
Chen CY, Amin MB, Sing LS, Jumah P. *Department of Orthopaedic Surgery, Faculty of Medicine, University of Malaya, 59660 Kuala Lumpur, Malaysia. †Department of Orthopaedic, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia.

Abstract

BACKGROUND CONTEXT: The clinical application of recombinant bone morphogenetic protein in spinal surgery has been shown to be safe and effective. However, its use in minimally invasive spine surgery has been limited to anterior interbody fusion procedures. To date, no study has evaluated the feasibility of percutaneous posterolateral fusion in the spine utilizing rBMP2.

PURPOSE: To evaluated the feasibility of percutaneous posterolateral fusion in the spine utilizing rBMP2.

STUDY DESIGN: Animal study.

METHODS: This is an animal research model involving 32 New Zealand white rabbits stratified into four study groups: Control, Autogenous Iliac Crest Bone Graft (ICBG), Demineralised Bone Matrix (DBM), and rhBMP-2 group with 8 study subjects per group. The rhBMP-2 group was subdivided into open technique (right side), and percutaneous technique (left side). Fusion was graded at 6 weeks and 3 months. After plain radiographic, computed tomography and clinical assessment with the following grading system: Grade A: no bone formation, Grade B: Non-bridging bone formation, Grade C: Fusion, Grade D: Fusion with ectopic bone formation.

RESULTS: No fusion was noted in the placebo group and DBM group. However, in the ICBG group, bone formation occurred in 37.5% of subjects. RhBMP-2 group had a higher fusion rate compared to ICBG group at 6 weeks and 3 months. The fusion rate for ICBG group, rhBMP-2 (open) and rhBMP-2 (percutaneous) was 37.5%, 87.5% and 50.0% at 6 weeks and 50.0%, 100.0% and 62.5% at 3 months. Ectopic bone formation occurred in 12.5% in the rhBMP-2 (percutaneous group) and 25.0% in rhBMP-2 (open group).

CONCLUSION: Usage of rhBMP-2 is feasible for percutaneous posterolateral fusion of the lumbar spine in this animal model. However, more precise delivery system might improve the fusion rate when percutaneous technique is used. Significant rate of ectopic bone formation occurred when rhBMP-2 is used.

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