

Long Segment Fusion to L5 Vertebra and Sacral Vertebra in Degenerative Lumbar Spine

Eung-Ha Kim, M.D., Hyun-Jung Kim, M.D.

Department of Orthopedic Surgery, National Medical Center, Seoul, Korea

– Abstract –

Study Design : A retrospective clinical study about problems in distal ends of long segment fusion to L5 and S1. Authors compared the incidence of fixation failure and analyzed the problematic cases.

Objectives : To verify the causes and associated conditions for high incidence of fixation failure in distal ends of long segment fusion.

Summary of Literature Review : In Degenerative lumbar diseases, degenerative kyphosis, degenerative scoliosis with revision surgery and multiple stenosis require long level fusion which is accompanied by various fixation problems extending to sacrum. Fusion to sacrum provides excellent correction of deformity. However, it results in the loss of movable segment and concentration of the force on lumbosacral region. Moreover it may foresee the problems of fixation or fusion and S-I joint problems. But long fusion to L5 leaving one movable segment below can result in early degenerative change of this segment.

Material and Methods : Among 65 patients given long level fusion involving more than 3 segment in National Medical Center from January 1991 to may 2000, 45 patients were selected and were followed for more than 2 years. First group (G1) involving L5 were 14 cases. Second group (G2) involving S1 were 31 cases. We evaluated loosening of implant-hallo around screw, pull out screw, breakage of screw or rod, change of adjacent segment and pseudarthrosis by means of radiologic modality.

Results : Follow up radiologic findings showed 28.6% of loosening of implant on L5 in G1. G2 showed 41.9% of halo around screw in S1. Among cases with more than 4 level fusion, G1 showed 33.3% lower segment screw loosening and G2 showed 57.9%. In G2, group performed more than 3 level fusion showed 16.7% lower segment screw loosening. More than 4 level fusion showed higher loosening rate (57.9%) with the statistical segmental corellation ($P=0.023$). Lower end screw loosening occurred 16% in cases with interbody fusion and 55% in cases without interbody fusion and it showed statistical corellation ($P=0.047$). Also cases with deformity correction by posterior instrumentation showed higher loosening rate (60%) and showed 18.2% in situ fusion cases and it showed statistical corellation ($P=0.049$). In second case, sacral screw loosening occurred more frequently in patients of osteoporosis (54%), sagittal imbalance postoperatively (38%), correction loss (31%). Only 1 case of G1 showed an

Address reprint requests to

Eung-Ha Kim, M.D.

Department of Orthopaedic Surgery, National Medical Center

#18-79 Ulchiro-6-ka, Choong-gu, Seoul 000-000, Korea

Tel : 82-2-2260-7193, Fax : 82-2-2278-9570, E-mail : eungha@unitel.co.kr

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increased degenerative change between L5-S1.

Conclusion : In fusion to S1 in degenerative lumbar disease, factors such as long level fusion more than 4 segments by posterior instrumented correction, correction loss, sagittal imbalance and accompanied osteoporosis is related to high incidence sacral implant loosening-hallo around screw, pull out screw, breakage of screw or rod. So if these kind of risk factor exist, it seems that the anteriorposterior interbody fusion is necessary. Postoperative L5-S1 degenerative change did not occur in follow up period in patient with well preserved sagittal balance postoperatively in this follow up periods.

Key Words : Degenerative lumbar disease, Long level fusion, Loosening of implant

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Table 1. Cause of long level fusion.

Cause	Case (%)
Multiple spinal stenosis	29 case (64.4)
Degenerative spinal kyphosis	20 case (44.4)
Spondylolisthesis	9 case (20)
Degenerative scoliosis	8 case (18)
Segmental Instability	6 case (13)

Table 2. Number of fusion segment

Level	Group I*	Group II†
3 level	11 (79%)	12 (39%)
4 level	2 (14%)	14 (45%)
5 level	1 (7%)	4 (13%)
6 level		1 (3%)

*Group I : Fusion to L5

†Group II : Fusion to S1

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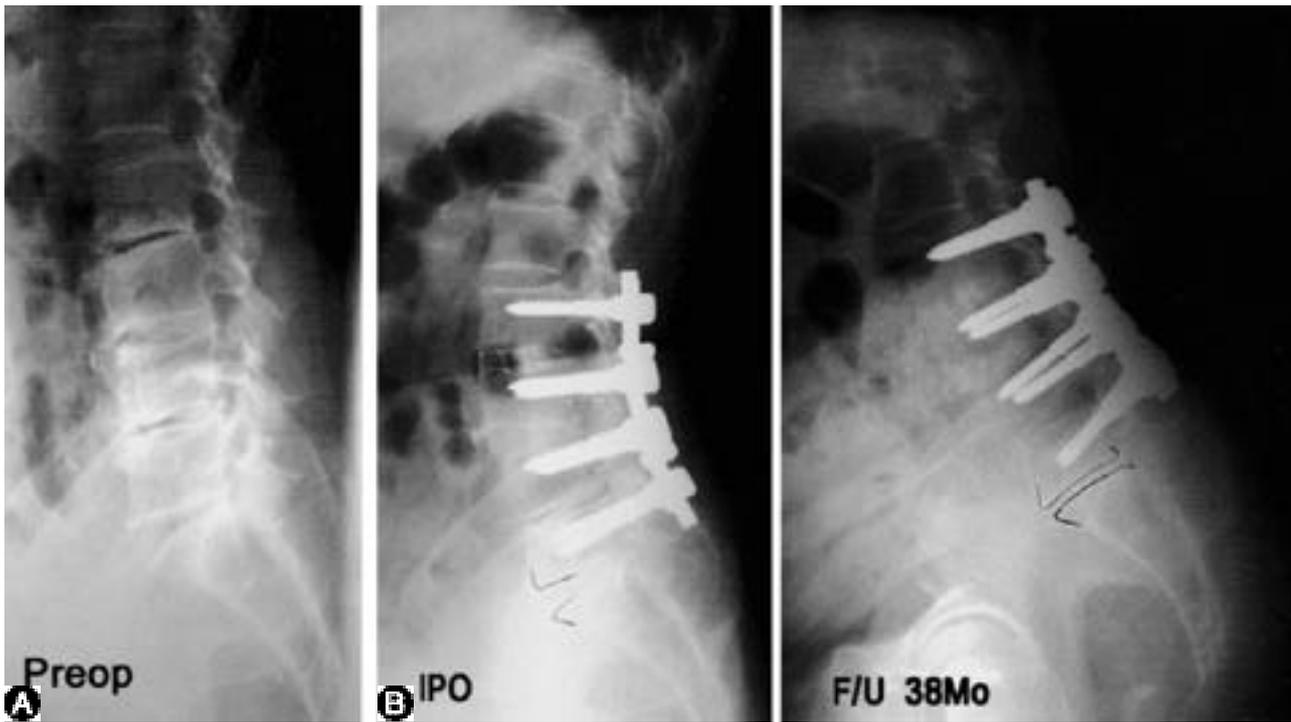


Fig. 1-A. Preoperative lateral side radiography of 67-year-old man shows degenerative lumbar kyphosis, and HNP L2-3-4-5.
B. Postoperative lateral side radiography with L2-5 posterolateral fusion with transpedicular screw and anterior interbody fusion.
 Postoperative 38-months follow-up lateral side radiography of lumbar spine shows correction loss and aggravation of degenerative change L5-S1.

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