

To Drain or Not to Drain: Effect of Surgical Drains on Length of Stay in Posterior Lumbar Spine Surgery

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INTRODUCTION: Surgical drains are frequently used in posterior lumbar spine surgery to reduce the risk of postoperative complications such as hematoma and infection. However, their efficacy remains controversial. Recently, attention has shifted from complication prevention to cost effectiveness, especially hospital length of stay (LOS). Previous studies have shown mixed results, with some reporting prolonged LOS due to drains and others showing no effect or even reduced LOS in select procedures. Moreover, most studies focus on a single surgical procedure, and little data exist regarding the influence of drain duration. While postoperative day 2 (POD2) is commonly used for drain removal, this timing remains arbitrary. The aim of this study was to evaluate whether the use of surgical drains and their duration was associated with increased hospital LOS in patients undergoing one- to three-level conventional posterior lumbar surgery.

METHODS: This single-center retrospective cohort study included adult patients who underwent open posterior lumbar decompression or fusion for degenerative disease between May 2022 and March 2024. Minimally invasive approaches and anterior/lateral fusions (ALIF, LLIF), trauma, tumor, or infection cases were excluded. Patients were stratified by procedure type (decompression alone vs. decompression with fusion) and drain duration: no drain, drain removal \leq POD2, and drain removal $>$ POD2. Data collected included demographics, comorbidities, operative details, postoperative complications, and LOS. Statistical analysis included chi-square or Fisher's exact tests for categorical variables, and ANOVA or Kruskal-Wallis tests with appropriate post hoc analysis for continuous variables.

RESULTS: A total of 177 patients were analyzed: 48 underwent decompression alone and 129 underwent decompression with fusion. The mean age was 64.8 years, with a mean BMI of 29.3 kg/m². Drains were used in 72% of patients, with a median duration of 3 days (range 0–18). The overall median LOS was 4.0 days. Drain use was significantly associated with increased LOS (median 5.0 vs. 1.0 days, $p < 0.001$). In both decompression and fusion cohorts, longer drain duration correlated with longer LOS ($p < 0.001$). In the decompression-only group, patients with $>$ POD2 drains had a median LOS of 5 days versus 1 day in those without drains ($p < 0.001$). Similarly, in the fusion group, median LOS was 5 days with $>$ POD2 drainage compared to 2 days with \leq POD2 ($p < 0.001$) (Figure 1). Patients who underwent more extensive surgeries were more likely to have prolonged drain usage and experienced higher blood loss. In the decompression only group, these patients also experienced more postoperative complications. No symptomatic epidural hematomas occurred, and all infections requiring reoperation occurred in patients with drains.

DISCUSSION AND CONCLUSION: Drain usage and prolonged duration were both associated with increased LOS. While prolonged drainage may delay discharge through output-based removal protocols or patient discomfort, it may also reflect greater surgical complexity. Patients with longer drain duration had more extensive surgery, higher estimated blood loss, and higher complication rates. Importantly, avoiding drains in smaller posterior lumbar procedures appeared safe, with no increase in hematoma or infection risk in this cohort. These findings align with emerging literature questioning routine drain use in spinal surgery. Routine drainage continues to be widely practiced despite limited supporting evidence. Our findings suggest that time-based removal by POD2, rather than output-based criteria, may reduce LOS without increasing complications. Future prospective randomized studies are needed to clarify the optimal role and timing of drain use in spine surgery.

