

Practical Answers to Frequently Asked Questions in Minimally Invasive Lumbar Spine Surgery

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INTRODUCTION:

The advent of minimally invasive spine surgery (MISS) has further broadened the range of treatment options for the treatment of degenerative lumbar pathology. MISS remains a relatively new concept which expectedly leads to queries regarding its risks and benefits. The purpose of this study was, therefore, to provide practical answers to the frequently asked questions (FAQs) patients have when considering minimally invasive lumbar spine surgery for the treatment of degenerative lumbar spine pathology.

METHODS:

This study was a retrospective review of prospectively collected data from a single-surgeon surgical database. Consecutive patients who underwent primary minimally invasive lumbar spine surgery in form of transforaminal lumbar interbody fusion (TLIF), decompression alone (unilateral laminectomy for bilateral decompression), or tubular microdiscectomy were selected. Only single-level TLIFs were included, whereas for decompression and microdiscectomy, patients were included irrespective of the number of levels operated. All patients had a minimum of 1-year follow-up. A list of ten FAQs was compiled based on the authors' experience and review of literature.

Patient demographics, surgical data (type of surgery, radiation exposure, and intraoperative complications), postoperative in-hospital data (postoperative length of stay [LOS] and complications) and post-discharge data (Visual Analog Scale-back and leg, VAS; Oswestry Disability Index, ODI; 12-Item Short Form Survey Physical Component Score, SF-12 PCS; Patient-Reported Outcomes Measurement Information System Physical Function, PROMIS PF; Global Rating Change, GRC; return to activities; complications) were analyzed.

Changes in VAS back, VAS leg, ODI, and SF-12 PCS from preoperative values to the early (<6 months) and late (>6 months) timepoints were analyzed with Wilcoxon Signed Rank Tests. The percentage of patients achieving minimal clinically important difference (MCID) for these patient-reported outcome measures (PROMs) at the two timepoints was also evaluated. The following improvements in PROMs were used as MCID-threshold values for TLIF and decompression: 12.8 in ODI, 1.2 in VAS back, 1.6 in VAS leg, and 4.9 in SF-12 PCS. The following improvements in PROMs were used as MCID-threshold values for microdiscectomy: 7.1% in ODI, 1.2 in VAS back, 1.71 in VAS leg, and 2.9 in SF-12 PCS. The MCID threshold for improvement in PROMIS PF was 4.0. Similarly, to detect clinically important deterioration (CIDET), the following raw values at postoperative timepoints were taken as thresholds beyond which the patient would feel worse: 48 for ODI, and 7.5 for VAS back and leg.

RESULTS:

There were 104 patients in the TLIF group (mean age 58.8 years, 53% female), 147 patients in the decompression group (mean age 64.5 years, 65% male), and 115 patients in the microdiscectomy group (mean age 45.2 years, 65% male). The following FAQs were answered:

1. Will my back pain improve?

Most patients report improvement by >50%. Improvement in back pain reaches a plateau at 12 weeks after TLIF and decompression and at 2 weeks after decompression (Figure 1).

2. Will my leg pain improve?

Most patients report improvement by >50%. Improvement in leg pain reaches a plateau at 12 weeks after TLIF and decompression and at 2 weeks after decompression (Figure 1).

3. Will my activity level improve?

Most patients report significant improvement in their activity level (Table 1).

4. Is there a chance I will get worse?

Based on GRC, 6% of patients after TLIF, 14% of patients after decompression, and 5% of patients after microdiscectomy feel worse after 6 months of the surgery (Figure 2).

5. Will I receive a significant amount of radiation?

The radiation exposure is likely to be tolerable and nearly insignificant in terms of radiation-related risks.

6. What is the likelihood I will have a complication while in the hospital?

17% (15% minor, 2% major) for TLIF, 10% (9.3% minor and 0.7% major) for decompression, and 1.7% (all minor) for microdiscectomy (Table 2). Major complications required an unplanned return to the operating room (OR).

7. Will I need another surgery?

6% and 16.3% after TLIF and decompression respectively (majority after 3 months), 13% after microdiscectomy (half within 3 months).

8. How long will I stay in the hospital?

Most patients get discharged on postoperative day one after TLIF and on the same day after decompression and microdiscectomy.

9. When will I be able to return to work?

>80% of patients return to work (average: 25 days after TLIF, 14 days after decompression, 11 days after microdiscectomy).

10. Will I be able to drive again?

>90% of patients return to driving (average: 22 days after TLIF, 11 days after decompression, 14 days after microdiscectomy).

DISCUSSION AND CONCLUSION:

These concise answers to FAQs in minimally invasive lumbar spine surgery can be used by physicians as a reference to enable patient education and shared decision-making.

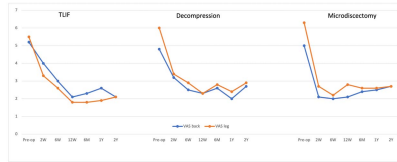


Figure 1: Trend of decline in pain scores over time. VAS, Visual Analog Scale; TLIF, transforaminal lumbar interbody fusion

		Pre-operative	Early (<6 mo)	Late (≥6 mo)
TLIF	SF-12 PCS	33.79 ± 9.32	39.42 ± 10.54 (p < 0.0001) MCID: 51.1%	44.13 ± 11.62 (p < 0.0001) MCID: 65.9%
	PROMIS PF	36.82 ± 8.35	43.2 ± 8.83 (p < 0.0001) MCID: 65.2%	47.19 ± 10.21 (p < 0.0001) MCID: 77.2%
Decompression	SF-12 PCS	33.38 ± 8.31	38.08 ± 9.59 (p < 0.0001) MCID: 46.7%	42.33 ± 10.39 (p < 0.0001) MCID: 55.4%
	PROMIS PF	35.59 ± 7.89	40.35 ± 9.59 (p < 0.0001) MCID: 52%	44.51 ± 8.96 (p < 0.0001) MCID: 69.9%
Microdiscectomy	SF-12 PCS	31.79 ± 8.7	40.97 ± 10.36 (p < 0.0001) MCID: 69.1%	43.47 ± 12.14 (p < 0.0001) MCID: 75%
	PROMIS PF	34.35 ± 7.73	44.24 ± 8.54 (p < 0.0001) MCID: 73.9%	48.16 ± 9.88 (p < 0.0001) MCID: 78.8%

Table 1: Mean SF-12 PCS and PROMIS PF at the preoperative, early (<6 mo), and late (≥6 mo) timepoints along with MCID achievement rates. SF-12 PCS, 12-Item Short Form Survey Physical Component Score; PROMIS PF, Patient-Reported Outcomes Measurement Information System Physical Function; MCID, minimal clinically important difference; TLIF, transforaminal lumbar interbody fusion

Complications	TLIF	Decompression	Microdiscectomy
Overall	18 (17.3%)	15 (10%)	2 (1.7%)
	16 (15.4%): minor 2 (1.9%): major	14 (9.3%): minor 24 (0.7%): major	Both minor
Intraoperative	0 (0%)	8 (5.4%): durotomy (7 minor and 1 required return to the OR)	1 (0.8%): durotomy (minor)
In-hospital	18 (17.3%)	7 (4.7%): all minor (POUR, PONV)	1 (0.8%): new onset radiculopathy (minor)
	16 (15.4%): minor (POUR, PONV) 2 (1.9%): major requiring return to the OR (1 SSI and 1 new onset neurological deficit due to screw misplacement)		

Table 2: Intraoperative and in-hospital complication rates. TLIF, transforaminal lumbar interbody fusion; POUR, postoperative urinary retention; PONV, postoperative nausea and vomiting; SSI, surgical site infection