THE ENHANCEMENT OF BONE DEFECT HEALING BY THE APPLICATION OF HYDROXYAPATITE EXTRACTED FROM INDONESIAN LIMESTONE

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ABSTRACT

Objective: This study aimed to examine the effect of hydroxyapatite extracted from Indonesian limestone on bone defects healing towards the number of osteoblasts, fibroblasts and osteoclasts. Method: This was an experimental laboratory study, with randomized post-test only control group design. Femurs of eighteen Cavia cobayas were drilled to make bone defects and divided into 3 groups; group 1 (G1): defects without bone graft treatment, group 2 (G2): bone defects were filled with bovine hydroxyapatite and group 3 (G3): bone defects were filled with Indonesian limestone. After 14 days, the animals were killed and femurs were resected. A histological analysis was undertaken to quantify the number of osteoblasts, fibroblasts and osteoclasts. The data was analyzed using one-way ANOVA and LSD test on which a result of p < 0.05 was considered statistically significant. Results: The number of osteoblasts were higher in G3 than that in group G1 (p <0.05) but not with group G2 (p > 0.05). The number of osteoclasts were significantly lower in group G3 compared with group G1 and G2 (p <0.05). The number of fibroblasts were higher in G3 than that in group G1 and group G2 (p > 0.05). Conclusion: Hydroxyapatite from Indonesian limestone enhanced the bone defect healing by increasing the number of osteoblasts and fibroblasts and reducing the number of osteoclasts. Keywords: Indonesian limestone, hydroxyapatite, osteoblasts, fibroblast, osteoclast

INTRODUCTION

Bone defect reconstruction often disrupted or failed in healing. This study aims to examine the effect of hydroxyapatite extracted from Indonesian limestone on bone defects healing towards the number of osteoblasts, fibroblasts and osteoclasts. The objective of this study is to examine the effect of hydroxyapatite extracted from Indonesian limestone on the number of osteoblasts, fibroblasts and osteoclasts. The study was conducted on eighteen Cavia cobayas. The femurs were divided into 3 groups; group 1 (G1): defects without bone graft treatment, group 2 (G2): bone defects were filled with bovine hydroxyapatite and group 3 (G3): bone defects were filled with Indonesian limestone. After 14 days, the animals were killed and femurs were resected. A histological analysis was undertaken to quantify the number of osteoblasts, fibroblasts and osteoclasts. The data was analyzed using one-way ANOVA and LSD test on which a result of p < 0.05 was considered statistically significant. Results: The number of osteoblasts were higher in G3 than that in group G1 (p <0.05) but not with group G2 (p > 0.05). The number of osteoclasts were significantly lower in group G3 compared with group G1 and G2 (p <0.05). The number of fibroblasts were higher in G3 than that in group G1 and group G2 (p > 0.05). Conclusion: Hydroxyapatite from Indonesian limestone enhanced the bone defect healing by increasing the number of osteoblasts and fibroblasts and reducing the number of osteoclasts. Keywords: Indonesian limestone, hydroxyapatite, osteoblasts, fibroblast, osteoclast

MATERIALS AND METHODS

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RESULT AND DISCUSSION

Hydroxyapatite extracted from Indonesian limestone enhanced the bone defect healing by increasing the number of osteoblasts and fibroblasts and reducing the number of osteoclasts. Keywords: Indonesian limestone, hydroxyapatite, osteoblasts, fibroblast, osteoclast

REFERENCE