R-15. Effect of a low dose of recombinant human bone morphogenetic protein-2 on bone formation in dog alveolar defects; a preliminary study

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Background

Bone morphogenetic proteins (BMPs) have been shown to play an important role in bone formation during development and wound healing. In spite of there being good prospects for BMP applications, an ideal dose of BMPs has yet to be determined. The purpose of this study was to evaluate the osteoconductive potential of a low dose of rhBMP-2 in a dog alveolar bone defect model.

Materials & methods

A 20mmX6mmX6mm, critical-size , box type, alveolar bone defect was surgically produced in either right or left jaw quadrants of four Mongrele dogs.A block type of macrophorous biphasic calcium phosphate(MBCP) was used as a carrier for rhBMP2 in this study. Each defect received carrier only (MBCP group) or carrier with rhBMP 2(rhBMP 2/MBCP group). For the test group, the MBCP block was soaked into the rhBMP 2(0.025mg/ml) solution of 0.5ml. The mucoperiosteal flaps were sutured. The groups were evaluated radiographically and histologically following a 8-week healing interval.

Results & conclusion

General healing was uneventful in the MBCP control, however, the gingival exposure was observed. the radiolucent area was evident between bone defect bed and MBCP block suggesting the poor bone healing. New bone formation was limited in the histologic examination. Surgical implantation of rhBMP-2/MBCP resulted in enhanced local bone formation at 8 weeks. New bone formation around the MBCP block and intimate bony contact between the block and bone defect bed was evident suggesting the favorable new bone formation. In histological analysis, the general

shape and size of the block was well maintained at 8weeks. The majority of the macropores in the lower part of the block were filled with new bone. Beneath the block, the defect sites were almost completely bridged with new bone and the MBCP block. Although some macropores with fibrous connective tissue could be found in the central and upper part of the block, marcropores with newly formed bone could be also found.

These results implicated that a low dose of rhBMP2 have a predictable effect on new bone formation and MBCP block could serve as a carrier system for predictiable bone tissue engineering using rhBMPs.

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