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ORIGINAL ARTICLE

HISTOLOGICAL AND HISTOMORPHOMETRIC EVALUATION OF THE SYSTEMIC METFORMIN ADMINISTRATION ON BONE HEALING IN RABBITS

Abstract:

Background: After injuries, infections, or tumor removal, endogenous healing depends on bone repair. Disorders of bone healing are difficult to treat in clinical settings. There are numerous induced methods for correcting bone abnormalities, such as the induced membrane technique, allogenic bone grafting, synthetic bone grafting, artificial joint replacement, and autologous bone grafting. However, the delivery of the bone graft and bone filling materials necessitates surgical implantation at the fracture site, which could cause edema, infection, and the development of heterotopic bone locally. Therefore, systemically administered osteogenic drugs will provide an excellent method for bone lesion healing. **Aim of the study:** to evaluate the systemic effect of metformin on bone healing after surgical induction of bony defect and to determine the amount of newly formed bone using histological, histomorphometric analysis, and the surface area measurement of newly formed bone. Also to study the safety of metformin administration at the administered dose for this purpose. **Materials and methods:** Twenty mature male New Zealand rabbits were separated into two groups, each including ten rabbits for the study. The same surgical procedure was performed on all rabbits. Two holes were made at the femur (3 mm in diameter and 3 mm in depth) and left empty. Metformin tablets were ground into a fine powder and the resultant powder was dissolved in 10ml of water to prepare a liquid dosage containing 50 mg /1ml of metformin. Metformin is administered orally to the rabbits through a feeding tube at a dose of 50 mg/kg body weight. Animals were euthanized at two-time intervals, 14 and 28 days. The femur was separated, sectioned preserved, and sent for histological analysis and histomorphometry. **Results:** The results revealed that there is an increase in new bone formation and bone-forming cells in the metformin-treated group. **Conclusion:** Metformin increases bone healing by increasing the number of bone-forming cells and the surface area of newly formed bone tissues and causes less inflammatory response at the site of a bone lesion. So it possesses an osteogenic effect.