Predictors of Blood Loss Following Multilevel Lumbar Laminectomy and Fusion

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Learning Objectives

The objective of this abstract is to show the factors that are associated with blood loss during lumbar laminectomy and fusion.

Introduction

Lumbar laminectomy and fusion has been shown to be a highly successful procedure. However, blood loss can have a deleterious impact on complication rate and outcome. Predicting those that will have greater blood loss may allow for perioperative interventions that minimize blood loss.

Methods

508 patients undergoing lumbar laminectomy and fusion of 3 or fewer levels were prospectively included in this study. Linear regression analysis evaluating the amount of blood loss during surgery was performed using age, BMI, ASA grade, preoperative hematocrit, length of surgery, primary vs. revision surgery, use of an interbody fusion, and the number of level fused as covariates.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
Constant	132.074	187.468		.705	.481	-236.296	500.444
Age	1.843	1.447	.055	1.274	.203	-1.000	4.687
BMI	3.938	2.626	.062	1.500	.134	-1.222	9.099
ASA Grade	-7.972	32.215	-.010	-.247	.805	-71.274	55.330
Preoperative Hct	-16.487	3.563	-.187	-4.627	.000	-23.489	-9.485
Length of Surgery	2.328	.253	.390	9.201	.000	1.831	2.825
Primary vs. Revision	46.983	32.749	.057	1.435	.152	-17.368	111.335
Interbody Fusion	1.028	35.515	.001	.029	.977	-68.758	70.814
Number of Levels	90.101	23.990	.166	3.756	.000	42.962	137.241

Table 1: Predictors of Blood Loss Following Multilevel Lumbar Laminectomy and Fusion

Results

The average blood loss in our cohort was 555 ± 405 mL (range 50-3600 mL). Of the covariates analyzed above, length of surgery had the greatest association with blood loss (correlation coefficient 2.3, $p<0.001$). The number of levels undergoing arthrodesis and preoperative hematocrit were also significantly associated with blood loss (90.1, $p<0.001$ and -16.5, $p<0.001$, respectively). This translates into each additional minute of surgery increased blood loss by 2.3 mL, each additional level fused increased blood loss by 90.1 mL, and each 1 point decrease in pre-op hematocrit increased blood loss by 16.5 mL.

Conclusions

Our work suggests that patients with increased operating times, more levels fused, and lower hematocrit will suffer larger volumes of blood loss following lumbar laminectomy and fusion (=3 levels). Our model could potentially be used to guide surgeons on perioperative decisions in relation to blood loss such as the use of autologous transfusions vs. allogeneic transfusions and antifibrinolytics.