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Assessment of DNA damage in obese premenopausal women with metabolic syndrome

Moushira Zaki[a], Sanaa Kamal [a], Walaa A Basha [a], Safinaz El-Toukhy [b], Walaa Yousef [a], Hala T. El-Bassyouni[c] Osama Azmy [d]

[a] Biological Anthropology Department, National Research Centre, Cairo, Egypt
[b] Medical Biochemistry Department, National Research Centre, Cairo, Egypt
[c] Clinical Genetics Department, National Research Centre, Cairo, Egypt.
[d] Reproductive Health Research Department, National Research Centre, Cairo, Egypt

Abstract

Background and Aim: Obesity is a main factor in the development of metabolic syndrome (MS). Obesity and MS are associated with increased oxidative stress that might cause damage to cellular biomolecules including DNA. So, we aimed of this study to assess the DNA damage in obese women with MS.

Methods: Thirty obese women with MS aged 25-35 years and thirty age-matched healthy non-obese women were enrolled in the study. Leukocyte DNA damage was assessed by comet assay.

Results: Among the obese women with MS, 20% of cases met criteria for polycystic ovary syndrome (PCOS). The percent of DNA damage was significantly higher in MS patients as well as in the subgroup of MS with PCOS than in controls. A significant association was determined between the frequency of DNA damage and some anthropometric measurements. Where, body mass index (BMI), waist circumference (WC) and waist to hip ratio (WHR) showed significant association with the frequency of DNA damage. Moreover, the mean of DNA damage frequency might be influenced by the presence of combined metabolic components within MS cases. Cases with the combination of hypertension plus dyslipidemia as well as cases with the combination of hypertension plus dyslipidemia plus elevated fasting glucose showed higher levels of DNA damage than those without.

Conclusions: These findings suggest that obese women with MS have an increased risk for DNA damage. Comet assay might serve as an early marker of obesity-related complications and it might be a useful tool in disease follow-up and management. The study emphasizes significant association between DNA damage and the combined metabolic components among MS cases that might be associated with increased risk of other chronic diseases.

Keywords: Obesity; MS; DNA damage

Introduction

Metabolic syndrome (MS) is a complicated disorder that includes risk factors for cardiovascular disease (CVD) and type 2 diabetes (T2D) (Alberti & Zimmet 1998). Central obesity with a high waist circumference and insulin resistance are the typical features of MS, these are the factors that eventually lead to high insulin, glucose, triglyceride levels and increased blood pressure levels. MS and obesity are major public health problems in many countries (Amos et al. 1997;