Lateral Lumbar Interbody Fusion (LLIF) And Percutaneous Screw Fixation Showed Lower Incidence Of Radiological Adjacent Segment Pathology (ASP) Than Posterior Lumbar Interbody Fusion (PLIF) And Open Pedicle Screw Fixation

Hak Soo Kim, **Jae Chul Lee**, Min Gon Song, Joong-Seok Cha, Sung-Woo Choi, Byung-Joon Shin,
Department of Orthopaedic Surgery, Soonchunhyang University Hospital, Seoul, Republic of Korea

Background: Minimally invasive spinal surgery (MISS) is expected to reduce the incidence of adjacent segment pathology (ASP) by preserving the posterior musculature and ligamentous structure. The purpose of this study is to report the incidence of ASP between MISS and open conventional surgery in accordance with these expectations. In this study, the patients treated with LLIF and percutaneous screw fixation showed lower incidence of radiological facet arthropathy than posterior lumbar interbody fusion and open pedicle screw fixation.

Objectives: To compare the incidence of adjacent segment pathology (ASP) through radiographs according to fusion method : Lateral lumbar interbody fusion (LLIF) and percutaneous screw fixation versus posterior lumbar interbody fusion (PLIF) and open pedicle screw fixation

Materials and methods: We reviewed the medical records and radiographs retrospectively of 107 patients who were followed up for more than 1 year (mean, 45.8 months) after spinal fusion of one or two segments. The mean age at index operation was 62.8 years (range, 29-86). The number of patients treated by LLIF and PLIF were 51 and 56 respectively. The demographic profile of two group had no significant difference. We measured grade of facet arthropathy, angular instability more than 15 degree on flexion and extension X-ray, and observed AP instability which means more than 3mm of anterior or posterior displacement, disc height change, and compression fracture of adjacent segment to evaluate the presence of radiological ASP on plain radiographs. Facet arthropathy was evaluated on preoperative and postoperative 1 year follow-up CT using Weishaupt grade. We assumed that Grade 0 and 1 was normal whereas grade 2 and 3 had facet arthropathy. The disc height change was calculated as the ratio of disc height before surgery to disc height at the final follow-up. Clinical outcome was evaluated by VAS score and Oswetry disability index at preoperative and postoperative 1 year respectively.

Results: Facet arthropathy in the LLIF group showed significantly lower incidence than PLIF group ($p=0.006$). The incidence of AP instability in the LLIF group (3.92%) was lower than that in the PLIF group (10.71%), however, there was no significant difference between two groups ($p=0.275$). Intergroup comparisons showed no significant difference in angular instability (LLIF group = 14.3%, PLIF group = 20.7%), neither ($p=0.324$). The ratio of disc height change showed no significant difference (LLIF group = 0.85, PLIF group 0.87, $p=0.830$). The rate of compression fracture of adjacent segment was compared, and there was no significant difference between two group (LLIF group = 11.76%, PLIF group = 10.71%, $p>0.99$). Clinical outcomes, VAS and ODI score at final follow-up, were reported that there was no significant difference between two groups.

Conclusion: In this study, the patients treated with LLIF and percutaneous screw fixation showed lower incidence of radiological facet arthropathy than posterior lumbar interbody fusion and open pedicle screw fixation. It was thought that preservation of muscle and ligamentous structures might have protective effect for development of radiological ASP. However, the clinical outcomes between two groups had no significant differences.