

Introduction

Prolonged length of stay (LOS) after surgery is associated with increased health care costs. Accurate prediction of LOS following elective lumbar fusion may help optimize the utilization of resources, and assist with framing physician and patient expectations. This study aims to elucidate preoperative and perioperative variables that are predictive of prolonged LOS.

Methods

This is a post-hoc analysis of a prospective randomized controlled trial comparing the efficacy of intrathecal morphine versus placebo for postoperative pain following elective lumbar fusion. The primary outcome was prolonged LOS defined as >5 days. Preoperative variables including patient age, sex, BMI, preoperative Oswestry Disability Index (ODI), and visual analogue scale (VAS) for pain were collected. Perioperative variables including number of level fused, length of surgery, and presence of perioperative adverse events were recorded.

Results

150 patients underwent elective lumbar fusion surgery. The mean age for patients with prolonged LOS (> 5 days) was 66.7 years compared to 60.1 years when LOS was <5 days ($p=0.002$). The ODI score was also higher in the prolonged LOS group (43.5 vs. 35.4) ($p=0.001$). Pain severity did not differ significantly between those with prolonged LOS (VAS of 59.4mm, SD: 22.0) and those without prolonged LOS (VAS of 52.5mm, SD: 21.8) ($p=0.3$). Similarly, compared to patients with mild to moderate disability, patients who reported severe disability ($ODI>40$) had a significantly longer LOS ($p=0.003$), however, no difference in LOS was observed between severe vs. mild/moderate pain group on VAS ($p=0.1$) (Figure 1).

The LOS ranged from 2 to 12 days after elective lumbar fusion surgery (Figure 2) and the median LOS after surgery was 4.0 days (IQR: 3.0). The median LOS for the prolonged LOS group was 7.0 days (IQR: 3.0) and for the = 5 days group was 4.0 days (IQR: 1.5). Most patients had 1-level fusion procedures (64.0%), and 94 patients (64.8%) had ASA class 2. Surgery type (transforaminal interbody fusion, posterior lumbar interbody fusion, and posterior-lateral fusion) had no impact on LOS ($p=0.8$).

Predictors of Prolonged Length of Stay

The multivariable model yielded 4 independent predictors associated with increased odds of prolonged LOS after elective lumbar fusion surgery: ODI (OR 1.05 [95%CI 1.02-1.09], $p=0.004$), age (OR 1.07 [95%CI 1.03-1.12], $p=0.001$), length of surgery (OR 1.01 [95%CI 1.002-1.02], $p=0.005$), and presence of perioperative adverse events (OR 5.7 [95%CI 1.7-19.3], $p=0.005$). History of diabetes, estimated blood loss, and number of levels fused were not found to be independently associated with prolonged LOS. The model fit for the log odds of prolonged LOS can be expressed as: $\log(\text{odds prolonged LOS}) = -9.7 + 0.049(\text{ODI}) + 0.069(\text{Age}) + 0.0089(\text{Length of Surgery}) + 1.7(\text{Adverse Events})$. Where ODI, age and length of surgery are

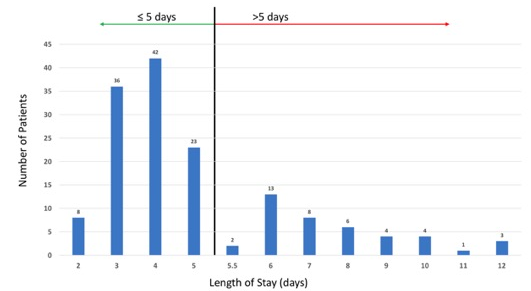


Figure 2. Length of stay following elective lumbar fusion. Prolonged length of stay defined as >5 days. Cases with prolonged length of stay are to the right of the reference line.

Conclusions

Four pre- and peri-operative predictors were found to be significantly associated with prolonged LOS following elective open posterior lumbar fusion. Preoperative disability measured by ODI is a novel modifiable risk factor that may benefit from targeted intervention before surgery.

Learning Objectives

By the conclusion of this session, participants should be able to 1) describe the risk factors for prolonged length of stay following elective open lumbar fusion surgery and 2) identify preoperative severe disability as a novel predictor for prolonged length of stay.

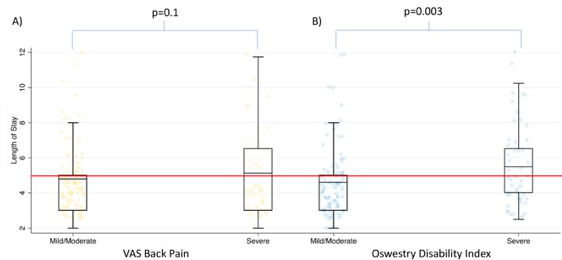


Figure 1. Box-plot comparing length of stay by A) visual analogue scale for back pain (severe pain >70mm) and B) Oswestry Disability Index (severe disability >40). Reference line depicts threshold for prolonged length of stay (>5 days).