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Systemic Effect of Metformin on Bone Healing at Bone Defect in Rabbits Using Radiographical and Serum Alkaline Phosphatase Assessment

ABSTRACT:

Clinical therapy for disorders of bone healing present serious challenges. The delivery of the bone filling materials necessitates surgical implantation at the fracture site, which could lead to local complications. As a result, taking osteogenic medications will offer a great way to heal bone lesions. Increased osteoblasts and decreased osteoclasts are 2 ways that metformin has an osteogenic impact. The aim of the study is to determine the systemic impact of metformin on bone healing at the site of a bony defect using radiographic and serum alkaline phosphatase testing. A total of 20 mature male rabbits, divided into 2 groups of 10 each for the treatment group and the control group, were utilized. All rabbits underwent identical surgical procedures under general anesthesia. Two holes that were 3 mm in diameter and 3 mm deep were created and left empty after the femur has been surgically exposed. The study was conducted over 28 days. The rabbits in the treatment group received 50 mg/kg of metformin orally daily for 28 days. The animals were sacrificed at 2 different time points, according to their groups, on the 14th and 28th day after surgery. Bone samples from the defect site of the femur were isolated, sectioned, assessed radiographically, and blood was drawn for serum alkaline phosphatase measurement. There was an increase in bone mineral density and osseointegration. In addition, serum alkaline phosphatase increased in the animals of the group treated with metformin than in the control group at both study time periods. Metformin increases bone healing and regeneration at the bone defect sites and enhances the process of osteogenesis and osseointegration more than the control untreated rabbits.