The Safety of Unilateral Biportal Endoscopic Lumbar Decompression for Obese Patients

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INTRODUCTION: The relationship between obesity and postsurgical outcomes remains complex. There is a lack of literature exploring outcomes and complications in patients with obesity, who have historically been detailed to have higher perioperative complication risk with spinal surgery. This study compares clinical outcomes and complications of unilateral biportal endoscopy (UBE) in non-obese and obese patients.

METHODS: Patients undergoing elective UBE lumbar decompression were retrospectively identified. Cohorts were based on preoperative body mass index (BMI)< 30 (Non-Obese) or ≥30 (Obese). Demographics, comorbidities, perioperative variables, complications, and patient-reported outcomes (PROs) were gathered. PROs included Visual Analog Scale-Back/Leg Pain (VAS-BP/LP), Oswestry Disability Index (ODI), Patient-Reported Outcome Measurement Information System-Physical Function (PROMIS-PF), 12-Item Veterans Rand Health Survey Physical/Mental Composite Score (VR-12 PCS/MCS), and Patient-Health Questionnaire-9 (PHQ-9). Chi-square analysis and Student's t-test compared demographics, perioperative data, complication rates, and baseline PROs. Multivariate regression compared postoperative PROs and changes in outcomes.
RESULTS: In total, 52 and 36 patients were in the non-obese and obese cohorts, respectively. There were significant intercohort differences in ethnicity (p=0.049). Obese patients had higher comorbidity burdens (p≤0.039, all). Perioperatively, two non-obese patients experienced nausea/vomiting. Obese patients reported inferior PROMIS-PF/VAS-BP at baseline (p≤0.046, both), VR-12 PCS/ODI at 6-weeks (p≤0.025, both), and VAS-BP at 12-weeks (p=0.048). There lacked significant differences in magnitude of improvement by 6-/12-weeks postoperatively (p≥0.176).
DISCUSSION AND CONCLUSION: Obese patients had greater comorbidity burdens but were not at increased risk of short-/mid-term complications, or reoperations. Obese patients had worse back pain/physical function at baseline, disability/physical health at 6-weeks, and back pain at 12-weeks, yet similar improvements as non-obese patients for all outcomes. UBE can safely be performed in appropriately selected obese patients.

Table 1. Demographic and perioperative characteristics

Characteristic	Total (n =88)	BMI<30 (n =52)	BMI≥30 (n =36)	*p-value
Age (years)	46.7±13.4	46.4±13.5	47.0±2.2	0.831
Female	34.1% (30)	38.5% (20)	27.8% (10)	0.299
BMI (kg/m²)	29.0±5.5	25.5±2.9	34.2±4.0	—
Ethnicity				**0.049**
Black	4.7% (4)	0.0% (0)	11.4% (4)	
Asian	4.7% (4)	5.9% (3)	2.9% (1)	
Hispanic	11.6% (10)	13.7% (7)	8.6% (3)	
White	74.4% (64)	72.6% (37)	77.1% (27)	
Other	4.7% (4)	7.8% (4)	0.0% (0)	
Comorbidities				
Smoker	9.2% (8)	9.8% (5)	8.3% (3)	0.815
Hypertension	16.3% (14)	6.0% (3)	30.6% (11)	**0.002**
Diabetes	3.4% (3)	0.0% (0)	8.3% (3)	**0.034**
ASA Classification				**0.001**
1	23.0% (20)	35.3% (18)	5.6% (2)	
2	66.7% (58)	60.8% (31)	75.0% (27)	
3	10.3% (9)	3.9% (2)	19.4% (7)	
Insurance Type				0.077
Workers' Comp	17.1% (15)	11.5% (6)	25.0% (9)	
Private	78.4% (69)	80.8% (42)	75.0% (27)	
Self-pay	4.6% (4)	7.7% (4)	0.0% (0)	
Number of decompressed levels				0.134
One	82.6% (57)	88.1% (37)	74.1% (20)	
Two	17.4% (12)	11.9% (5)	25.9% (7)	
Spinal Pathology				
Degenerative spondylolisthesis	2.3% (2)	0.0% (0)	5.6% (2)	0.086
Herniated disc	84.1% (74)	90.4% (47)	75.0% (27)	0.052
Central stenosis	84.1% (74)	84.6% (44)	83.3% (30)	0.873
Foraminal stenosis	69.3% (61)	76.9% (40)	58.3% (21)	0.063
Operative Time (min.)	51.1±20.2	50.0±22.2	52.7±17.0	0.538
Estimated Blood Loss (mL)	24.6±2.6	24.8±1.5	24.3±3.7	0.462
Length of Stay (hours)	2.0±0.6	2.0±0.5	2.0±0.7	0.946
POD 0 VAS Pain	3.9±2.1	4.0±2.0	3.8±2.1	0.683
POD 0 Narcotic Consumption (OME)	14.0±5.5	13.8±5.6	14.4±5.5	0.605

BMI = Body Mass Index; ASA = American Society of Anesthesiologists; CCI = Charlson Comorbidity Index; Workers' Comp = workers' compensation; POD = postoperative day; SD = standard deviation; VAS = Visual analog scale; OME = oral morphine equivalents

*p-value calculated using Student's t-test for continuous variables and Chi-square analysis for categorical variables.

Boldface indicates significance (p<0.05).

