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Ovariectomized Decrease Serum Bone Turnover Markers But Not Change The Ratio of Bone Mineral Elements in Rats

Z. Noor., B. Setiawan
TW2W was also greater in HJ30 compared to all the groups. In FWW, there were significantly greater values in all the groups compared to sedentary (C) group, meanwhile there was significantly greater value of FWW in HJ30 compared to all the other groups. In reproductive hormones, LH levels were significantly lower in all the groups compared to C, with exception of J20 and HJ60 and there were significantly higher LH levels in J20, HJ20 and HJ30 compared to J30. Serum FSH levels were significantly lower in H, J20, J50 compared to C, with exception of HJ20 and HJ50. However, there were no significant difference in HJ20 and HJ50 compared to C.

**Conclusion:** High intensity jumping exercise in combination with honey elicited beneficial effects on bone mass, bone strength level compared to low intensity exercise with or without honey supplementation and honey supplementation alone. Moreover, honey plays a protective role against adverse effects induced by jumping exercises on reproductive hormone secreted from anterior pituitary gland.

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**OVARIECTOMIZED DECREASE SERUM BONE TURNOVER MARKERS BUT NOT CHANGE THE RATIO OF BONE MINERAL ELEMENTS IN RATS**

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**Aims:** This study was aimed to elucidate whether ovariectomized change the ratio of bone mineral element and serum bone turnover markers in rat.

**Methods:** A total of 30 Wistar male rats, were randomly divided into three groups including one control group and two groups for ovariectomized rats (1 and 2 months after ovariectomy). The ovariectomized procedure was done in Pharmacology Laboratory, Medical Faculty, Brawijaya University of Malang. The calcium/phosphorus ratio, copper/zinc ratio, calcium/iron ratio, calcium/nickel was analyzed using X-ray fluorescence in Central and Physics Laboratory, Malang State of University, Malang, East Java, Indonesia. The expression of osteocalcin and crosslinked telopeptide was analyzed by ELSIA in Biomedical Laboratory, Faculty of Medicine, University of Brawijaya, Malang. Nonparametric test was used to analyze the different level of bone mineral element ratio and serum bone turnover markers. This study was approved by Local Ethics Committee, Medical Faculty, Brawijaya University of Malang.

**Results:** There levels of calcium/phosphorus ratio, copper/zinc ratio, calcium/iron ratio, calcium/nickel were not significantly different between all groups (p > 0.05).

There expression of osteocalcin was lower significantly in ovariectomized rats compared to control group (p < 0.05). There expression of crosslinked telopeptide was lower significantly in ovariectomized rats compared to control group (p < 0.05).

**Conclusion:** Ovariectomized decrease serum bone turnover markers but not change bone mineral elements in rats.

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**MEOSTRUCTURE AND ATOMIC MINERAL COMPOSITION IN OSTEOPOROSIS**

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**Aims:** To know the difference between mesostructure and atomic mineral composition on osteoporosis compared to normal bone.

**Methods:** Cross-sectional study was conducted at Ulin General Hospital, Faculty of Medicine, University of Lambung Mangkurat, Banjarmasin Saiful Anwar General Hospital, Faculty of Medicine, University of Brawijaya, Malang, Indonesia. 25 osteoporosis patients and 18 normal patients had undergone surgery procedure involved in this study. Bone was obtained from surgery room then analyzed for mesostructure by scanning electron microscope (SEM) and atomic mineral composition by X-ray fluorescence (XRF) in Central and Physics Laboratory, Malang State of University, Malang, East Java, Indonesia. This study was approved by Local Ethics Committee, Medical Faculty, Brawijaya University of Malang.

**Results:** SEM result show degeneration of micro architecture (resorption cavity, holes, and high granule) in osteoporosis compared to normal bone. The level of iron (Fe), nickel (Ni), copper (Cu), ytterbium (Yb), chromium (Cr), molybdenum (Mo), and plumbum (Pb) were higher in osteoporosis bone compared to normal bone. The level of calcium (Ca), zinc (Zn), arsenic (As), silicon (Si), and titanium (Ti) were lower in osteoporosis compared to normal bone.

**Conclusion:** There is a difference of mesostructure between osteoporosis bone than normal that based on its character atomic mineral. The level of atomic mineral which change in osteoporosis compared to normal bone, is candidate for osteoporosis therapy.
CERTIFICATE OF POSTER PRESENTATION

We Cyrus Cooper, Ambrish Mithal, Joon Kiong Lee & Swan Sim Yeap certify that:

Dr Zairin Noor

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OVARIECTOMIZED DECREASE SERUM BONE TURNOVER MARKERS BUT NOT CHANGE THE RATIO OF BONE MINERAL ELEMENTS IN RATS

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INTRODUCTION

• Osteoporosis is characterized by a reduction in bone mass and the micro-architectural deterioration of bone tissue bone fragility and an increase in susceptibility to fracture (Zhoa et al., 2012).
• Ovariectomized (OVX) rats and dogs have been used extensively in osteoporosis models (Liang et al., 2011).
• Ovariectomized rats showed significant gradual increase in serum calcium and phosphorus level (Srikantha et al., 2011).
• Blood zinc and copper levels in ovariectomized rats were significantly increased compared to the sham control (Liang et al, 2011).

OBJECTIVES

• This study was aimed to elucidate whether ovariectomized change the ratio of bone mineral element and serum bone turnover markers in rat.

METHODS

FEMALE WISTAR RATS
CUT\RNED ENTRISE
ONE MONTH POST OVARIECTOMIZED
TWO MONTH POST OVARIECTOMIZED
CONTROL

• Bone mineral elements was measured in femur using X-Ray Fluorescence at the Piharg and Central Laboratory Faculty of Mathematics and Natural Science University of Malang.
• A commercial detection kit (Novateinbio) was applied to measured osteocalcin and carboxyteleopeptidase in serum.

RESULTS

Control One month after OVX Two months after OVX
Phosphorus 13.280 ± 0.172 10.200 ± 2.074 16.060 ± 0.925
Calcium 75.920 ± 3.221 75.550 ± 4.015 67.750 ± 16.800
Ions 0.000 ± 0.699 2.000 ± 0.404 2.000 ± 2.104
Nickel 3.600 ± 0.385 5.055 ± 2.073 9.200 ± 4.770
Copper 0.480 ± 0.924 0.945 ± 0.133 1.145 ± 1.180
Zinc 0.725 ± 0.392 0.955 ± 0.052 1.188 ± 0.479
Calcium/phosphorus 6.556 ± 0.065 6.514 ± 2.046 7.732 ± 2.128
Crushing power 0.891 ± 0.431 0.469 ± 0.176 0.704 ± 0.414
Calcium:zinc 189.66 ± 162.54 36.015 ± 8.346 50.985 ± 45.949
Calcium:collagen 33.396 ± 150.947 10.200 ± 0.738 20.938 ± 17.990

Bone mineral element levels is not different significantly in one month and two month after ovariectomized groups compared to control group (p>0.05).

DISCUSSION

• This finding indicated that mineralization have adaptive process to compensate the effect of estrogen deficiency.
• Although reduced in mass, the bones are normal with respect to mineralization; however, histologically there could be significant decreases thickness of the cortex and the number and size of trabecules (Srikantha et al., 2011).
• Decreasing of osteocalcin and CTX simultaneously indicated decrease of bone turnover marker in one and two months of ovariectomized rats.

CONCLUSION

• Ovariectomized decrease serum bone turnover markers but not change bone mineral elements in rats.

REFERENCES


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