

The Effects of BMI on Complications of Extreme Lateral Interbody Fusion: A Retrospective Analysis

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Introduction

Extreme Lateral Interbody Fusion (XLIF) is a minimally invasive approach for spinal fusion. BMI has been considered as an independent predictor of increased complication rate, however early studies have not supported the use of BMI as an independent predictor of increased complications for minimally invasive surgery. Given the increasing prevalence of obesity in the U.S, the effects of increased BMI on surgical outcomes require characterization.

	BMI <30	BMI ≥ 30
Subjects	121	104
Mean Age	65.6 ± 11.5	62.8 ± 11.3
Mean BMI	25.5 ± 3.1	34.4 ± 4.1
Mean # of Lv	1.7 ± 0.9	1.7 ± 0.9
Pedicle	12.5%	15.4%
Mean LOS	3.8 ± 2.4	3.7 ± 2.5
Female	66.1%	71.2%
Smoking	19.8%	16.5%
Diabetes	11.6%	26.0%
CAD	20.7%	15.4%
Surg Hx	49.6%	50.0%

Methods

The study population consists of all patients having undergone XLIF performed by the Illinois Neurological Institute between 2006-2012, excluding patients with traumatic fractures.

The study population was divided into a BMI =30 group and BM <30 group. Patients were followed retrospectively from preoperative consultation through 1 year. Primary outcomes recorded include surgical revision, fusion, subsidence, perioperative complications, and neurological complications. Neurological complications were defined as psoas muscle weakness, anterior thigh numbness, or increasing radicular pain as compared to the documented preoperative physical exam. Preoperative variables including surgeon, age, sex, smoking status, diabetes, coronary artery disease, number of levels, placement of pedicle screws, length of stay (LOS),and previous lumbar surgery were recorded. Pain and disability outcomes were measured using the Visual Analog Scale (VAS) and the Oswestry Disability Index (ODI).

Results

225 total subjects were included in the study with 387 levels of fusion. There were 104 subjects with BMI =30 and 121 subjects with BMI <30. Only a difference in the prevalence of diabetes was shown to be statistically significant when comparing the groups.

Using logistic regression, with a significance level of 0.05, there is not enough evidence to conclude that BMI =30 has an effect on overall complication rate, fusion rate, perioperative complication rate, and neurological complication rate. There was not enough evidence to conclude a significant relationship between surgical revision or subsidence and BMI. Diabetes and ICD diagnosis appeared to have statistically significant effects on revision rate, however there were too few events to conduct logistic regression. For patients who smoke, the odds ratio for radiologic evidence of boney formation across the fused level within the first year is 0.36 (0.17-0.78). As age increases 1 unit, a 4% increase in the odds of having perioperative complications as defined in this study is expected, holding obesity as a fixed variable. To assess if average VAS or ODI and its trajectory depend on obesity after controlling for the baseline measure, the linear mixed model was used. At a significance level of 0.05, there is no evidence to conclude that the average ODI or VAS is statistically different between the BMI =30 group and the BMI <30 group after adjusting for the baseline measure.

Conclusions

The results of this study do not support the use of BMI as an independent predictor of increased complication rate following XLIF surgery. Additionally, BMI was not shown to be an increased predictor of worse pain and disability outcomes as recorded by VAS and ODI scores. The effect of smoking on bone growth and age on perioperative complications shown in this study are consistent with scientific literature and lend credence to study results and continued inclusion of each in preoperative counseling. It is worth noting that potential exists for stratifying perioperative complications and examining the effect of BMI as an independent predictor. Additionally, a higher BMI cut-off value could be used.

	Incidence	Odds Ratio (95% CI)
Surgical Revision	3.6%	-
Subsidence	11.3%	-
Fusion	43.0%	0.71(0.41-1.24)
Perioperative Complications	23.1%	0.89(0.46-1.70)
Neurological Complications	40.5%	1.32(0.72-2.43)
Infection Complications	2.7%	-
Vascular Complications	1.8%	-

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