

Open versus Endoscopic Lumbar Discectomy: A Propensity-Matched Analysis of 2,618 Surgical Patients

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INTRODUCTION: Lumbar disc herniation is a prevalent condition often treated surgically through open discectomy (OD) or endoscopic discectomy (ED). ED has gained popularity due to its minimally invasive nature, but prior studies comparing ED and OD report inconsistent findings regarding complication rates and long-term outcomes. Most are limited by small sample sizes and lack of risk adjustment. This study aimed to compare intraoperative, short-term, and long-term outcomes of ED versus OD using a large national database.

METHODS: A retrospective cohort study was performed using the PearlDiver database from 2010 to 2022. Adult patients undergoing one-level ED (CPT 62380) or OD (CPT 63030) were identified. Propensity score matching (1:1) was used to balance age, sex, and Charlson Comorbidity Index (CCI). Outcomes included intraoperative complications (dural tear, nerve injury), 90-day complications (surgical site infection [SSI], wound complications, DVT, UTI, dura repair, persistent pain), and 2-year surgical reoperations (repeat discectomy, laminectomy, posterior fusion). Multivariate logistic regression controlled for medical comorbidities, and odds ratios (ORs) with 95% confidence intervals (CIs) were reported.

RESULTS: A total of 2,618 patients (1,309 ED, 1,309 OD) were included. ED was associated with significantly lower odds of dural tears (0.15% vs. 1.15%, OR: 0.179, p=0.006), SSI (0.08% vs. 1.15%, OR: 0.082, p=0.001), wound complications (OR: 0.342, p=0.023), and dura repair (OR: 0.091, p=0.021). ED also had lower persistent pain at 90 days (OR: 0.665, p=0.048). There were no significant differences in nerve injury, DVT, UTI, or readmission. Although unadjusted analysis showed higher repeat ED rates, this was not significant after adjustment. Two-year reoperation, laminectomy, and fusion rates were similar between groups.

DISCUSSION AND CONCLUSION: ED demonstrates lower rates of key complications—such as dural tears, wound infections, and persistent pain—compared to OD, supporting its safety profile. While reoperation rates were comparable after adjustment, ED may be a favorable option for patients at higher risk for wound healing issues or infections. Selection of surgical approach should consider individual comorbidities, anatomy, and surgeon expertise to optimize outcomes.

Table 3. Complications and Analysis

COMPLICATIONS	Univariate			Multivariate		
	Open (%)	Endo (%)	P-value	OR	95% CI	P-value
1 Day Postop						
Dural tear	15 (1.15%)	2 (0.15%)	0.004	0.179	0.042 - 0.529	0.006
Nerve injury	2 (0.15%)	0 (0.00%)	0.479	-	-	-
90 Days Postop						
Transfusion	4 (0.31%)	3 (0.23%)	1.000	0.453	0.107 - 1.72	0.252
Acute kidney injury	19 (1.45%)	16 (1.22%)	0.734	0.591	0.34 - 1.01	0.057
Cardiac arrest	0 (0%)	0 (0%)	1	-	-	-
Deep vein thrombosis	4 (0.31%)	6 (0.46%)	0.751	1.984	0.768 - 5.481	0.164
Wound complications	14 (1.07%)	5 (0.38%)	0.065	0.342	0.124 - 0.814	0.023
Dura Repair	9 (0.69%)	1 (0.08%)	0.027	0.091	0.005 - 0.459	0.021
Hematoma	5 (0.38%)	4 (0.31%)	1.000	0.796	0.248 - 2.47	0.691
Pulmonary embolism	4 (0.31%)	3 (0.23%)	1.000	-	-	-
Urinary tract infection	30 (2.29%)	26 (1.99%)	0.685	1.036	0.66 - 1.624	0.878
Surgical site infection	15 (1.15%)	1 (0.08%)	0.001	0.082	0.013 - 0.275	0.001
Readmission	6 (0.46%)	5 (0.38%)	1.000	0.678	0.275 - 1.6	0.381
Neurostimulator use	2 (0.15%)	1 (0.08%)	1.000	0.405	0.020 - 3.207	0.437
Persistent pain	37 (2.83%)	29 (2.22%)	0.383	0.665	0.441 - 0.991	0.048
2 Years Postop						
Repeat endo	0 (0.00%)	48 (3.67%)	0.001	-	-	-
Open surgery	19 (1.45%)	32 (2.44%)	0.089	0.886	0.595 - 1.312	0.547
Laminectomy	74 (5.65%)	94 (7.18%)	0.129	1.228	0.974 - 1.548	0.082
Posterior fusion	38 (2.90%)	43 (3.28%)	0.651	1.087	0.774 - 1.526	0.628

Open = Open Discectomy; Endo = Endoscopic Discectomy; OR = Odds Ratio for Endoscopic Discectomy relative to Open; CI = Confidence Interval