Insulin Resistance in Elderly

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Aging population is increasing as an impact of demographic transition in Indonesia. This is followed by the epidemiologic transition which lead to the increase of chronic degenerative diseases in elderly such as cerebrovascular disease, cardiovascular disease, and diabetes mellitus type-2. Those chronic degenerative diseases are thought to be related with insulin resistance which is an important key of metabolic syndrome. Insulin resistance was defined as the diminished ability of cells to respond the action of insulin in transporting glucose from bloodstream into muscle and other tissues. The insulin resistance syndrome represents the co-occurrence of hyperglycaemia, hypertension, central and overall obesity, and dyslipidemia characterized by low high density lipoprotein-cholesterol and high trygliceride level.1

Prevalence of insulin resistance syndrome is increasing in elderly population. Studies found the prevalence in elderly is around 35%-50%.2,3 The mechanism in underlying the development of insulin resistance are multi-factorial. Change in body composition, decrease physical activity, hormonal disorder, oxidative stress, decrease mitochondrial function, and resistance of leptin effect in elderly are contributing factors of insulin resistance syndrome.4-7 Fat mass in elderly is increasing and related to insulin resistance. Study done by Noto among elderly patients found a positive correlation between percentage of total body fat, truncal subcutaneous fat, peripheral subcutaneous fat, waist circumference and insulin resistance in elderly.

Dietary constituents have also been shown to modulate insulin sensitivity, especially in the elderly, with increased fat content and reduced amount of carbohydrates leading to insulin resistance.8 Vitamin D deficiency is also thought related with insulin resistance in elderly.9 The prevalence of vitamin D deficiency is high in elderly. Study done by Setiati among elderly women in Indonesia found prevalence of vitamin D deficiency was 35.1%.10

Clinical conditions such as glucose intolerance, diabetes mellitus, obesity, dyslipidemia, and hypertension are related with insulin resistance.11 Metabolic syndrome is also related to insulin resistance. Obesity as one of metabolic syndrome components has positive correlation with insulin resistance. Prevalence of metabolic syndrome is increasing by age. Data shown the prevalence among 60-69 age group was 43.5% and 42% among elderly 70 years or older. Study done by Intan among elderly women in Indonesia revealed prevalence of metabolic syndrome was 53%. Subjects with insulin resistance had at least one component of metabolic syndrome.12

Insulin resistance may increase circulating free fatty acid concentration and ectopic fat accumulation that disturb insulin mediated glucose uptake in skeletal muscle and elevated glucose production in liver. Finally, insulin resistance together with abnormalities in insulin secretion leads to diabetes mellitus type 2.13 Diabetes mellitus may contribute to the development of peripheral arterial disease (PAD), which is a marker of systemic atherosclerosis. This diseases is increasing with age. Study done by Kuswardhani among elderly with type 2 Diabetes mellitus found that older age and homocystein level as risk factors of PAD.

As the prevalence of obesity increase in elderly, it is important for health professionals to do insulin resistance screening in order to prevent them from the development of diabetes mellitus and other chronic degenerative diseases. Early identification and treatment of the insulin resistance syndrome is an important approach to reduce the overall burden of morbidity and mortality in the elderly.
REFERENCES