



Outcomes of Surgery for Lumbar Spinal Stenosis Depend on Insurance Type

Jacob H. Bagley BS; Shivanand P. Lad MD PhD; Beatrice Ugiliweneza MSPH; Ranjith Babu; Timothy Ryan Owens MD; Chirag G. Patil MD MS; Maxwell Boakye MD

1) Division of Neurosurgery, Duke University Medical Center; 2) Department of Neurosurgery, University of Louisville
3) Center for Neurosurgical Outcomes Research, Department of Neurosurgery, Ceders-Sinai Medical Center



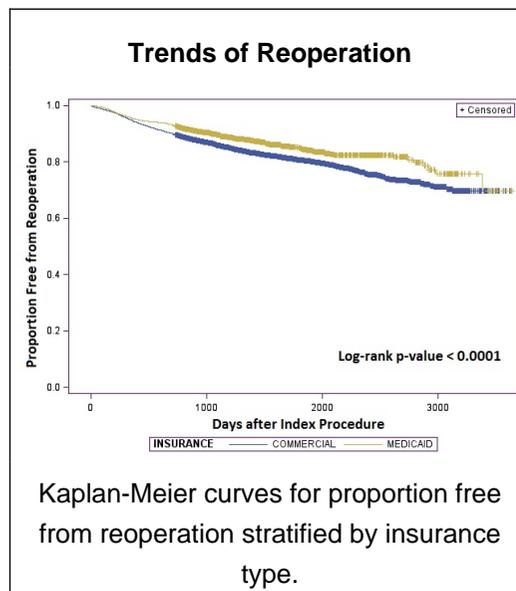
Introduction

Lumbar spinal stenosis is one of the most common reasons patients undergo spinal procedures. The association between insurance type and outcomes of surgery for lumbar spinal stenosis is unknown. We sought to evaluate insurance disparities in the rate of complications, rate of reoperation, and health care resource usage after surgery for lumbar stenosis.

Methods

We analyzed the Medicaid and Commercial datasets of the Reuter's MarketScan database. We included all adult patients with a primary diagnosis of lumbar stenosis who underwent laminectomy or fusion between 2000 and 2009. We excluded those who lacked 2 years of pre- and post-operative follow-up. We used multivariate regression and general linear models to determine the association between the different insurance types and the rate of reoperation, amount of health care resource usage, and rate of complications. We controlled for age, sex, year of index operation, length of follow-up, and comorbidities.

	Total (n = 12127)	Commercial (n = 10604)	Medicaid (n = 1523)	p-value
Age [mean (SD)]	56 (8)	56 (7)	60 (12)	<0.0001*
Post-operative follow-up days [mean (SD)]	1505 (633)	1481 (623)	1675 (675)	<0.0001*
Gender: females [n (%)]	6500 (53.60)	5399 (50.91)	1101 (72.29)	<0.0001*
Charlson index [n (%)]				
0	9755 (80.44)	8816 (83.14)	939 (61.65)	
1	1891 (15.59)	1495 (14.10)	396 (26.00)	<0.0001*
2	368 (3.03)	222 (2.09)	146 (9.59)	
≥ 3	113 (0.93)	71 (0.67)	42 (2.76)	



	Total	Commercial	Medicaid	p-value
Index hospitalization	28462	25821	2641	
Complications	1985 (6.97)	1725 (6.68)	260 (9.84)	<0.0001*
aOR (95% CI)		REF	1.215 (1.046, 1.410)	0.0109*
30-day complications	27577	25000	2577	
Complications	2347 (8.51)	2059 (8.24)	288 (11.18)	<0.0001*
aOR (95% CI)		REF	1.144 (0.993, 1.318)	0.0626
90-day complications	25771	23307	2464	
Complications	1932 (8.29)	1724 (11.12)	208 (8.48)	<0.0001*
aOR (95% CI)		REF	1.092 (0.948, 1.259)	0.2224

