

عنوان مقاله:

The Effect of Secretome, Xenogenic Bone Marrow-Derived Mesenchymal Stem Cells, Bone Morphogenetic Protein- γ , Hydroxyapatite Granule and Mechanical Fixation in Critical-Size Defects of Rat Models

محل انتشار:

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خلاصه مقاله:

Background: Recent studies have shown that human bone marrow-derived mesenchymal stem cells (hBM-MSCs) have several drawbacks in treating critical-sized bone defect (CSD). Secretome may offer considerable advantages over living cells in terms of potency, manufacturing and storing easiness, and potential as a ready-to-go osteoinductive agent. However, thus far, there are no studies regarding the efficacy of secretome in bone healing. The objective of this study is to investigate the effect of the secretome in rat models with CSD. Methods: This was an experimental study with post-test only control group design using 60 skeletally mature Sprague Dawley rat which was divided evenly into 6 treatment groups (MSC only, Secretome only, MSC + Secretome, MSC + Secretome + BMP- γ , Control group using Normal Saline). We used Bone Marrow derived MSC in this research. The critical-sized bone defect was created by performing osteotomy and defect was treated according to the groups. Rats were sacrificed on 2nd and 4th week and we measured the radiological outcome using Radiographic Union Score for Tibia (RUST) and histomorphometric (callus, osseous, cartilage, fibrous, and void area) evaluation using Image J. Results: There was no difference in the weight of rats between groups before and after the intervention. RUST score in all intervention group is significantly higher than the control group, however, the MSC-only group was not statistically significant higher than the control group. There is no statistically significant difference in RUST Score between intervention groups. Histomorphometric evaluation showed that total callus formation is the widest in the MSC+Secretome+BMP- γ combination group while the osseous area is found highest on the secretome-only group. Conclusion: Secretome, whether used solely or

combined with BM-MSc and BMP- γ , is a novel, potent bone-healing agent for CSD in rat models. Level of evidence: V

کلمات کلیدی:

Secretome, Mesenchymal stem cell, radiographic, Histomorphometric, Bone Healing, Sprague Dawley Rat

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