

Patients with achondroplasia have increased risk of 90-day adverse events following laminectomy: a matched comparison using a national database

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INTRODUCTION:

Achondroplasia is one of the most common forms of skeletal dysplasia. Performing laminectomy on patients with achondroplasia may present unique challenges. Data on 90-day adverse events following laminectomy are sparse for such patients. The purpose of this study was to evaluate and analyze 90-day postoperative adverse events following laminectomy in patients with and without a diagnosis of achondroplasia.

METHODS:

All patients undergoing thoracic and lumbar laminectomy in the 2010-2020 PearlDiver Mariner 91 administrative database were identified. Those with achondroplasia were matched 1:4 to patients without achondroplasia based on weighted propensity score matching of age, sex, medical comorbidities (Elixhauser Comorbidity Index [ECI]), and insurance type. Ninety-day adverse events were assessed and compared using multivariate logistic regression. These included an aggregated category of “all adverse events” (AAE), with subcategorization for transfusion, urinary tract infection (UTI), disruption of wound, hematoma, pneumonia, cardiac arrest, acute kidney injury (AKI), other perioperative/iatrogenic adverse events, durotomy, and venous thromboembolism (VTE) based on international classification of diseases (ICD) 10 coding. Odds ratios (OR), 95% confidence intervals (CI), and p-values were reported with significance set at $p < 0.05$.

RESULTS:

A total of 231 patients with achondroplasia were matched to 924 patients without achondroplasia (Table 1). On multivariate analysis, patients with achondroplasia were found to have 2.82 greater odds of 90-day all adverse events compared to those without following laminectomy ($p < 0.001$). In comparing individual adverse events, patients with achondroplasia were found to have significantly greater odds of transfusions (OR 6.40, $p < 0.001$), UTI (OR 3.79, $p < 0.001$), disruption of wound (OR 3.71, $p < 0.001$), and hematoma (OR 2.94, $p = 0.032$). Pneumonia, cardiac arrest, AKI, other perioperative events, durotomy, and VTE were not found to be significantly different (Table 2, Figure 1).

DISCUSSION AND CONCLUSION:

The present study represents the largest comparative cohort study of patients with and without achondroplasia undergoing laminectomy to date. Patients with achondroplasia were found to have significantly greater risk of 90-day adverse events following laminectomy compared to a matched cohort of patients without achondroplasia. This study suggests that cautious awareness of and monitoring of patients with achondroplasia undergoing laminectomy may be warranted.

Odds of 90-Day Adverse Events for Achondroplasia Patients

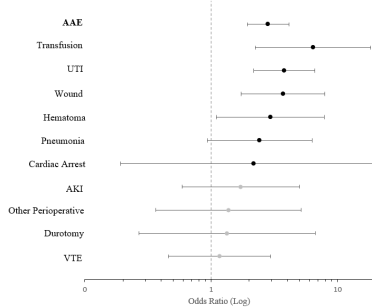


Figure 1: Forest plot of 90-day adverse events following laminectomy in patients with achondroplasia compared to those without.

Table 1: Patient Characteristics

	Laminectomy		p-value
	No Achondroplasia Value % (SD)	Achondroplasia Value % (SD)	
Total	924	231	
Age Mean Years	50.0 (17.5)	49.8 (17.8)	0.891
Sex			0.941
Female	481 52.1%	119 51.5%	
Male	443 47.9%	112 48.5%	
Insurance			1.000
Commercial	693 75.0%	174 75.3%	
Medicaid	61 6.6%	15 6.5%	
Medicare	154 16.7%	38 16.5%	
Other	16 1.7%	<10 <4.3%	
ECI	4.1 (3.5)	4.0 (3.4)	0.713

Abbreviations:
ECI = Elixhauser Comorbidity Index
SD = Standard Deviation

Table 2: Multivariate analysis of 90-day adverse events after laminectomy in patients with achondroplasia

	OR	95% CI	p-value
AAE	2.82	1.93 4.12	<0.001
Transfusion	6.40	2.24 18.34	<0.001
UTI	3.79	2.18 6.61	<0.001
Wound	3.71	1.73 7.96	<0.001
Hematoma	2.94	1.10 7.87	0.032
Pneumonia	2.42	0.93 6.28	0.070
Cardiac Arrest	2.17	0.19 24.65	0.532
AKI	1.71	0.59 4.98	0.324
Other perioperative	1.37	0.37 5.14	0.641
Durotomy	1.33	0.27 6.65	0.697
VTE	1.16	0.46 2.94	0.754

Boldface = Significant p-value ($p < 0.05$)

Abbreviations:
AAE = All Adverse Events
AKI = Acute Kidney Injury
CI = Confidence Interval
UTI = Urinary Tract Infection
VTE = Venous Thromboembolism