

Thirty-Day Readmission Rate and Risk Factors Among 2,042 Patients Undergoing Single Level Elective Anterior Lumbar Interbody Fusion (ALIF). An Analysis from a National Database.

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INTRODUCTION

Anterior lumbar interbody fusion (ALIF) is a popular interbody fusion technique (a,b).

An analysis of the Nationwide Inpatient Sample, including 923,038 total LIFs, demonstrated that compared to the ALIF cohort, the PLIF/TLIF cohort had a greater incidence of neurologic complications (0.37% and 0.96%, respectively) (a).

Risks associated with ALIF include (c):

- Vascular injuries
- Prolonged ileus
- Abdominal wall hernia

- Erectile dysfunction or retrograde ejaculation Benefits of ALIF include reduced risk of damage to the paraspinal muscles, posterior ligaments, and neural elements.

Total hospital charges for an initial ALIF procedure have been described(a,d), but readmission rates and predictors of readmission have not been investigated.

Objective: Determine important causes, risk factors, and 30-day readmission precentage

METHODS

Data Source: ACS-NSQIP Database

- CPT code: 22558; procedure was confirmed using the descriptive secondary procedure variable
- Inclusion: Patients whom underwent elective single level
- ALIF surgery since 2006
- Exclusion:
- Segmental fusion
- Emergency or trauma cases were excluded.

Statistical Analysis

- Binary univariable logistic regression analysis identified predictors using a P-value <0.20

- Multivariate model using forward and backward stepwise regression

Outcome: 30-day Readmission

RESULTS

Total n = 2,042 patients Years: 2011 to 2013 had readmission data Readmitted proportion was 5.19% (106/2,042)

Table 1: 30-day Readmission & Causes %, 2011-

2013

Year of Admission	2011	2012	2013	Total
n Readmitted	22	34	50	106
% Readmitted	5.02%	5.49%	5.08%	5.19%
% Cases with Reportable	n/a	70%	80%	60%
Readmission Cause		(24)	(40)	(64)
Total	438	619	985	2,042

Top 3 causes for readmission:

(1) poor post-operative pain (11%)

(2) deep (9%) and

(2) superficial (9%) surgical site infections

Table 2:Patient Demographics and Risk Factors

Risk Factor	ACS NSQIP Variable	Readmission within 30 days	NO Readmission within 30 days	p-value
Surgery performed by Neurosurgeon	surgspec	53/106 (50%)	854/1935 (44%)	0.24
Age (mean years ±SE)	age	57.31 ± 1.22 (n=106)	54.26 ± 0.31(n=1936)	0.02
Female Gender	sex	60/106 (56%)	1077/1935 (56%)	0.85
ASA Class (mean +SE)	asaclas	2.37 ± 0.06 (n=105)	2.35 ± 0.01 (n=1933)	0.74
Underweight <18.5 Normal 18.5 to <25 Overweight 25 to <30 Obese 30 to <35 Morbidly obese >35	-	3/106 (3%) 20/106 (19%) 39/106 (37%) 21/106 (19%) 23/106 (22%)	22/1929 (1%) 425/1929 (22%) 631/1929 (33%) 480/1929 (25%) 371/1929 (19%)	0.28 °
Current Smoker within 1 year	smoke	27/106 (25%)	499/1936 (26)	0.95
History of Diabetes Mellitus	diabetes ^a	17/106 (16%)	235/1936 (12%)	0.24
History of severe COPD	hxcopd	8/106 (8%)	60/1936 (3%)	0.02
History of Hypertension Rx	hypermed	53/106 (50%)	849/1936 (43%)	0.22
	Peri	operative Risk Factors		
Total operation time in minutes (mean+SE)	optime	218.49+11.92 (n=106)	205.26+2.82 (n =1942)	0.28
Length of total hospital stay (mean+SE)	tothios	4.58 ± 0.40 (n=106)	3.96 ± 0.15 (n=1918)	0.15
Superficial Wound Infection	supinfec	9/106 (8%)	15/1936 (<1%)	<0.01
Days from ALIF surgery to superficial wound infection (mean + SE)	dsupinfec	14.22 <u>+</u> 1.48 (n=9)	20.53 <u>+</u> 1.59 (n=15)	0.01
Deep Wound Infection	wndinfd	9/106 (8%)	8/1936 (<1%)	< 0.001
Days from ALIF surgery to deep wound infection (mean + SE)	dwndinfd	18.55 <u>+</u> 2.53 (n=9)	13.50±3.30 (n=8)	0.11
Pulmonary embolism	pulembol	1/106 (<1%)	13/1936 (<1%)	0.53
Occurrence of Sepsis	othsysep	7/106 (7%)	7/1936 (<1%)	< 0.001
Urinary Tract Infection	uminfec	2/106 (2%)	18/1936 (1%)	0.33
Occurrences of DVT/Thrombophlebitis	othdvt	2/106 (2%)	13/1936 (<1%)	0.18
Pneumonia diagnosed after surgery	oupneumo	6/106 (6%)	14/1936 (<1%)	< 0.001
Reoperation within 30 days	returnor	36/106 (34%)	35/1936 (2%)	< 0.001
RVU (mean + SE)	-	114,71+3.52 (n=14)	114.67+1.35 (n= 155)	0.99

Risk factors not associated with readmission: bleeding disorders, anemia, and perioperative blood loss

Table 3: Final Binary Logistic Regression Model

Real Contractor Real Advances	Full Model n=2,024		
Risk Factor	OR ^a (95% CI)	p-value	
Preoperative Risk Factor			
Age, in years	1.02 (1.00-1.03)	0.05	
History of severe COPD	2.11 (0.95-4.70)	0.08	
Perioperative/Post-operative F	Period	38	
Pneumonia diagnosed after surgery	6.58 (2.36-18.30)	< 0.001	
Superficial Wound Infection	11.68 (4.88-27.95)	< 0.001	

CONCLUSIONS

- First nationwide evaluation of readmission risk factors for patients undergoing single level ALIF procedure.

- Readmission rate was comparable to other interbody fusion techniques

- Surgical site infections and post-operative pain control are important modifiable causes

- PNA and COPD are important risk factors associated with readmission

- Limitations: missing data, lacking procedure specific operative outcomes

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