Robotic Assistance Does Not Improve Outcomes in Posterior Lumbar Fusion Surgery

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INTRODUCTION: Spinal fusion surgery, commonly performed for degenerative disease processes, typically involves the use of pedicle screws for fixation. Pedicle screw placement can be technically challenging, and current literature indicates that screw misplacement and associated complications are common. The aim of this study is to assess the impact of robotic assistance in the setting of posterior lumbar fusion surgery.

METHODS: This was a retrospective cohort study utilizing the National Readmissions Database, years 2016-2019. Patients undergoing posterior lumbar fusion surgery, both conventional and robotic assisted, were identified via ICD-10 codes. Multivariate regression was performed to compare postoperative outcomes. Negative binomial regression was performed to assess 30-day readmissions and reoperation, and discharge disposition. Quasi-Poisson regression was performed to assess total charges and length of stay. Patient demographics and comorbidities, measured via the Elixhauser comorbidity index, were both controlled for in our regression analysis.

RESULTS: A total of 56,951 patients undergoing posterior lumbar fusion, including 731 (1.28%) who underwent a procedure with robotic assistance, were included in our analysis. We found no difference in complications or hospital-related outcomes between cohorts; however, robotic assisted procedures were associated with increased total charges (Odds Ratio (OR) 1.184; p<0.001).

DISCUSSION AND CONCLUSION: Robotic assistance does not improve outcomes following posterior lumbar fusion surgery, but is more expensive. While we found no difference in complications or hospital-related outcomes, robotic assistance was associated with significantly greater total charges. Possible long-term benefits of robotic surgery were not assessed; however, this study calls into question some of the purported short-term benefits of robotic surgery including shorter hospital stays and improved patient safety.

Adverse Event		OR	95% CJ Lower	95% C.I Upper	P
Medical Complication	process and the second	0.968	0.796	1.153	0.651
Respiratory Failure		0.651	0.411	1.029	0.067
Pulmonary Embolism		1.402	0.590	3.283	0.437
Preumonia		0.712	0.356	1.425	0.337
Cardiac Arrest		0.042	0.105	3.813	0.024
Heart Failure		0.023	0.477	1.42	0.485
Myocardial Infaction		1307	0.433	3.946	0.635
Deep Vein Thrombesis		0.914	0.439	1.905	0.511
Acute Kidney Disease		1.012	0.704	1.454	0.95
Uralogical Infection		1.003	0.092	1.454	0.967
Stroke		0.964	0.316	2.005	0.652
Plegia and paresis:		0.935	0.603	1.449	0.764
Ontegrayolitais		0.355	0.037	3.430	0.37
Sepsis		0.785	0.440	1,373	0.396
Surigcal Complication		1.105	0.954	1200	0.153
Wound Disruption		0.967	0.511	1.905	0.97
Postoperative Infection		1,295	0.672	2.172	0.527
Mechanical Complication		0.923	0.650	1.441	0.89
Transfusion		1.219	0.900	1.534	0.092
Postoperative Shock		1.003	0.479	2.101	0.994
ostoperative Neurological Complication		1.30	0.001	2:377	0.245
Postsperative Vascular Complication		1.122	0.450	2.745	0.861

Hopsital		OR	95% C.I Lower	95% C.I Upper				
Thirty day readmission		1.068	0.732	1,559	0.731			
Thirty day reoperation	-	0.979	0344	2.767	0.965			
Routine Discharge	· · ·	1.121	0.942	1.336	0.196			
Length of Stay		0.065	0.747	1.001	0.052			
Length of stay 3 days	i=	0.969	0.539	1	0.052			
Length of stay 5 days		0.65	0.772	0.906	0.001 *			
Length of stay 7 days		0.787	0.679	0.913	0.002*			
Length of stay 10 days		0.771	0.619	0.96	0.02			
Total Charges		1.184	1.00	1299	-0.001 °			
	CE OF Site win of Mill architect Female 22 25 26 26 26 26 26 26 26 26 26 26 26 26 26	Figure 1. Obtain takes thurbating the higher occurrence of hospital variables among patients undergoing sizons fusion compared to those with no sizons assistance						