## 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 $\leq$ 0.039, all). Perioperatively, two non-obese patients experienced nausea/vomiting. Obese patients reported inferior PROMIS-PF/VAS-BP at baseline (p $\leq$ 0.046, both), VR-12 PCS/ODI at 6-weeks (p $\leq$ 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 $\geq$ 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.

April	*p-value	BMI≥30	BMI<30	Total	Characteristic
Tenuk   M. 18/16/09   278/16/09   278/16/09		(n =36)	(n =52)	(n -88)	
MM Quiv)	0.831	47.0±2.2	46.4±13.5	46.7±13.4	Age (years)
Tablestry	0.299	27.8% (10)	38.5% (20)	34.1% (30)	Female
Black	_	34.2±4.0	25.5±2.9	29.0±5.5	BMI (kg/m <sup>2</sup> )
Asia         4,7% (4)         5.9% (3)         2.9% (3)           Bilogiani         11,9% (4)         12,7% (7)         17,7% (7)         18,7% (7)         17,7% (7)           Whin         4,7% (6)         12,5% (7)         17,7% (7)         17,7% (7)         18,7% (7)         17,7% (7)           Whin         4,7% (6)         15,5% (8)         18,7% (7)         19,7% (7)	0.049				Ethnicity
		11.4% (4)	0.0% (0)		Black
When 4, 1445 (64) 2, 256 (27) 2, 715 (27) (20) (20) (20) (20) (20) (20) (20) (20		2.9% (1)	5.9% (3)	4.7% (4)	Asian
Other         4,7% (4)         7,3% (4)         0,9% (9)           Souder         3         3,4% (1)         3,5% (1)         3,5% (1)           Souder         1,3% (4)         4,6% (1)         3,5% (1)         3,5% (1)         3,5% (1)         3,5% (1)         3,5% (1)         3,5% (1)         3,5% (1)         3,5% (2)         4,5% (2)         3,5% (2)         <		8.6% (3)	13.7% (7)	11.6% (10)	Hispanie
Consentation		77.1% (27)	72.6% (37)	74.4% (64)	White
Sender   \$250,01   \$350,		0.0% (0)	7.8% (4)	4.7% (4)	Other
Nymerisis					Comorbidities
Diabetes         3.48 (3)         0.96 (9)         8.3% (3)           ASCA Classification         3.98 (3)         8.3% (14)         4.98 (3)           1         4.68 (3)         8.3% (13)         2.98 (27)           1         6.67 (3)         8.98 (1)         1.98 (27)           1.00 (3)         3.98 (3)         1.98 (4)         1.98 (4)           1.00 (4)         7.37 (4)         0.96 (9)         3.96 (27)           Solley or         4.96 (4)         1.75 (4)         0.96 (9)           Number of Recognizate Invest         1.98 (12)         1.98 (1)         3.29 (7)           New York of Solley or         1.98 (12)         1.98 (1)         3.29 (7)           New York of Solley or         1.98 (1)         3.98 (1)         3.98 (1)           Two         1.25 (2)         0.98 (10)         3.98 (1)         3.98 (1)           Spind Twinter         2.25 (2)         0.98 (10)         3.98 (1)         3.98 (1)           Foreignt attention         4.13 (2)         4.98 (4)         3.13 (3)         3.98 (1)           Foreignt attention         4.13 (2)         3.89 (1)         3.98 (1)         3.98 (1)           Foreignt attention         6.38 (18)         8.98 (22)         3.25 (1)         3.98 (1)	0.815	8.3% (3)	9.8% (5)	9.2% (8)	Smoker
ASA Chauffeedine    2	0.002	30.6% (11)	6.0% (3)	16.3% (14)	Hypertension
2.596/20  3.336/16  5.96/2    3   667/76  5.96/2  1.95/6/2    3   667/76  5.96/2  1.95/6/2    3   667/76  5.96/2  1.95/6/2    3   667/76  5.96/2  1.95/6/2    3   667/76  5.96/2  1.95/6/2    3   667/76  5.96/2  1.95/6/2    4   667/76  6.96/2  1.95/6/2    5   667/76  6.96/2  1.95/6/2    5   667/76  6.96/2  1.95/6/2    6   667/76  6.96/2  1.95/6/2    6   667/76  6.96/2  1.95/6/2    6   667/76  6.96/2  1.95/6/2    6   667/76  6.96/2  1.95/6/2    7   667/76  6.96/2    7   667/	0.034	8.3% (3)	0.0% (0)	3.4% (3)	Diabetes
2 d. 68,76(38) 68,86(11) 25,86(27) 3	0.001				ASA Classification
3 (1956) (2950) (2954) (1954) (7)  Worker Comp. (1954) (1		5.6% (2)	35.3% (18)	23.0% (20)	1
Notestar Cype		75.0% (27)	60.8% (31)	66.7% (58)	
