Endothelial Dysfunction In Obese Females

Thesis
Submitted for Partial Fulfillment of the M.D. Degree
in Medical Biochemistry

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2002

SUMMARY

Obesity is a multifactorial syndrome characterized by an excessive adipose tissue accumulation and could possess a serious health hazards. Numerous metabolic complications are associated with abdominal obesity and most of them, such as diabetes mellitus, dyslipidemias and arterial hypertension, appear to be linked to insulin resistance.

Insulin resistance is a state in which a given concentration of insulin produces less than expected biological effect. It underlies a constellation of adverse metabolic and physiological changes called the insulin resistance syndrome, which is a strong risk factor for development of glucose intolerance and type 2 diabetes.

The vascular endothelium, building the inner layer of capillaries and blood vessels, represents a highly active metabolic and endocrine organ producing a multitude of different molecules, including vasoactive peptide hormones, growth factors, coagulation factors and adhesion molecules.

The present study was conducted on 75 female subjects divided into 5 groups: **Group I (controls)** which included 15 healthy non-obese subjects (with BMI < 25 Kg/m^2); **Group IIa** and **IIIa** which included 25 and 10 nondiabetic and diabetic obese subjects respectively (grade I obesity with BMI = 30-34.9 Kg/m^2) and **Group IIb** and **IIIb** which included 15 and 10 nondiabetic and diabetic obese subjects respectively (grade II obesity with BMI = 35-39.9 Kg/m^2). A complete physical examination including the measurement of the BMI and W/H was performed for every subject included in the study. Fasting samples were taken from each subject for determination of plasma glucose and PAI-1 and serum creatinine, ALT, insulin, total cholesterol, triacylglycerols, HDL-cholesterol and sialic acid. After 2-hours of a standard glucose load, plasma glucose and serum insulin were determined again. Serum LDL concentration, LDL/HDL ratio, G/I ratio (as regards both the fasting and the 2-hours postglucose levels) and the percent increase in insulin levels were calculated.

The following results were obtained:

Concerning BMI, W/H ratio, plasma glucose and serum insulin (fasting and 2-hours post glucose load), total cholesterol, TAG, LDL-cholesterol, LDL/HDL ratio, Serum sialic acid and plasma plasminogen activator inhibitor-1 (PAI-1), the

levels were increased in obese subjects and obese diabetics (grade I and II) when compared to controls, with higher levels in grade II (obese and diabetics) when compared to grade I. These results were higher in diabetics (grade I and II) when compared to the same grade in obese subjects, being higher in grade II diabetics, when compared to grade I.

As regards HDL-cholesterol, the levels were decreased in obese subjects and obese diabetics (grade I and II) when compared to controls. The percent increase in serum insulin was higher in obese subjects when compared to controls and in grade II when compared to grade I. Meanwhile it was decreased in diabetics when compared to both controls and diabetics; being slightly higher in diabetics grade II when compared to grade I.

Concerning G/I ratio (fasting and 2-hours post glucose load), the levels were decreased in obese subjects and obese diabetics (grade I and II) when compared to controls; being lower in grade II (obese and diabetics) when compared to grade I. The levels showed marked drop in postglucose load, when compared to fasting; being more in obese subjects (grade I and II) when compared diabetics. The ratio was decreased in grade II (obese and diabetics) more than grade I.

In conclusion:

Obesity is a chronic disease with metabolic and hemostatic disturbances, largely due to the associated insulin resistance and endothelial dysfunction. The majority of these disturbances, particularly the inflammatory condition as evidenced by the sialic acid levels and the hypercoagulability and endothelial dysfunction as evidenced by PAI–1 levels, resemble those of the diabetic state but with a milder degree. These disturbances also progress with increased grading of obesity. The results of the present study indicated that BMI, fasting insulin and serum sialic acid emerged as independent risk factors for PAI–1; thus reflecting the association of obesity, insulin resistance, atherosclerosis and endothelial dysfunction.