

Insurance Disparities in Anterior Cervical Discectomy and Fusion Outcomes: An Institutional Database Study

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INTRODUCTION: Disparities in age and income between patients with private insurance and those with Medicare / Medicaid are well recognized. These disparities can contribute to outcomes of patients undergoing anterior cervical discectomy and fusion surgery (ACDF). The purpose of our study was to determine the impact of insurance status on outcomes such as length of stay (LOS), non-home discharge, and readmission following ACDF.

METHODS: Patients undergoing ACDF were identified using a database of spine cases from 2008-2019 at a single academic institution in New York. Patients who underwent ACDF were included in the study using the CPT codes 22551, 22552, and 63075. Non-elective procedures, trauma cases, tumor cases, and all procedures involving a posterior approach were excluded. The patients were separated into four groups based on their insurance status – private insurance, Medicare, Medicaid, and other. Private insurance was treated as the reference group for all statistical comparisons. Patient characteristics such as age, sex, ASA status, Elixhauser index, and segments fused were collected. Outcome variables included prolonged intubation, prolonged LOS, in-hospital complication, non-home discharge, and 30- and 90-day readmission, and rates of these outcomes were compared between insurance statuses. All variables were analyzed using a student's t-test or chi-squared analysis, where appropriate. Additionally, logistic regression models controlling for patient characteristics were created to study the effect of insurance status on all outcome variables while controlling for patient characteristics.

RESULTS: Of the 2,804 patients in our sample, 1,521 patients (54.2%) had private insurance, 523 patients (18.7%) had Medicare, 319 patients (11.4%) had Medicaid, and 441 patients (15.7%) had other insurance. Compared with the private insurance group, Medicare patients were older (65.2 years vs. 49.8 years; $p < 0.001$) and had more segments fused (2.95 vs. 2.83; $p = 0.004$). Medicaid patients were more likely to be female than patients in the private insurance group (61.1% vs. 51.5%; $p = 0.002$), and Medicare and Medicaid patients both had higher ASA scores compared to private insurance patients ($p < 0.001$). Patients with Medicare insurance had higher rates of prolonged intubation (2.7% vs. 1.0%; $p = 0.009$), non-home discharge (13% vs. 2.3%; $p < 0.001$), prolonged LOS (21.6% vs. 11.6%; $p < 0.001$), 30-day readmission (4.6% vs. 2.0%; $p = 0.002$), and 90-day readmission (9.6% vs. 3.8%; $p < 0.001$) compared to patients with private insurance. Medicaid insurance was associated with higher rates of non-home discharge (5.0% vs. 2.3%; $p = 0.013$) and prolonged LOS (16.9% vs. 11.6%; $p = 0.011$) (Table 1). On multivariate analysis, Medicare insurance showed an increased risk for non-home discharge (OR 2.79; 95% CI [1.69, 4.60]; $p < 0.001$) after controlling for patient characteristics (Table 2).

DISCUSSION AND CONCLUSION: When planning postoperative care prior to ACDF procedures, surgeons should consider that patients with Medicare and Medicaid insurance may be at a higher risk for non-home discharge and prolonged LOS.

Table 1. Rates of adverse outcomes following ACDF stratified by insurance status.

	Private (n = 1521)	Medicare (n = 523)	Medicaid (n = 319)	Other (n = 441)
Prolonged Intubation	15 (1.0%)	14 (2.7%)	7 (2.2%)	2 (0.5%)
P-Value	ref.	0.009	0.128	0.441
Required ICU Stay	45 (3.0%)	21 (4.0%)	8 (2.5%)	9 (2.0%)
P-Value	ref.	0.3	0.8	0.383
In-Hospital Complication	56 (3.7%)	30 (5.7%)	10 (3.1%)	18 (4.1%)
P-Value	ref.	0.058	0.755	0.806
Nonhome Discharge	35 (2.3%)	68 (13.0%)	16 (5.0%)	9 (2.0%)
P-Value	ref.	<0.001	0.013	0.887
Prolonged LOS	176 (11.6%)	113 (21.6%)	54 (16.9%)	43 (9.8%)
P-Value	ref.	<0.001	0.011	0.325
30-Day Readmission	30 (2.0%)	24 (4.6%)	7 (2.2%)	3 (0.7%)
P-Value	ref.	0.002	0.97	0.099
90-Day Readmission	58 (3.8%)	50 (9.6%)	18 (5.6%)	11 (2.5%)
P-Value	ref.	<0.001	0.181	0.239

Table 2. Multivariate logistic regression results showing risks of adverse outcomes by insurance status after controlling for patient characteristics.

	Private (n = 1520)	Medicare (n = 523)	Medicaid (n = 318)	Other (n = 441)
Prolonged Intubation	ref.	1.34 (0.55, 3.25)	2.00 (0.80, 5.03)	0.51 (0.11, 2.25)
P-Value	ref.	0.517	0.140	0.372
Required ICU Stay	ref.	0.64 (0.34, 1.20)	0.69 (0.32, 1.50)	0.75 (0.36, 1.56)
P-Value	ref.	0.162	0.352	0.438
In-Hospital Complication	ref.	0.90 (0.52, 1.54)	0.74 (0.37, 1.48)	1.22 (0.70, 2.12)
P-Value	ref.	0.695	0.392	0.482
Nonhome Discharge	ref.	2.79 (1.69, 4.60)	1.83 (0.99, 3.39)	0.99 (0.47, 2.12)
P-Value	ref.	<0.001	0.056	0.988
Prolonged LOS	ref.	1.21 (0.88, 1.66)	1.29 (0.92, 1.82)	0.93 (0.65, 1.33)
P-Value	ref.	0.241	0.144	0.687
30-Day Readmission	ref.	1.00 (0.52, 1.95)	0.94 (0.41, 2.20)	0.39 (0.12, 1.29)
P-Value	ref.	0.99	0.895	0.122
90-Day Readmission	ref.	1.54 (0.96, 2.46)	1.32 (0.76, 2.28)	0.70 (0.36, 1.35)
P-Value	ref.	0.076	0.326	0.288