



Factors Associated with Complications and Length of Stay Following Multilevel Lumbar Laminectomy and Fusion

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Learning Objectives

This abstract shows that diabetes is significantly associated with increased 30 and 90-day complications. Additionally, we also find that older patients, those undergoing multilevel fusions, and those that sustain an in hospital complication have increased length of hospital stay.

Introduction

There is a paucity of data examining patient characteristics that affect surgical complication rates and length of hospital stay for patients undergoing multilevel lumbar laminectomy and fusion.

Methods

508 patients undergoing lumbar laminectomy and fusion in 3 or fewer levels were prospectively included in this study. Length of hospital stay and presence/type of a postoperative complication within 30/90-days postoperatively were collected in a comprehensive spine registry. Logistic regression analyses for 30/90-day complications were performed using age, gender, BMI, ASA grade, comorbidities (smoker, diabetes, coronary artery disease), preoperative patient reported outcome scores (preoperative ZUNG depression rating, preoperative MSPQ anxiety measure, preoperative EQ5D, and preoperative ODI) and surgical factors (blood loss, length of surgery, primary vs. revision surgery, use of an interbody fusion, number of levels fused) as covariates. Linear regression analysis for length of hospital stay also included complications occurring during the initial hospital stay as a covariate.

Table 1: Patient demographics and baseline PROs, n = 508

Age	59.5 ± 11.7
Male (%)	224 (44)
BMI	31.0 ± 6.2
ASA grade	2.7 ± 0.5
Smoker (%)	269 (53)
Diabetes (%)	117 (23)
CAD (%)	100 (20)
ZUNG	36.7 ± 9.8
MSPQ	6.8 ± 5.0
EQ5D	0.54 ± 0.21
ODI	49.5 ± 14.6

Predictors of Length of Stay

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta				Lower Bound	Upper Bound
1 (Constant)	1.781	1.075			1.657	.098	-.332	3.894
Age	.017	.009	.088	2.022	.044	.000	.034	
Gender	-.318	.185	-.076	-1.717	.087	.482	.046	
BMI	-.011	.015	-.033	-.729	.466	.451	.019	
ASA Grade	-.047	.183	-.012	-.256	.798	.425	.312	
BloodLoss	-1.446E-5	.000	-.003	-.053	.958	.001	.001	
Transfusion	.372	.273	.062	1.361	.174	-.165	.909	
LengthofSurgery	.003	.002	.110	2.264	.024	.000	.006	
PrimaryRevision	.208	.185	.048	1.125	.261	-.155	.571	
InterbodyFusion	.034	.197	.008	.174	.862	-.353	.421	
NumberofLevels	.325	.136	.114	2.382	.018	.057	.593	
Smoker	-.058	.179	-.014	-.322	.748	-.409	.294	
Diabetes	.257	.221	.052	1.163	.245	-.177	.891	
CardiacDisease	.166	.237	.032	.701	.484	-.259	.831	
PreopZungDSDepr	.022	.012	.106	1.807	.071	-.002	.047	
PreopMSPQAnxiety	.029	.022	.089	1.327	.185	-.014	.071	
PreopEQ5D	-.928	.535	-.082	-1.734	.084	-1.980	.124	
PreopODI	-.012	.008	-.085	-1.440	.150	-.029	.004	
InitialStayComplication	3.025	.365	.351	8.282	.000	2.307	3.742	