Association of Insurance Type and Risk of Reoperation

	Total (n = 12127)	Commercial (n = 10604)	Medicaid (n = 1523)	p-value
1 year re-operation [n (%)]	645 (5.32)	575 (5.42)	70 (4.60)	0.1790
aOR (95% CI)			0.888 (0.679, 1.162)	0.3874
Laminectomy	366 (3.02)	317 (2.99)	49 (3.22)	0.6269
Fusion	280 (2.31)	261 (2.46)	19 (1.25)	0.0032*
Fusion revision	176 (1.45)	151 (1.42)	25 (1.64)	0.5069
2 year re-operation [n (%)]	1202 (9.91)	1092 (10.30)	110 (7.22)	0.0002*
aOR (95% CI)			0.661 (0.533, 0.820)	0.0002*
Laminectomy	664 (5.48)	586 (5.53)	78 (5.12)	0.5162
Fusion	579 (4.77)	550 (5.19)	29 (1.90)	<0.0001*
Fusion revision	374 (3.08)	329 (3.10)	45 (2.95)	<0.0001*
Overall re-operation [n (%)]	2003 (16.52)	1791 (16.89)	212 (13.92)	0.0035*
aOR (95% CI)			0.722 (0.612, 0.851)	0.0001*
Laminectomy	1174 (9.68)	1029 (7.70)	145 (9.52)	0.8211
Fusion	1033 (8.52)	959 (9.04)	74 (4.86)	0.1501
Fusion revision	696 (5.74)	615 (5.80)	81 (5.32)	<0.0001*
			0.822 (0.637, 1.060)	0.1306

Healthcare Resource Use

	Total (n = 12127)	Commercial (n = 10604)	Medicaid (n = 1523)	p-value	
Hospital days [mean (SD)]	3 (4)	3 (4)	4 (5)	<0.0001*	
Mean Ratio estimate (95% CI)			1.09 (1.05, 1.13)	<0.0001*	
Post-op 1yr total	2 (7)	2 (6)	3 (10)	<0.0001*	
Post-op 2yr total	3 (10)	3 (9)	5 (13)	<0.0001*	
Outpatient services [mean (SD)]	69 (65)	67 (63)	82 (77)	<0.0001*	
Mean diff estimate (95% CI)	131 (115)	126 (109)	161 (149)	<0.0001*	
Charpt ER services [mean(SD)]	2 (10)	1 (6)	9 (23)	<0.0001*	
Mean diff estimate (95% CI)	Post-op 1yr total	4 (17)	2 (9)	7.84 (6.85, 8.98)	<0.0001*
Medications [mean(SD)]	40 (40)	36 (34)	67 (62)	<0.0001*	
Mean diff estimate (95% CI)	Post-op 1yr total	77 (78)	70 (67)	1.51 (1.40, 1.63)	<0.0001*
Hospital charges[mean (SD)]	22612 (22649)	23196 (22491)	18545 (23322)	<0.0001*	
Mean Ratio estimate (95% CI)	7031 (25735)	6915 (25969)	7837 (24034)	1.41 (1.11, 1.79)	0.0050*
Outpatient charges[mean (SD)]	8495 (11990)	6233 (11661)	2365 (5474)	<0.0001*	
Mean Ratio estimate (95% CI)	16104 (20814)	12830 (20555)	5594 (12248)	0.54 (0.50, 0.58)	<0.0001*
Outpatient ER charges[mean (SD)]	274 (1269)	183 (1190)	196 (843)	<0.0001*	
Mean Ratio estimate (95% CI)	3418 (4634)	2136 (3952)	1089 (2689)	0.82 (0.69, 0.98)	0.0337*
Medication charges [mean(SD)]	6982 (9368)	4836 (8223)	2673 (5459)	<0.0001*	
Overall cost: index hosp + postop input + postop output + postop mds	41557 (41222)	42327 (41634)	36196 (37809)	<0.0001*	
1 year total	59348 (57095)	60146 (57522)	53797 (53720)	<0.0001*	
2 year total			0.76 (0.72, 0.79)	<0.0001*	

Results

After applying our inclusion and exclusion criteria, our cohort contained 10,604 patients with commercial insurance and 1,523 with Medicaid. On average, the Medicaid population was slightly older, had longer follow-up, contained more females, and had more comorbidities than those with commercial insurance. After adjusting for covariates, Medicaid patients were 32% less likely to receive any reoperation than those with commercial insurance (aOR = 0.78, p < 0.01). Patients with Medicaid were at 21% increased risk of immediate post-operative complications (aOR = 1.21, p < 0.0001) and were prescribed more medications (130 vs. 70, p < 0.0001) than those with commercial insurance.

Conclusions

The results of our national, retrospective study suggest that **patients with Medicaid have worse outcomes after lumbar stenosis operations**, even after correcting for age, sex, and comorbidities. Patients with Medicaid have more complications, receive fewer reoperations, and use more health care resources than patients with commercial insurance.