

HANYANG UNIVERSITY SEOUL HOSPITAL

**Outcomes of Lumbar Spinal Fusion in
Super-elderly Patients Aged 80 Years and over
: Comparison with Patients Aged 65 Years and
over, and under 80 Years**

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- **“Super-elderly” (SE) (≥ 80)** with degenerative spinal disease experience difficulties in their daily life due to low back pain and leg pain
- Surgery may be necessary because many elderly patients remain socio-physically active as life expectancy increases
- The **surgical outcomes in SE patients** are not fully documented

The **purpose** of this study

- ❖ To **compare the outcomes and complications** of lumbar spinal fusion for degenerative lumbar spinal stenosis(DLSS) in **SE patients** age 80 years and over with those in patients aged 65 years and over, and under 80 years

- Retrospective study
- Jan. 2011 ~ Nov. 2019

- 160 patients were classified of **Group SE(≥ 80)** and **Group E($80 >$, ≥ 65)**
- At least one year of follow-up

- Op : **Open TLIF with cages**

- Exclusion criteria: spinal trauma, tumors, deformity, infection,
or revision surgery

- **Clinical and radiological outcomes**

- ✓ Pre- and Post-operative VAS score and Korean Oswestry disability index(K-ODI)
- ✓ Standing AP and Lateral X-ray (Postop 1 and 6 weeks, 3 and 6 months and 1 year)
- ✓ Brantigan, Steffee and Fraser(BSF) classification based on computed tomography(CT)

- **Postoperative complications**

- ✓ **Early complication**
 - ✓ Major : death, neurologic deficit, leakage of cerebrospinal fluid(CSF), deep wound infection, CHF, DVT, PTE, AMI, pneumonia, atelectasis, AKI, stroke
 - ✓ Minor : wound dehiscence, superficial wound infection, hematoma, UTI, urinary disturbance, ileus, gastritis, ischemic colitis, delirium
- ✓ **Late complication**
 - ✓ Adgacent segment disease(ASD), revision surgery and implant failure

- **Group SE (30 patients)**
✓ Average age 82.0
- **Group E (130 patients)**
✓ Average age 71.6
- **Demographic data did not differ between two groups excepts for age and body mass index**
- **The groups were the same preoperative physical status (Comorbidities and ASA score)**

Table 1. Demographics and baseline characteristics

| | Group SE (n=30) | Group E (n=130) | P |
|---------------------------------------|-----------------|-----------------|--------|
| Age at surgery (years) | 82.0 ± 2.1 | 71.6 ± 4.2 | 0.000* |
| Gender (male/female) | 12/18 | 32/98 | 0.089 |
| ¹ BMI (kg/m ²) | 22.8 ± 3.4 | 24.3 ± 3.6 | 0.044* |
| Osteoporosis | 16 (53.3%) | 48 (36.9%) | 0.098 |
| ² BMD (T-score) | -2.4 ± 1.1 | -2.2 ± 1.0 | 0.318 |
| Preoperative ³ Hb (g/dL) | 12.2 ± 1.1 | 12.6 ± 1.5 | 0.103 |
| Preoperative albumin (g/dL) | 3.9 ± 0.4 | 4.1 ± 0.4 | 0.094 |
| Number of fused segments | 2.1 ± 1.4 | 2.2 ± 1.4 | 0.869 |
| Operative time (minutes) | 339.5 ± 97.3 | 337.6 ± 93.2 | 0.921 |
| ⁴ EBL (mL) | 1285.0 ± 1018.6 | 1208.7 ± 868.2 | 0.675 |
| Blood transfusion (mL) | 1031.3 ± 773.7 | 786.2 ± 955.1 | 0.192 |
| Hospital days | 33.1 ± 18.3 | 27.5 ± 25.8 | 0.260 |
| ⁵ ICU hospitalization | 2 (6.7%) | 1 (0.8%) | 0.090 |
| Follow-up period (months) | 33.7 ± 22.4 | 28.0 ± 18.4 | 0.146 |

- **No significant differences in pre- and post-operative VAS score**
- **K-ODI was significantly higher in group SE than group E**
- **No significant differences in percent change of VAS score, K-ODI and Fusion rate**

Table 3. Clinical and radiological outcomes

| | Group SE (n=30) | Group E (n=130) | P |
|----------------------------------|-----------------|-----------------|--------|
| Preoperative ¹ VAS-BP | 6.2 ± 1.7 | 5.5 ± 2.4 | 0.076 |
| Preoperative ² VAS-LP | 6.1 ± 1.7 | 6.5 ± 2.1 | 0.312 |
| Preoperative ³ K-ODI | 31.3 ± 5.5 | 28.2 ± 6.6 | 0.017* |
| Postoperative VAS-BP | 2.8 ± 1.7 | 2.2 ± 1.8 | 0.125 |
| Postoperative VAS-LP | 2.4 ± 1.7 | 2.3 ± 1.8 | 0.597 |
| Postoperative K-ODI | 18.1 ± 6.3 | 14.7 ± 7.7 | 0.022* |
| Percent change of VAS-BP | -53.1 ± 32.1 | -57.6 ± 32.6 | 0.767 |
| Percent change of VAS-LP | -58.4 ± 27.6 | -65.7 ± 26.8 | 0.183 |
| Percent change of K-ODI | -41.8 ± 18.2 | -48.3 ± 25.5 | 0.108 |
| Fusion rates_6 months | 21 (70.0%) | 89 (68.5%) | 0.870 |
| Fusion rates_1 year | 27 (90.0%) | 118 (90.8%) | 1.000 |

- Overall early and late complications were not different between the two groups
- Among the minor complications, only **postoperative delirium was significantly higher in group SE than group E**
- **Blood transfusion was a significant risk factor for major complications, and SE status for delirium**

Table 4. Postoperative complications

| | Group SE (n=30) | Group E (n=130) | P |
|------------------------|-----------------|-----------------|--------|
| Early complications | 17 (56.7%) | 57 (43.8%) | 0.204 |
| Major complications | 5 (16.7%) | 22 (16.9%) | 0.973 |
| Minor complications | 16 (53.3%) | 42 (32.3%) | 0.031* |
| Postoperative delirium | 8 (26.7%) | 12 (9.2%) | 0.027* |
| Late complications | 13 (43.3%) | 56 (43.1%) | 0.980 |

- Some SE patients with DLSS hesitate to undergo surgical treatment because of **concerns about their physical status and comorbidities**
- When performing spinal surgery in SE patients, surgeons are concerned about postoperative complications because several studies have reported that these complications are higher in older patients
- **Satisfactory clinical and functional outcomes** were obtained after spinal fusion surgery for DLSS in **SE patients** in the present study
- **Limitation** : Retrospective study, small SE group, short follow-up period, selection bias of SE group

- **Spinal fusion surgery** for DLSS in **SE patients** resulted in more minor complications, especially **postoperative delirium**, than in elderly patients
- The only **risk factor for postoperative delirium** in this study was **SE status** (odds ratio of 3.4)
- **Spinal fusion surgery** is **considerable treatment** to improve the quality of life of SE patients with DLSS

- **Disclosure declaration**
- **none of the authors has any potential conflict of interest**
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