

# Comparing single-level anterior and posterior approaches to lumbar interbody fusion: a retrospective study assessing risk factors and 30-day perioperative outcomes

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## Introduction

Operative management normally involves an anterior lumbar interbody fusion (ALIF) or posterior lumbar interbody fusion (TLIF/PLIF). Each procedure has surgical risks and benefits; however, few reports with conflicting findings characterize early outcomes. Our objective is to compare the two surgical approaches for elective single-level fusions based on the following outcomes: operation time, hospital length of stay (HLOS), early complications, discharge destination, reoperation and mortality.

## Methods

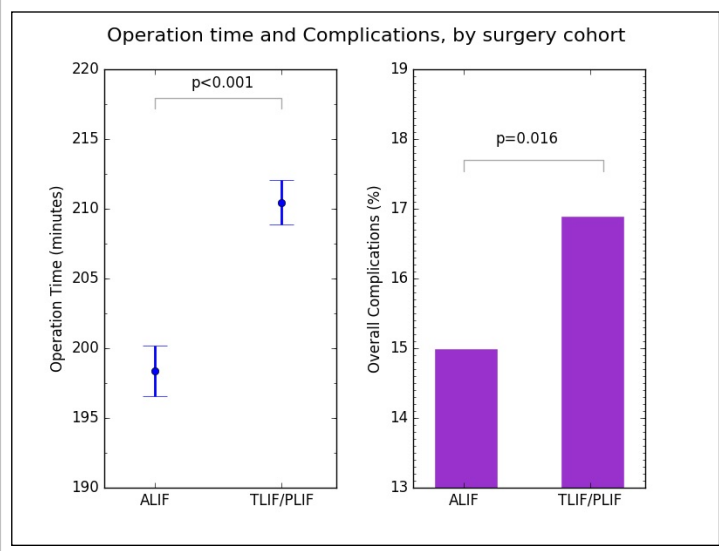
Adult patients undergoing elective single-level ALIF or TLIF/PLIF operations were abstracted from American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) years 2011-2014. Univariate analyses were performed by surgery cohort for each outcome, and corrected for demographic/clinical variables (age=65, sex, race, body mass index (BMI), American Society of Anesthesiologists physical classification (ASA) score, functional status, inpatient/outpatient status, smoking, hypertension, Charlson Comorbidity Index) using multivariable regression. Significance was assessed at  $p < 0.05$ .

## Results

Of 8,263 subjects, ALIF subjects were younger ( $< 65$  years: 72.6% vs. 64.4%;  $p < 0.001$ ), less obese (BMI  $< 30$ : 49.9% vs. 47.2%;  $p = 0.001$ ), less physically impaired (ASA 3-4: 38.5% vs. 43.6%,  $p = < 0.001$ ).

On multivariate analysis ALIF associated with shorter operation time ( $B = -9.77$ -minutes, 95% CI [5.00, 14.53];  $p < 0.001$ ), decreased blood transfusions (10.89% vs. 11.51%;  $p = 0.085$ ) and urinary tract infections (UTI) (1.20% vs. 1.83%;  $p = 0.024$ ).

Multivariate analysis also demonstrated TLIF associated with shorter HLOS ( $B = -0.27$ -days, 95% CI [-0.54, -0.01];  $p = 0.041$ ) and fewer cases of ventilator dependency (0.14% vs. 0.39%;  $p = 0.017$ ) and pneumonia (0.51% vs. 0.9%;  $p = 0.027$ ). Reoperation rates did not differ between surgical cohorts.



## Comparison of early major complications

Complication Variable	ALIF (n=4325)	TLIF/PLIF (n=3938)	Univariate Sig. (p)	Multivariate Sig. (p)
Univariate - N (%)				
Pulmonary embolism	30 (0.69%)	27 (0.62%)	0.929	0.803
Renal failure	1 (0.02%)	1 (0.02%)	0.521	0.948
Pneumonia	39 (0.9%)	22 (0.51%)	0.091*	0.027*
Deep venous thrombosis	31 (0.72%)	25 (0.58%)	0.749	--
Peripheral nerve injury	0 (0%)	2 (0.05%)	0.438	0.999
Urinary tract infection	52 (1.20%)	79 (1.83%)	0.004*	0.024*
Stroke	2 (0.05%)	5 (0.12%)	0.378	--
Myocardial infarction	10 (0.23%)	11 (0.25%)	0.829	0.898
Cardiac arrest	7 (0.16%)	9 (0.21%)	0.661	0.590
Blood transfusion >1 unit	471 (10.89%)	498 (11.51%)	0.014*	0.085*
Superficial wound infection	49 (1.13%)	36 (0.83%)	0.381	0.243
Deep wound infection	25 (0.58%)	18 (0.42%)	0.541	0.401
Ventilator dependency >24 hrs	17 (0.39%)	6 (0.14%)	0.062*	0.018*
Reintubation	12 (0.28%)	11 (0.25%)	0.847	0.879
Death	9 (0.21%)	9 (0.21%)	0.970	0.992

## Conclusions

Patients undergoing ALIF procedures were healthier and younger. ALIF patients experienced decreased operative time and decreased likelihood of experiencing postoperative UTIs, however ALIF patients were more likely to experience postoperative pulmonary complications and longer hospital stays. Our data demonstrates that ALIF performs comparably to TLIF/PLIF in context of 30-day perioperative outcomes. Future studies are needed to confirm these findings.

## Learning Objectives

At the conclusion of our presentation participants will be able to:

- 1) Characterize differing patient populations that undergo either anterior or posterior lumbar interbody fusion.
- 2) Understand the risks and benefits associated with each procedure (ALIF vs. TLIF/PLIF) in context of one of the largest samples of patients heretofore studied.