Table 2. Post-Surgical Complications

Complication	Total (n =88)	BMI<30 (n =52)	BMI≥30 (n =36)	*p-value
Acute Renal Failure	0.0% (0)	0.0% (0)	0.0% (0)	
Altered Mental Status	0.0% (0)	0.0% (0)	0.0% (0)	
Anemia, postoperative	0.0% (0)	0.0% (0)	0.0% (0)	
Arrhythmia	0.0% (0)	0.0% (0)	0.0% (0)	
Aspiration/Re-intubation	0.0% (0)	0.0% (0)	0.0% (0)	
Atelectasis	0.0% (0)	0.0% (0)	0.0% (0)	
Epidural Hematoma	0.1% (1)	0.0% (0)	0.0% (0)	
Fever of Unknown Origin	0.0% (0)	0.0% (0)	0.0% (0)	
Ileus	0.0% (0)	0.0% (0)	0.0% (0)	
Incontinence, urinary	0.0% (0)	0.0% (0)	0.0% (0)	
Nausea/Vomiting	2.3% (2)	3.9% (2)	0.0% (0)	0.240
Pleural effusion	0.0% (0)	0.0% (0)	0.0% (0)	
Pneumonia	0.0% (0)	0.0% (0)	0.0% (0)	
Pulmonary Embolism	0.0% (0)	0.0% (0)	0.0% (0)	
Urinary Retention	0.0% (0)	0.0% (0)	0.0% (0)	
Urinary Tract Infection	0.0% (0)	0.0% (0)	0.0% (0)	
Venous Thromboembolism	0.0% (0)	0.0% (0)	0.0% (0)	

Boldface indicates significance
*p-value determined through Chi-square analysis

Table 3. Patient-reported outcomes measures and minimum clinically important difference

	Total (n =88)	BMI<30 (n =52)	BMI≥30 (n =36)	*p-value
Pre-Op				
VR-12 PCS	32.9±8.0	34.4±7.9	31.0±8.0	0.151
VR-12 MCS	51.2±11.1	51.7±10.2	50.6±12.4	0.739
PROMIS-PF	37.4±6.3	38.9±5.5	35.5±6.9	**0.046**
PHQ-9	6.0±5.9	5.6±4.7	6.6±7.2	0.549
VAS-BP	5.8±2.2	5.0±2.3	6.7±1.8	**0.003**
VAS-LP	5.6±2.6	5.2±2.5	6.9±2.7	0.234
ODI	39.3±17.0	37.3±16.2	41.9±18.1	0.308
6-week Post-Op				
VR-12 PCS	42.0±9.8	45.2±8.0	37.6±10.4	**0.009**
VR-12 MCS	54.9±10.3	55.9±10.6	53.5±10.1	0.114
PROMIS-PF	44.4±7.3	46.0±7.3	41.9±6.7	0.166
PHQ-9	4.4±5.9	3.5±5.5	5.4±6.4	0.095
VAS-BP	2.2±2.4	1.7±2.1	2.8±2.6	0.204
VAS-LP	2.1±2.3	1.8±2.2	2.4±2.4	0.321
ODI	23.0±17.0	17.73±13.7	30.4±19.1	**0.025**
12 Weeks Post-Op				
VR-12 PCS	46.7±9.7	48.8±8.7	43.4±10.6	0.199
VR-12 MCS	58.1±7.9	58.8±8.8	57.1±6.6	0.305
PROMIS-PF	49.0±9.8	49.7±9.2	47.9±10.9	0.613
PHQ-9	4.4±5.9	3.5±5.5	5.4±6.4	0.095
VAS-BP	1.9±2.1	1.5±2.0	2.5±2.0	**0.048**
VAS-LP	1.8±1.9	1.7±2.1	2.0±1.5	0.377
ODI	16.5±17.1	14.4±16.8	19.1±17.7	0.324
Δ Pre-Op to 6-week Post-Op				
VR-12 PCS	9.0±8.9	8.9±10.4	9.2±6.5	0.631
VR-12 MCS	4.1±10.5	3.3±12.9	5.3±5.0	0.526
PROMIS-PF	6.7±7.9	7.7±8.4	5.1±7.1	0.399
PHQ-9	2.0±5.1	2.4±4.8	1.6±5.6	0.083
VAS-BP	3.6±2.9	3.2±2.7	4.0±3.2	0.176
VAS-LP	3.8±2.7	3.9±3.0	3.6±2.5	0.813
ODI	17.9±19.16	20.0±18.3	15.1±20.4	0.910
Δ Pre-Op to 12 Weeks				
VR-12 PCS	13.0±9.9	12.7±7.1	13.3±13.1	0.256
VR-12 MCS	4.0±12.7	7.4±15.7	0.0±7.5	0.437
PROMIS-PF	12.3±10.4	11.8±10.4	13.1±11.0	0.644
PHQ-9	3.4±4.5	3.1±3.0	4.0±5.4	0.856
VAS-BP	4.2±2.6	3.8±2.5	4.8±2.9	0.540
VAS-LP	3.5±2.5	2.8±2.5	4.5±2.3	0.275
ODI	23.6±19.8	24.1±14.9	22.8±24.8	0.515

VR-12, 12-Item Veterans Rand; PCS, Physical Component Score; MCS, Mental Component Score; VAS, Visual Analog Scale; BP, Back Pain; LP Leg Pain; PROMIS-PF, Patient-Reported Outcome Measurement Information System Physical Function; ODI, Oswestry Disability Index; PHQ-9, Patient-Health Questionnaire-9
*p-value calculated using Student's t-test for continuous variables at the preoperative time point. At postoperative time points and changes in PROs, p-values were calculated using multivariable linear regression accounting for ethnicity, ASA score, diabetes, and hypertension
Bolding denotes statistical significance (p < 0.05)