Assessment of Leptin , soluble leptin receptors and body fat mass in obese patients

Thesis
submitted for partial fulfillment of the requirements for the MD degree in Physical medicine, Rheumatology and Rehabilitation

By

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Ain Shams University
2010

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2006

Introduction

Obesity is the accumulation of excess body fat and it represents the long term results of positive energy and fat balance (Hansen et al., 2005).

Leptin, the ob gene product (Zhang et al., 1995) is implicated in the regulation of food intake and energy balance (Campfield et al., 1995). In humans, circulating leptin levels are increased in obesity and are regulated by fasting, feeding and body weight changes (Zida et al., 2002), suggesting that a hallmark of obesity is not leptin deficiency but leptin resistance (Ogawa et al, 2004).

Leptin achieves its metabolic and endocrine effects by interacting with a receptor which is a member of class 1 cytokine receptor family (Ogier et al., 2002). In the cytokine receptor family, the extracellular domain of the hormone receptors is present in the circulation and acts as binding protien to modulate the concentration of the active ligand in the extracellular milieu (Ogier et al., 2002). The serum soluble leptin receptors (sLR) concentration decreases with increasing body mass index.

The reduction in serum sLR concentrations in overweight and obese persons may reflect downregulation of hypothalamic leptin receptor

production and might be an important factor in leptin resistance (Shimizu et al., 2002). Soluble LR levels in plasma could reflect the amount of leptin receptor expressed by tissues. This could implicate that decreased plasma levels of sLR as found in morbidly obese subjects is a sign of decreased expression of functional leptin receptors .This might be in agreement with the proposed leptin resistance in morbidly obese subjects.

Elucidation of such putative role for sLR in leptin resistance may help to understand the devolopment of obesity (vanDielen et al., 2002).

Plasma leptin values are highly correlated with total body fat mass (Taylor and Goulding , 1998). Assesment of the body composition has become increasingly important in the evaluation of its impact on health and disease.

Present methodology is the use of dual energy x-ray absorpiometry (DEXA) which was first developed to measure bone mineral content and is now considered as useful tool for the appraisal of gross and regional body composition (Salamone et al., 2000). This technique has a small radiation dose, high precision and is suitable for all ages (Taylor and Goulding, 1998).

It was found that trunk fat (measured by DEXA) explains more the variance in circulating leptin

concentrations than leg fat, suggesting that the propensity to leptin resistance may be increased in women with higher central adiposity (Taylor and Goulding , 1998).

Aim of the work:

The aim of this work is:-

1-To assess serum leptin and sLR levels in order to find out their role in pathogenesis of obesity.

2-To study the effect of weight loss on the levels of serum leptin and sLR and on body fat mass.

3- To find out a new drug therapy for obesity.

Subjects and methods:

The study will include fourty (40) obese subjects (body mass index >30) of premenopausal females with age ranged from 20 to 40 years presented to obesity clinic of AIN SHAMS UNIVERSITY HOSPITALS.

Ten (10) healthy lean females matched in age will be taken as control group.

* **Exclusion criteria:**

Patients with rheumatic diseases, diabetes, hypertension will be excluded from the study. Pregnant and lactating females will be also excluded .

* All subjects will be subjected to:

1- Full medical history taking.

2-Thorough clinical examination.

3- Anthropometric measurments:

*Body mass index (BMI).

*Waist circumference.

* Waist to hip ratio.

*RT arm circumference

* RT thigh circumference.

*Chest circumference.

*Skin fold measurment.

4-laboratory investigations:

A-Complete blood picture (coulter counter).

B-Fasting blood sugar (GPO-PAP method).

C-Lipid profile (GPO-PAP method).

D-Serum leptin (ELISA).

E-Soluble leptin receptors (ELISA).

5-Radiological investigations:

Dual energy x-ray absorpiometery (DEXA) to measure total and regional body fat mass for trunk and leg.

Then the subjects will be divided into three groups as follow:

Group A : will be subjected to diet regimen

and acupuncture.

Group B : will be subjected to diet regimen and exercise programme.

Group C : will be subjected to diet regimen and local lipolysis.

The programme will be carried out for three months, after which the following investigations will be repeated

A- lipid profile.

B- Serum leptin (ELISA).

C- sLR levels (ELISA).

D- DEXA to measure body fat mass.

The data will be collected, tabulated and statistically analysed to assess serum levels of leptin and sLR and find out the effect of loss of weight by different programs on their levels and body fat mass and compare between the three groups.

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Acknowledgment

I wish to express my sincere gratitude to Prof. Dr. Azza Kamal ElGogary, Professor of Physical Medicine, Rheumatology and Rehabilitation , Ain Shams University, For her kind supervision, unfailing advice, constructive encouragement, and guidance as well as her moral support throughout the whole work, and for the time she spent and the effort she paid in directing and helping me during my work, that without her aid, this work would not have come to light.

I am also deeply grateful to Prof. Dr. Mona Mahmoud Arafa , Professor of Physical Medicine, Rheumatology and Rehabilitation , Ain Shams University, who debated her time, effort and experience most generously throughout the work of this thesis, and for help and valuable observations which made it possible to complete this work.

I would also like to express my sincere gratitude and thanks to Prof. Dr. Omar Hussein Omar, Professor of Diagnostic Radiology, Faculty of Medicine, and Ain Shams University, for his help and effort in supervising this work.

I would like also to express my gratitude and appreciation to Dr. Neveen Ahmed Shaker, Assistant Professor of Physical medicine, Rheumatology and Rehabilitation Faculty of Medicine, Ain Shams University, for her precious help, which was very essential for this work.

Last, But not least, my thanks to all my colleagues in

the Physical medicine, Rheumatology and Rehabilitation Department for their cooperative spirit and help, also, my deepest gratitude to my family who I cannot forget their great assistance and their moral support .

Contents

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