

SPILANTHES ACMELLA AND PHYSICAL EXERCISE INCREASED TESTOSTERONE LEVELS AND OSTEOBLAST CELLS IN GLUCOCORTICOID-INDUCED OSTEOPOROSIS MALE MICE

¹Hening Laswati, ¹Imam Subadi, ²Retno Widyowati, ²Mangestuti Agil,
³Jahya Alex Pangkahila³

¹Department of Physical Medicine and Rehabilitation, Faculty of Medicine,
Airlangga University, Surabaya-Indonesia

²Department of Pharmacognosy and Phytochemistry, Faculty of Pharmacy,
Airlangga University, Surabaya-Indonesia

³Department of Andrology and Sexology, Faculty of Medicine, Udayana
University, Bali-Indonesia

Background: Glucocorticoid-induced osteoporosis is leading cause of secondary osteoporosis by decreasing formation activity and increasing resorption activity. *Spilanthès acmella*, is one of Indonesia medicinal plants that contain of polyphenol and flavonoids. Previously in vitro study showed that buthanol and water fraction from this plant have increased alkaline phosphatase that known as marker of bone formation. The objective of this study to analyze the effect of *Spilanthès acmella* and physical exercise in increasing testosterone and osteoblast cells of femoral's trabecular glucocorticoid-induced osteoporosis male mice. **Method:** This study using a posttest control group design, 36 male healthy mice (5 months old) were randomizely divided into 6 groups, there are : 1. Healthy control group (without induction dexamethaxone), 2. Osteoporosis groups (induction with dexamethaxone without treatment), 3. Positive control receive suspension alendronat, 4. 70% Ethanol extract of *Spilanthès acmella* group, 5. Combination group of 70% extract ethanol of *Spilanthès acmella* and exercise, and 6. Exercise group (walking using mice treadmill 10m/minute, 5-12 minutes 3 times a week). All of the intervention were given for 4 weeks. The serum levels of testosterone were determined using immunoserology (ELISA) and osteoblast cells were determined histomorphometry by light microscopy. All statistical test were carried out using SPSS 23 and statistical significance was set at $p < 0.05$ for all analysis. The testosterone levels between group were compared using Mann-Whitney test and osteoblast cells between group were compared with multiple comparison. **Results:** It showed that the alendronate group, combination group and the exercise group increasing testosterone level ($p < 0.05$) from that osteoporotic group. There were also increasing osteoblast cells ($p < 0.05$) in the alendronate group and combination group. There was no correlation between testosterone level and osteoblast cells ($p > 0.05$). **Conclusion:** It proved that 70% ethanol extract of *Spilanthès acmella* have an additive effect to weight bearing exercise in glucocorticoid-induced osteoporosis male mice.

Keywords: Glucocorticoid; Induced; Osteoporosis; *Spilanthès acmella*; Testosterone

INTRODUCTION

Osteoporosis is defined as a skeletal disorder of compromised bone strength predisposing to an increased risk of fracture.¹ Recent epidemiological studies have shown that osteoporosis become as a

worldwide major public health problem not only for women population but also in men population. It is estimated that the total number of hip fractures in women and men in 2025 will be similar.² In men the distribution of prevalence of osteoporosis is bimodal, the early peak (before age 50) is mostly due secondary osteoporosis, while the later peak (after age 60) mostly represents primary osteoporosis.³ According to the World Health Organization (WHO) by applying the standard from The International Society for Clinical Densitometry it is estimated that 1 to 2 million men in the United

Address for correspondence:

Hening Laswati

Department of Physical Medicine and Rehabilitation,
Faculty of Medicine, Airlangga University, Surabaya-
Indonesia

Email: apangkahila@gmail.com