OXIDATIVE STRESS IN METABOLIC SYNDROME

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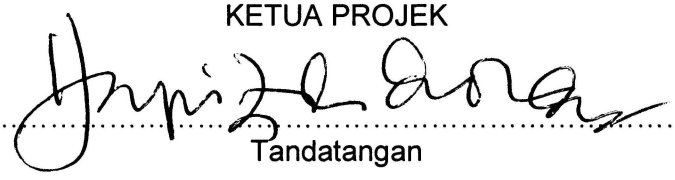
KETUA PROJEK



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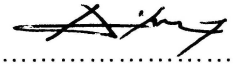

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ABSTRACT

CENTRAL OBESITY IN THE PRESENCE OF METABOLIC SYNDROME HAS ENHANCED OXIDATIVE STRESS

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Background: Metabolic syndrome (MS) is a cluster of abdominal obesity, atherogenic dyslipidaemia, hypertension and insulin resistance with or without hyperglycaemia associated with increased risk of coronary heart diseases. There may be a possible link between MS, central obesity and increased markers of oxidative stress. The oxidative stress in central obesity and MS with different glycaemic status is still unclear.
Objective: The aim of our study was to evaluate the oxidative stress in central obesity and MS subjects with different glycaemic status and subjects with central obesity without MS.
Design: A total of 260 subjects (Mean±SD : 53±11, 66 Males) were randomly recruited and divided into 5 groups: central obesity without MS (OBXMS), MS with diabetes (MSDM), MS with impaired fasting glucose (MSIFG), MS with normoglycaemia (MSNG) and normal control (NC). In addition, MSDM, MSIFG and MSNG were grouped as all MS group with a total number of 156. The blood levels of oxidized low-density lipoprotein (oxLDL) and 8-Isoprostane were evaluated.
Results: OBXMS group was not significantly different compared to NC group. MSDM group compared to NC group had higher 8-Isoprostane ($p<0.001$). MSIFG group compared to NC group had higher oxLDL ($p<0.05$) and 8-Isoprostane ($p<0.001$). MSNG group compared to NC group had higher 8-Isoprostane ($p<0.001$). All MS group compared to NC group had higher oxLDL ($p<0.05$) and 8-Isoprostane ($p<0.001$). All MS group compared to OBXMS group had higher 8-Isoprostane ($p<0.001$).
Conclusions: MS irrespective of glycaemic status has enhanced oxidative stress compared to controls. There is enhanced oxidative stress in central obesity especially in the presence of MS, suggesting high coronary risk of MS subjects.

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1.0 INTRODUCTION AND BACKGROUND

1.1 Introduction & General Background

Metabolic syndrome (MS) has multiple, interrelated factors that raise risk and is characterized by a constellation of metabolic risk factors within an individual. This cluster of disorders is collectively called the metabolic syndrome - a term synonymous with syndrome X, insulin-resistance syndrome, plurimetabolic syndrome and Reaven's syndrome (Betteridge, 2004). Specifically, this includes abdominal obesity, high blood pressure (BP), high triglycerides (TG), high low density lipoprotein cholesterol (LDL-c), hyperglycaemia, and diabetes mellitus (DM) as well as the insulin resistance which is the main candidate for being the underlying etiology (Isomaa *et al.*, 2001). The mechanistic connections between insulin resistance and metabolic risk factors are not fully understood and appear to be complex (Zainal Arifin *et al.*, 2005).

Clustering analysis has shown that risk factors for diabetes and cardiovascular disease (CVD) are more likely to occur simultaneously than would be expected by chance, suggesting that they underlie the same metabolic disorders (Betteridge, 2004). It has been suggested that increased oxidative stress as an early event in the development of the MS and, as such, might contribute to disease progression (Goldstein and Scalia, 2004).

Oxidative stress is defined as the imbalance in the rate at which the intracellular content of free radicals, produced through a number of cellular events, increases relative to the capacity of the cell to dispose of these oxidants. When not neutralized, these free radicals have the capacity to alter the integrity of numerous molecules such as lipids, proteins and DNA (Goldstein and Scalia, 2004).

Lipids are the major target of free radical attack, which induces lipid peroxidation. Free radical-induced peroxidation of membrane lipids can be very damaging because it leads to alterations in the biophysical properties of the membrane, such as the degree of fluidity, and can lead to inactivation of membrane-bound receptors or