

Extended Oral Antibiotic Prophylaxis After Lumbar Spine Surgery Is Associated with Increased Postoperative Infections and Reoperations: A Matched Cohort Study

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INTRODUCTION: Extended oral antibiotic prophylaxis, commonly employed in hip and knee arthroplasty beyond the standard 24-hour perioperative period, has gained popularity as a preventive measure. However, recent large-scale matched cohort studies have reported no reduction in prosthetic joint infection rates and, in some cases, an increase in complications. Despite limited evidence, the practice remains widespread, particularly among high-risk patients. In spine surgery, the efficacy of extended oral antibiotics in reducing postoperative infection, sepsis, or revision rates has not been evaluated in large, multi-institutional studies. Given the rising concerns over antibiotic resistance and microbiome disruption, this study investigates the clinical utility of extended prophylaxis following lumbar spine decompression and fusion.

METHODS: A retrospective cohort study was performed using data from the TriNetX United States Collaborative Network. Adult patients (≥18 years) who underwent lumbar spine decompression and fusion were identified via CPT codes. All patients were assumed to have received standard intravenous antibiotic prophylaxis within 24 hours postoperatively. Cohorts were defined by the presence or absence of extended oral antibiotic prescriptions administered between 24 hours and 7 days following surgery. Propensity score matching (1:1) was used to control for age, sex, BMI, smoking status, and relevant comorbidities (e.g., renal failure, diabetes mellitus). The primary outcome was 90-day postoperative spinal surgical site infection. Secondary outcomes included reoperation and sepsis. Outcomes were analyzed using Kaplan-Meier survival estimates, hazard ratios, and cumulative incidence statistics.

RESULTS: A total of 32,662 patients who received extended oral antibiotics following lumbar spine decompression and fusion were propensity score matched 1:1 to 32,662 patients who did not. The 90-day incidence of surgical site infection was statistically higher in the extended antibiotic cohort compared to controls (15.63 vs. 9.283%; RR: 1.684, p <0.0001). Reoperation rates were also elevated in the antibiotic group (2.847% vs. 2.235%, RR: 1.274, p <0.0001). Sepsis occurred in 2.547% of patients receiving extended antibiotics versus 1.362% of controls (RR 1.87, p < 0.0001). Wound infections were significantly more frequent in the extended antibiotic cohort (4.4957% vs. 2.25%; RR 1.997, p < 0.0001).

DISCUSSION AND CONCLUSION:

Extended oral antibiotic prophylaxis following lumbar spine decompression and fusion was associated with significantly higher rates of surgical site infection, sepsis, wound infection, and reoperation compared to standard perioperative prophylaxis alone. These findings, while accounting for potential selection bias, challenge the presumed protective benefit of extended antibiotic use in this context. In light of the increased complication rates and the broader implications for antimicrobial resistance and microbiome disruption, the routine use of extended prophylaxis warrants critical reevaluation.

Table 1. Baseline demographic and clinical characteristics of propensity-matched cohorts undergoing lumbar decompression and fusion with and without extended oral antibiotic prophylaxis.

	Antibiotic (N=32,662)	Control (N=32,662)	p-value
Age (Mean±SD)	53.1 ± 14	52.1 ± 14	0.5532
Sex (M)	13,124	13,124	0.9344
BMI	28.859	28.821	0.8204
OR	25.8 ± 8.98	25.8 ± 8.98	<0.0001
Neuraxials	10,522	10,522	0.8882
Resection/Discectomy	6,407	6,407	0.8814
Level (Cervical)	2,981	2,981	0.2613
Long Term Steroid Use	1,641	1,641	0.4937
Diabetes Mellitus	8,841	8,841	0.9019

Table 2. Ninety-day postoperative complication rates and relative risk in patients undergoing lumbar decompression and fusion with versus without extended oral antibiotic prophylaxis.

Complication	Antibiotic Cohort Incidence (%)	Control Cohort Incidence (%)	Risk Ratio	p-value	Risk Ratio (95% CI)
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	Antibiotic (N=32,662)	Control (N=32,662)	Difference	p-value	Risk Ratio (95% CI)
90 Days					
Surgical Site Infection	5,132 (15.72%)	3,122 (9.52%)	6.24%	<0.0001	1.684 (1.518, 1.861)
Reoperation	930 (2.847%)	730 (2.235%)	0.612%	<0.0001	1.274 (1.158, 1.402)
Sepsis	832 (2.547%)	465 (1.424%)	1.182%	<0.0001	1.87 (1.688, 2.066)
Wound Infection	1,488 (4.4957%)	728 (2.23%)	2.244%	<0.0001	1.997 (1.83, 2.170)

Figure 1. Risk ratios for postoperative complications in patients receiving extended oral antibiotics following lumbar decompression and fusion compared to matched controls.

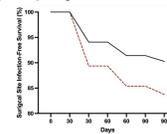
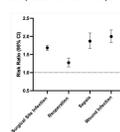


Figure 2. Kaplan-Meier survival curves showing the probability of remaining free from surgical site infection (SSI) over 90 days postoperatively. Patients receiving extended oral antibiotic prophylaxis are shown in red; those receiving standard perioperative prophylaxis are shown in black.