

Repair of compact bone critical sized defect with natural originated scaffold in rabbit

ABSTRACT

The main aim of the present study was to investigate, the effect of combination of bone marrow as the primary origin of osteoblast and at the same time as the seed cell and corticocancellous bone graft as the natural scaffold in the repair of critical sized defect compact bone in rabbit. For the test group, bone marrow has been aspirated and seeded into the corticocancellous bone graft, which was used to repair critical size bone defect made in mid shaft femoral bone of the same rabbit. Corticocancellous bone graft itself was utilized as the control group. Radiographs were taken to observe the healing during the 8 weeks of study period. Rabbits were euthanized after 8 weeks. The femoral bone was removed for gross observation, histopathological and scanning electron microscope assessment and evaluation. New bone formation and osteogenesis was observed at the margins and centre of the test group. The bone formation pattern included osteogenesis, osteoinduction and osteoconduction. In the implant of only corticocancellous autograft bone, the major new bone formation was at the margins of the defect and osteogenesis was not observed at the centre of the defect. The combination of bone marrow and corticocancellous bone autograft had better results than corticocancellous bone graft alone in osteogenesis. Bone formation capability and critical sized defect repair was faster in the test defect.

Keyword: Bone marrow; Compact bone; Corticocancellous bone graft; Critical sized defect; Scaffold mesenchymal stem cell and osteoblast