a. Dependent Variable: LengthofStay

Predictors of 30 Day Complications

Step 1 ^a	Variables in the Equation					95% C.I. for EXP(B)		
	B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Age	-.004	.015	.075	1	.784	.996	.967	1.025
Gender(1)	-.140	.322	.190	1	.663	.869	.462	1.634
BMI	-.021	.026	.655	1	.418	.979	.929	1.031
ASA Grade			2.983	3	.558			
ASA Grade(1)	19.173	17199.210	.000	1	.999	212118916.1	.000	.
ASA Grade(2)	19.055	17199.210	.000	1	.999	188600455.0	.000	.
ASA Grade(3)	20.152	17199.210	.000	1	.999	565039228.6	.000	.
BloodLoss	.000	.000	1.324	1	.250	1.000	1.000	1.001
LengthofSurgery	.000	.003	.012	1	.911	1.000	.995	1.005
PrimaryRevision	.456	.327	1.949	1	.163	1.578	.832	2.993
InterbodyFusion	-.525	.349	2.265	1	.132	.592	.299	1.172
NumberofLevels	.242	.217	1.243	1	.265	1.274	.832	1.850
Smoker	.320	.313	1.048	1	.308	1.377	.746	2.541
Diabetes	.721	.352	4.193	1	.041	2.057	1.031	4.101
CardiacDisease	-.608	.431	1.989	1	.158	.545	.234	1.287
PreopZungDSDepr	-.018	.021	.746	1	.388	.982	.942	1.023
PreopMSPQAnxiety	.015	.035	.176	1	.674	1.015	.947	1.088
PreopEQ5D	-.385	.912	.178	1	.673	.680	.114	4.066
PreopODI	.023	.015	2.430	1	.119	1.023	.984	1.053
Constant	-21.455	17199.210	.000	1	.999	.000		

Predictors of 90 Day Complications

Step 1 ^a	Variables in the Equation					95% C.I. for EXP(B)		
	B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Age	-.011	.014	.558	1	.455	.990	.963	1.017
Gender(1)	-.177	.308	.330	1	.566	.838	.458	1.533
BMI	-.021	.025	.710	1	.399	.979	.931	1.029
ASA Grade			1.820	3	.611			
ASA Grade(1)	19.258	17556.851	.000	1	.999	231016406.0	.000	.
ASA Grade(2)	19.175	17556.851	.000	1	.999	212580021.7	.000	.
ASA Grade(3)	20.198	17556.851	.000	1	.999	591564420.8	.000	.
BloodLoss	.001	.000	2.055	1	.152	1.001	1.000	1.001
LengthofSurgery	-.001	.003	.246	1	.620	.999	.984	1.004
PrimaryRevision	.360	.312	1.331	1	.249	1.433	.778	2.641
InterbodyFusion	-.320	.333	.924	1	.338	.726	.378	1.394
NumberofLevels	.324	.211	2.354	1	.125	1.382	.914	2.090
Smoker	.135	.297	.207	1	.649	1.145	.639	2.050
Diabetes	.683	.340	4.021	1	.045	1.979	1.015	3.856
CardiacDisease	-.484	.411	1.385	1	.239	.616	.275	1.380
PreopZungDSDepr	-.013	.020	.394	1	.530	.987	.949	1.027
PreopMSPQAnxiety	.010	.034	.087	1	.768	1.010	.945	1.080
PreopEQ5D	-.400	.878	.209	1	.648	.670	.120	3.729
PreopODI	.015	.014	1.066	1	.303	1.015	.987	1.045
Constant	-20.703	17556.851	.000	1	.999	.000		

Results

There was a 12.4% and 15.9% rate of 30 and 90-day complications in this cohort, respectively. Only diabetes was significantly associated with the incidence of 30 and 90-day complications (OR 2.057, 95% CI 1.031-4.101, p = 0.041 & OR 1.970, 95% CI 1.015-3.856, p = 0.045, respectively) after controlling for all other covariates. Increasing length of stay was seen in those with complications during the initial hospital stay (3.025, p = 0.001), increased age (correlation coefficient 0.017, p = 0.044), and increasing number of levels fused (0.325, p = 0.018).

Conclusions

Our study suggests that diabetes is significantly associated with increased 30 and 90-day complications in patients undergoing lumbar laminectomy and fusion. Increased length of stay was noted in older patients, multilevel fusions, and those that sustained an in hospital complication. Future studies on the role of pre, peri, and post-operative glucose control may elucidate management strategies to reduce complication rates in these patients.