Impact of Conventional Versus Muscle-Sparing Pedicle Screw Placement on Opioid Use and Early Ambulation Following Lumbar Interbody Fusions: A Propensity-Matched Post-Hoc Analysis of a Randomized Controlled Trial

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INTRODUCTION:

No studies have investigated the impact on recovery (opioid use, pain, ambulation) of conventional versus muscle-sparing pedicle screw placement in one- and two-level lumbar fusions including anterior (ALIF), lateral (LLIF), and posterior (TLIF) fusions. The impact on recovery of cage placement (anterior, lateral, or posterior) is also underexplored. Our purpose was to investigate the impact on recovery of conventional versus muscle-sparing pedicle screw placement following lumbar fusion

METHODS:

This was a post-hoc analysis of a randomized-controlled trial (RCT). A propensity-matched post-hoc analysis of an RCT of one and two-level lumbar fusions was performed. The “conventional” cohort received pedicle screws through a midline exposure and dissection of the paravertebral musculature; the “muscle-sparing” cohort received screws through muscle-sparing techniques (e.g. Wiltse incisions; percutaneous screws). Outcomes included opioid use (MME), pain (NPRS), Oswestry disability index (ODI), operative time, blood loss (EBL), length of stay (LOS), ambulation distance, urinary retention, and radiation exposure. Subgroup analyses of ALIF/LLIF-only and TLIF-only was performed. Kruskal-Wallis was used to compare ALIF/LLIF/TLIF cage placement approaches within each cohort.

RESULTS: After matching, 90 patients (30 muscle-sparing, 60 conventional) were included. The muscle-sparing cohort showed significantly greater oral and lesser intravenous opioid use, lower MME on postoperative day (POD)0-POD2, lower EBL, shorter operative time, shorter LOS, greater ambulation distance POD0-POD1, and greater radiation. There were no significant differences in POD1, POD3, 1-year, or 2-year NPRS or urinary retention. The muscle-sparing cohort had lower 2-year ODI. In ALIF/LLIF-only, the conventional cohort showed significantly greater opioid use POD0-POD2 and LOS. In TLIF-only, the conventional cohort showed significantly shorter ambulation distance POD0-POD1, longer LOS, and greater 1-year pain. On Kruskall-Wallis analysis, there were no significant differences between ALIF/LLIF/TLIF regarding opioid use, ambulation distance, or pain between cohorts.

DISCUSSION AND CONCLUSION:

Muscle-sparing screw placement results in less opioid use and greater postoperative ambulation distance. Cage placement approach does not significantly impact postoperative recovery.