Changes in Left Ventricular Structure and Function in Uncomplicated Obesity

Thesis

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Abstract

Fasting blood sugar was higher in the obese group, but still within normal levels. Fasting lipid profile (S.cholesterol, triglycerides, HDL and LDL) and CRP titre showed insignificant differences between the two groups (M-mode) echocardiography revealed increased left ventricular end-systolic dimensions in the patients of the obese group despite normal fractional shortening.

Key word:

Structure

Uncomplicated

Obesity

I

Dedicate this Thesis

To My

Father

Mother

Husband

DAUGHTER

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LIST OF ABBREVIATION

AO: aortic root

AF: atrial fibrillation

BMI: body mass index

CHD: coronary heart disease

CVD: cardiovascular disease

CT: computed tomography

CRP: C-reactive protein

2D: 2 dimensional

DBP: diastolic blood pressure

DPP: dipeptidyl peptidase

DT: deceleration time

ECG: electrocardiogram

EDD: end-diastolic dimension

EF: ejection fraction

ESD: end-systolic dimension

FS: fractional shortening

GERD: gastroesophageal reflux disease

GIP: gastric inhibitory polypeptide

GH: growth hormone

HDL: high-density lipoprotein

IL: interleukin

IVCT: isovolumic contraction time

IVRT: isovolumic relaxation time

LDL: low-density-lipoprotein

LA: left atrium

LV: left ventricle

M-mode: motion mode

MC4R: melanocortin-4 receptor

MI: myocardial infarction

MSH: melanocyte- stimulating hormone

MRI: magnetic resonance imaging

PCOS: polycystic ovary syndrome

PPAR: peroxisome-proliferator-activated receptor

PVN: paraventricular nucleus

PW: posterior wall thickness

SBP: systolic blood pressure

SW: septal wall thickness

TDI: tissue Doppler imaging

TNF-α: tumor necrosis factor α

TSH: thyroid- stimulating hormone

VLDL: very-low-density-lipoprotein

WHR: waist-to-hip ratio

INTRODUCTION

&

AIM OF THE WORK

Changes in Left Ventricular Structure and Function in Uncomplicated Obesity

Rationale and background:

Obesity is generally a chronic condition, and Doppler echocardiography can be used as a noninvasive instrument for early evaluation of left ventricular diastolic indeces. Obesity is associated with increased cardiovascular morbidity and mortality. A direct effect of isolated obesity on cardiac function is not well established. Subclinical left ventricular diastolic dysfunction is present in all grades of isolated obesity, correlates with BMI, and is associated with increased systolic function in the early stages of obesity (**Pascual et al., 2003)**.

A massive amount of fat tissue, as that observed in obese subjects with BMI over 50 kg/m², could affect cardiac morphology and performance, but little data on this issue is available **(Iacobellis et al., 2004)**.

Some studies show that obesity, in the absence of glucose intolerance, hypertension, and dyslipidemia, seems to be associated only with an impairment of diastolic function and hyperkinetic systole, and not with left ventricular hypertrophy **(Iacobellis et al., 2002)**.

C-reactive protein (CRP) values predict atherothrombotic cardiovascular disease and type 2 diabetes mellitus. Associations between CRP and obesity, predominantly assessed anthropometrically, may partly explain these observations **(Jerry et al., 2004)**.

Circulating levels of C-reactive protein (CRP) predict cardiovascular events. In contrast, an association between CRP and direct measures of atherosclerosis has not been established clearly **(Muredach et al., 2003)**.

Hypothesis:

Uncomplicated obesity is associated with subtle or overt morphological cardiac changes and these changes can be predicted indirectly by an increased CRP.

Objective:

The aim of this study is to examine the relationship between left ventricular mass, and left atrial diameter, or other morphological cardiac changes and obesity and body fat distribution, also the relationship between CRP and obesity.

REVIEW OF THE LITERATURE

ETIOLOGY AND NATURAL HISTORY OF OBESITY

Introduction

The publications by the National Heart, Lung, and Blood Institute **(NIH, 1998)** and the World Health Organization [WHO] **(WHO, 1998)** have provided uniform definitions of overweight and obesity. Although "overweight" technically refers to an excess of body weight and "obesity" to an excess of fat, these two words can be defined operationally in terms of body mass index.

The body mass index (BMI) is the most practical way to evaluate the degree of overweight. It is calculated from the height and weight as follows:

BMI = body weight (in kg) ÷ square of stature (height, in meters)

The degree of risk associated with overweight is related to the BMI. A BMI between 25 and 30 kg/m2 is low risk, above 30 kg/m2 is moderate risk. The WHO and the National Center for Health Statistics define overweight as a BMI >25 and ≤29.9 and obesity as a BMI greater than 30 kg/m2.

AGE AT WHICH OVERWEIGHT DEVELOPS

People can become overweight at any age. However, there are certain times when weight gain tends to occur, which vary between men and women.