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Potence for Osteogenesis of (*Cissus quadrangularis* Salisb) Ekstract in Ovariectomized Rats

Mustafa Sabri^{1,*}, Nurhidayat², Wasmen Manalu², Bambang Pontjo Priosoeryanto³, Hamny¹, Sri Wahyuni¹

¹Laboratory of Anatomy, Faculty of Veterinary Medicine, Syiah Kuala University, Banda Aceh, Indonesia.

²Departement of Anatomy, Physiology and Pharmacology, and ³Department of Clinic, Reproduction and Pathology, Faculty of Veterinary Medicine, Bogor Agricultural University, Bogor 16680, Indonesia

*Corresponding author: mustafa_sabriyosa@yahoo.com

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INTRODUCTION

Osteoporosis is conditions or changes in bone due to a decrease in bone mass, mineral and bone matrix that decrease bone density or bone loss. The decrease is due to imbalance of bone resorption to bone formation. Osteoporosis process occurs because of decreased estrogen in post menopausal women. While, osteoblastogenesis in red marrow of myloid tissues (Sabri, 2011; Smith 1993) needs estrogen. Osteoblasts are active mature cell function to synthesize organic matrix and arrange mineralization process (Potu *et al.* 2009).

Cissus quadrangularis Linn (Cq) is widely used as alternative treatment of joint pain, venereal disease, and osteoporosis in India, Sri Langka and Malaysia (Shirwaikaret *al.* 2003). In Aceh, *Cissus quadrangularis* Salisb locally known as ekstrak sipatah-patah (ESP) has long been used to treat bone fracture. Cq was reported to contain calcium, phosphate, and phytoestrogen having efficacy in treating bone fracture, ESP could be used as an antiosteoporosis. This research was designed to study ESP effectivity in improving osteoblastogenesis to inhibit declining of bone mass on ovariectomized rats.

MATERIALS AND METHODS

Twenty ovariectomized female Sprague Dawley rats at the age of 50 days were assigned into 5 groups: Sham rats (OV-0), Ovariectomized rats without ESP administration (OV-1) and ovariectomized rats administered ESP at the age of 90 days during 120 days (OV-2), at the age of 120 days during 90 days (OV-3), at the age 150 days during 60 days (OV-4) with dosage of 750 mg/kg body weight until the age of 180 days. At the age of 180 days, the experimental rats were sacrificed to measure and analyze osteoblast density, bone growth and microstructure. Paraffin sections of tibia fibula stained by using HE method to observe bone microstructure, osteoblast and osteoclast density.

RESULTS AND DISCUSSION

Administration of ESP during 90 days on OV-3 group showed decrease of number of active and passive osteoblast with its osteoblast density higher than that of control group ($P < 0,05$). Then, active osteoblast density on OV-4 group also showed declining of osteoblasts but similar result to control group ($P < 0,05$). Meanwhile, osteoclast density increased on shorter of administration of ESP duration. Administration of ESP during 120 days on Ovariectomized rat showed lower osteoclast density than those of control group and other groups (OV-3 dan OV-4) ($P < 0,05$). Administration of ESP on ovariectomized rats at the age of 90 days (OV-3) and 60 days (OV-4) showed lower osteoclast density than that of control groups ($P < 0,05$). Administration of ESP on ovariectomized rats during 60 days also showed rare bone marrow and thin trabeculae as well as

Table 1. Active and pasive Osteoblast density, osteoclast and blood vessel in tibia bone of ovariectomized rat administered ESP at the age of 90, 120 and 150 days.

group	Osteoblasts		Osteoclasts	Blood vessels
	Aktif	Pasif		
OV-0	30,75±19,16 ^c	41,79±17,37 ^b	3,21±2,19 ^c	8,04±3,59 ^b
OV- 1	28,17±14,79 ^c	38,00±14,52 ^b	16,00±3,32 ^a	8,50±2,60 ^{ab}
OV- 2	57,19±18,67 ^a	67,31±18,45 ^a	6,68±3,35 ^b	11,17±5,57 ^a
OV- 3	38,46±8,36 ^b	45,75±10,45 ^b	7,67±2,59 ^b	10,75±3,37 ^a
OV- 4	28,39±15,55 ^c	36,39±16,97 ^b	9,06±3,67 ^b	8,71±4,61 ^{ab}

OV-0 = *sham rats*; Ovariectomized rats without ESP administration (OV-1), Ovariectomized rats with ESP administration during 120 days (OV-2), 90 days (OV-3), and 60 days (OV-4).

increased osteoclast density. This condition showed that increase of calcium concentration of bone is influenced by duration of ESP administration during treatment. Phytoestrogen of ESP has role as estrogen of bone formation to decrease bone resorption. On the other side, estrogen also can inhibit parathyroid hormone activity on resorption process through increasing calcitonin (Sabri, 2011).

CONCLUSION

The administration of ESP on ovariectomized rats can increase active osteoblast density and dense trabeculae.

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