ABSTRACT

Bone fracture is defined as the condition where the bone continuity is broken. This may occur due to direct or indirect injury. This study was conducted to observe the acceleration process of bone remodeling using gelatin as a biomaterial, of which the composition is similar to that of the bone. Gelatin as type-1 collagen is biodegradable and able to unite with the surrounding bone. In this study, gelatin was combined with the composite hydroxyapatite with the ratio of 8: 2, with 0.5% concentrated cross-link glutaraldehyde agent, as well as 10% gentamicin as the active ingredient. A comparison of bovine hydroxyapatite-gelatin (BG) and bovine hydroxyapatite-glutaraldehyde-gentamicin (BGG) was applied to the femur of male rabbits. Animals were divided into three groups: positive control group, BG treatment group and BGG treatment group, all of which are given local implant into a 4.2 mm-long bone fracture. Bone growth in the defect was evaluated by histological examinations, X-ray and BALP markers. The X-Ray observations showed that the implants began to shrink in bone defects from days 14 to 42. The results of BALP levels observation in the BG and BGG groups showed that the osteoblastic phase began working significantly on day 14 ($p = 0.0467$). But compared to positive controls there were no significant differences on days 14, 28 and 42. Histological staining showed that in the positive control group, BG group, and BGG group, bone growth was seen as marked by the appearance of osteoclasts, osteoblasts and osteocytes on days 14, 28 and 42. The results showed that BG and BGG implants are able to accelerate the process of bone repair in the femur of fractured rabbits, and BG and BGG have the ability as biomaterials sufficient as bone filling material, as seen using hematoxylin-eosin staining, X-ray results.

Keywords: Bone Remodeling, Bone Fracture, X-Ray, BALP, HE