The 10th Anniversary
FUKUOKA ACTIVE AGING CONFERENCE
IN ASIA PACIFIC 2016

Constructing an Age-friendly Collaboration
among Academic, Industrial, Governmental
and Civic Circles

CONFERENCE BOOK
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54. Distribution Pattern of Methylene tetrahydrofolate Reductase (MTHFR) C677T Gene Variants in Postmenopausal Indonesian Women with Osteoporosis

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Abstract

Backgrounds: Elderly people are the fastest growing section of population in the world. At the same time, susceptibility to bone loss and fracture risk has increased in parallel, so that the population aging is closely related to the bone fragility disease of osteoporosis. Osteoporosis is a common health disorder suffered by many elderly people around the world. According to the WHO Study Group, in 2003 osteoporosis has struck 75 million people in the United States, Europe, and Japan, and causes more than 8.9 million fractures annually worldwide. In Indonesia, in 2005 the prevalence of osteopenia and osteoporosis was 41.7% and 10.3%, respectively. Two out of each five people in the Indonesian population are at risk of developing osteoporosis, a condition characterized by reduced bone mass and micro-architectural bone deterioration. Previous studies have suggested that the MTHFR C677T polymorphism may be involved in the development of osteoporosis. Objective: This study aimed to assess the frequency distribution of this polymorphism in Indonesian postmenopausal women with osteoporosis and osteopenia. Materials and methods: The DNA samples used in this study were extracted from the blood serum of postmenopausal Indonesian women. The inclusion criteria specified that all patients are women without menstrual cycle for more than one year, and having signed the informed-consent form. The total set of 100 extracted DNA samples included 25 samples of subjects with osteopenia, 50 samples with osteoporosis, and 25 control samples from healthy postmenopausal women. SNP genotyping for MTHFR C677T polymorphism was conducted on all samples by the PCR-RFLP technique.

Results and conclusion: The genotypes of the test population included 70% of CC (wild type), 29% of CT (heterozygous polymorphic), and 1% of TT (homozygous polymorphic), with 15.5% frequency of T-allele in the test population. The distribution of the MTHFR genotypes followed the Hardy-Weinberg equilibrium, but there was no significantly association of MTHFR C677T polymorphism with the genotype. Our data show that the MTHFR C677T polymorphism had a weak effect on BMD (Bone Mineral Density).

Keywords: Bone mineral density, osteoporosis, MTHFR, polymorphism
Distribution Pattern of Methylenetetrahydrofolate Reductase (MTHFR) C677T Gene Variants in Postmenopausal Indonesian Women with Osteoporosis

Introduction

Osteoporosis is associated with fracture, this disease becomes dangerous with mobility rate, mortality, and high healthcare costs. Previous studies have shown that the MTHFR C677T polymorphism may be involved in the development of osteoporosis among postmenopausal women.

Objectives

Studied frequency distribution MTHFR C677T polymorphism in 100 Indonesian postmenopausal women with osteoporosis and osteopenia.

Materials and Methods

100 extracted DNA samples from the blood serum of postmenopausal women. The inclusion criteria are women without menstrual cycle for more than 1 year and had signed the informed-consent form.

Table 1: Characteristics of 100 samples

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<th>Variables</th>
<th>Frequency</th>
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<tr>
<td>Normal</td>
<td>25</td>
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<tr>
<td>Osteopenia</td>
<td>25</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>50</td>
</tr>
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</table>

The MTHFR C677T (rs1801133) genotyping was performed by polymerase chain reaction (PCR). The PCR products were digested with restriction enzyme HinfI (New England Biolabs, Genetika Science Indonesia PT, Jakarta, Indonesia) for 14 hours at 37°C. The digested products were separated, and visualized on 3% agarose gels. The digested PCR produced a 175 and 23 bp fragments for TT condition (homozygous polymorphic) and a 108, 175 and 23 bp fragments for CT condition (heterozygous polymorphic). An undigested product length of 198 bp was retained by the wild type (CC).

Results

The distribution of C alleles and CC genotypes were dominanted in this study. Genotype CC was found in 70 (70%) and C allele was found in 169 (64.5%) of samples. Genotype CC was found in 72% of osteoporosis, 28% were with genotype CT, no detection for TT genotype.

In Osteopenia cases, genotype CC was found in 80%, and 20% were with genotype CT. As for the controls, 56% were genotype CC, 40% were with genotype CT, and 4% were with genotype TT.

The result of MTHFR C677T polymorphism, the allelic T frequency was 0.156 of total allele. No significant difference in the genotypic distribution between cases (osteoporosis and osteopenia and controls) was observed.

Discussion

The purpose of this study is to show the distribution frequency of the MTHFR polymorphism in postmenopausal Indonesian women with osteoporosis and also to show the correlation between MTHFR C677T polymorphism with osteopenia.

From the results that we get, only 1 of 100 samples was available for TT genotype, and that was found in control samples.

They are not found in osteoporosis and osteopenia samples for TT genotype. And only 20 of the whole samples were found CT genotype: 14 (28%) of osteoporosis, 5 (20%) of osteopenia and 10(60%) of the control sample.

The presence of the T allele is only 31 (15.5%). Several studies have reported that only a few of T allele was found in population, especially in Asian population.

Conclusion

This current study shows that only a few of MTHFR C677T polymorphism was found in postmenopausal and does not have a significant association with bone mineral density.
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Jumlah Penulis : 8 orang
Status Pengusul : penulis keempat/penulis ke 4 / 8 penulis korespondensi **
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