

# Robotic Assistance Does Not Improve Outcomes in Posterior Lumbar Fusion Surgery

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**INTRODUCTION:** Spinal fusion surgery, commonly performed for degenerative disease processes, typically involves the use of pedicle screws for fixation. Pedicle screw placement can be technically challenging, and current literature indicates that screw misplacement and associated complications are common. The aim of this study is to assess the impact of robotic assistance in the setting of posterior lumbar fusion surgery.

**METHODS:** This was a retrospective cohort study utilizing the National Readmissions Database, years 2016-2019. Patients undergoing posterior lumbar fusion surgery, both conventional and robotic assisted, were identified via ICD-10 codes. Multivariate regression was performed to compare postoperative outcomes. Negative binomial regression was performed to assess 30-day readmissions and reoperation, and discharge disposition. Quasi-Poisson regression was performed to assess total charges and length of stay. Patient demographics and comorbidities, measured via the Elixhauser comorbidity index, were both controlled for in our regression analysis.

**RESULTS:** A total of 56,951 patients undergoing posterior lumbar fusion, including 731 (1.28%) who underwent a procedure with robotic assistance, were included in our analysis. We found no difference in complications or hospital-related outcomes between cohorts; however, robotic assisted procedures were associated with increased total charges (Odds Ratio (OR) 1.184;  $p < 0.001$ ).

**DISCUSSION AND CONCLUSION:** Robotic assistance does not improve outcomes following posterior lumbar fusion surgery, but is more expensive. While we found no difference in complications or hospital-related outcomes, robotic assistance was associated with significantly greater total charges. Possible long-term benefits of robotic surgery were not assessed; however, this study calls into question some of the purported short-term benefits of robotic surgery including shorter hospital stays and improved patient safety.

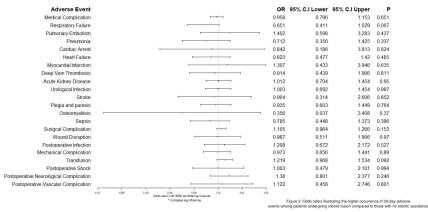


Figure 1 Odds ratios illustrating the higher occurrence of adverse events among patients undergoing robotic fusion compared to those with no robotic assistance.

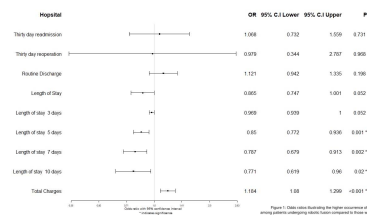


Figure 2 Odds ratios illustrating the higher occurrence of hospital outcomes among patients undergoing robotic fusion compared to those with no robotic assistance.