the healthy control group (Nakazawa *et al.,* 1991). Janssen et al (2002) opined that body mass index and waist circumference independently contributed to the prediction of abdominal, subcutaneous and visceral fat (Tantisira *et al.,* 2003).

It is assumed that BMI and WC have independent effects on obesity-related health risk factors. But, recent findings indicate that WC is a stronger marker of health risk than BMI (Zhu*,* 2002). A recent study showed a sifnificant positive relation between WC and lipid profile after removing the total adiposity effect (Shahraki *et al.,* 2009). These authors state that WC had more effect on lipids/lipoproteins than WHR (Heitmann*,* 1992). Another study on adults women showed that more of the lipid variation was explained by overall obesity in men and more of the variation was explained by abdominal obesity in women (Heitmann*,* 1992). Hardev et al indicated that Waist to hip circumference ratio was positively correlated with serum cholesterol, triglyceride and LDL-C in patients with diabetes mellitus (Janssen *et al.,* 2002). Our study demonstrated that among the anthropometric indices, just waist circumference had a correlation significantly with TC level. None of the indices showed any relation to levels other variables. Our data showed that WC is partly good predictors of abnormalities in lipid profile in asthma patients. More research is needed to further explore any potential link between anthropometrical indexes and lipid profile in these patients.

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