

ASA Status is Associated with Cost and Length of Stay in Lumbar Laminectomy and Fusion: Results from an Institutional Database

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Introduction

- LLF is a commonly performed spine procedure used to treat degenerative spine disorders and deformities by decompressing and stabilizing the lumbar spine.
- American Society of Anesthesiologists (ASA) physical status classification system was developed to estimate preoperative health, and is indicative of a patient's medical complexity.
- Spinal fusion accounts for the highest hospital costs of any surgical procedure performed in the US, and ASA status has been shown to be a risk factor for cost and length of stay in the orthopedic literature.
- There is a paucity of literature that directly addresses the influence of ASA status on cost and length of stay following lumbar laminectomy and fusion.
- The aim of the current study is to characterize the costs associated with higher ASA class, and to determine the extent to which ASA status is a predictor of increased cost and length of stay following LLF.

Methods

- An institutional database was utilized to identify patients undergoing single-level lumbar laminectomy and fusion between 2006 and 2016.
- Univariate comparisons between groups were made using chi-squared tests for categorical variables and t-tests for continuous variables.
- Multivariate linear regression was utilized to estimate regression coefficients, and to determine whether ASA status is an independent risk factor for cost and length of stay following LLF.

Results

- 1,849 patients met inclusion criteria.
- The average age of the sample was 57.2 ± 13.73 , 54.1% were female, and the average BMI was 29.9 ± 15.9 kg/m². Emergent procedures represented 1.2% of the cases. Patients with higher ASA status tended to be older, had higher BMIs, and were more likely to have the procedure performed emergently.
- Patients with high ASA status had a statistically significantly increased total OR time, operative time, and anesthesia time compared to patients with low ASA status. Patients with high ASA status had a statistically significantly increased crystalloid and colloid administration, as well as increased RBC, platelet, FFP, and cell saver requirements. They also, on average, had a greater estimated blood loss than did patients with low ASA status.
- Patients with high ASA status had increased total direct cost, with ASA 4 patients costing, on average, \$32,035.85 more than ASA 1 patients ($P < 0.001$). The most important drivers of the differences in direct costs are surgery, ICU, and pharmacy costs.
- For every one-point increase in ASA score, ICU length of stay increased by 0.518 days (CI: 0.391-0.646, $P < 0.001$), and hospital length of stay increased by 1.93 days (CI: 1.56-2.29, $P < 0.001$). For every one-point increase in ASA score, direct cost increased by \$7,474.62 (CI: 5,861.31-9,087.92, $P < 0.001$).

Conclusions

- ASA status was a predictor of hospital length of stay, ICU length of stay, and direct cost.
- Consideration of the ways in which ASA status contributes to increased cost and prolonged length of stay can allow for more accurate reimbursement adjustment as well as more precise targeting of efficiency and cost effectiveness initiatives in the future.

Learning Objectives

- By the end of this session, participants should be able to understand the costs associated with ASA class, and to determine the extent to which ASA status is a predictor of increased cost and length of stay following lumbar laminectomy and fusion (LLF).

References

- [1] Youssef JA, Orndorff DO, Patty CA, Scott MA, Price HL, Hamlin LF, et al. Current status of adult spinal deformity. Global spine journal. 2013;3:51-62.
- [2] Cowan JA, Jr., Dimick JB, Wainess R, Upchurch GR, Jr., Chandler WF, La