Worksor*Comp         13/8 (3)         13/8 (3)         25/8 (9)           Fribrate         78.6 (9)         8158 (47)         15/8 (5)           Softger         45/8 (4)         15/8 (2)         15/8 (5)           Te         10         81.3 (47)         14/8 (50)         15/8 (51)           Tex         12/8 (52)         11/8 (52)         25/8 (7)         14/8 (50)           Signal Frishing         1         15/8 (21)         15/8 (21)         55/8 (7)         15/8 (7)           Degenerative republishings         4,418 (40)         48/8 (41)         33/8 (21)         15/8 (21)         15/8 (21)           Foundal rationsis         44,18 (40)         48/8 (41)         33/8 (21)         15/8 (21)         15/8 (21)           Foundal rationsis         43,18 (40)         48/8 (40)         33/8 (21)         15/8		19.4% (7)	3.9% (2)	10.3% (9)	3
Private         7,846,009         8,855,021         359,027           Soff-py         4,966,00         8,855,021         359,027           Number of Georganyaed Brist         1,96         7,75,04         0,876,00           Ore         2,269,127         84,385,077         74,15,050           Tool         1,764,123         1,996,00         5,967,1           Degenerative quosipolithesis         2,942,1         0,976,00         5,967,27           Hemistrod die         44,157,01         84,96,407         3,375,07           Freminal transit         44,15,02         84,96,407         3,375,01           Orgenierity quosipolithesis         2,976,10         3,974,10         3,375,11           Orgenierity quosipolithesis         3,976,10         3,974,10         3,375,11           Orgenierity quosipolithesis         3,976,10         3,974,11         3,375,11           Orgenierity quosipolithesis         3,974,10         3,974,11         3,974,11           Orgenierity quosipolithesis         3,974,11         3,974,11         3,974,11           Orgenierity quosipolithesis         3,974,11         3,974,11         3,974,11           Orgenierity quosipolithesis         3,974,11         3,974,11         3,974,11           Or	0.077				Insurance Type
Softgay		25.0% (9)			Workers' Comp
Number of Georgerous Revis    Section   12,696,737   84,356,777   74,156,000     Teo   17,664,127   11,964,577   74,156,000     Teo   17,664,127   11,964,577   74,566,777     Teo   17,664,777   11,964,777   11,964,777   11,964,777     Teo   17,664,777   11,964,777   11,964,777   11,964,777     Teo   18,154,777     Teo		75.0% (27)	80.8% (42)	78.4% (69)	Private
One         L 2,696 (57)         M 15% (07)         24 15% (29)           To Two         12,96 (17)         11.96 (19)         2.596 (7)           Spikal Printing         2,596 (2)         0.096 (0)         5.096 (2)           Degreening equolybiolishesis         2,396 (2)         0.096 (0)         5.096 (2)           Hemisted die         44.15 (14)         46.96 (47)         3.396 (20)           Commit amenin         44.15 (14)         46.96 (47)         3.396 (20)           Operation French         44.15 (14)         46.00 (22)         2.32116           Instituted Blood Case (nd)         2.54.62 (24)         2.54.61 (24)         2.54.12 (24)           Operation French         2.56.62 (24)         2.54.61 (24)         2.54.12 (24)         2.54.12 (24)           Leigh of Stay Down         2.04.65 (24)         2.04.61 (24)         2.04.61 (24)         2.04.61 (24)           Op O VAS Pin         3.92.1 (24)         4.00.20 (24)         3.82.1 (24)		0.0% (0)	7.7% (4)	4.6% (4)	Self-pay
Tee         1.746 (2)         1.196 (2)         2.95 (2)           Signal Tributes         3.07 (3)         60 (6)         3.06 (2)           Degenerative quodylolischei         3.06 (3)         60 (6)         3.06 (3)           All N. (5)         4.07 (4)         4.05 (2)         3.05 (2)           Cerminal Internial         44.15 (2)         4.05 (4)         3.13 (3)           Fernanda Internial         6.03 (3) (3)         5.00 (22)         3.37 (3)           Oppositive Tiane (miss)         3.11 (2)         5.00 (22)         3.27 (12)           Commont Distriction         2.44 (3)         2.00 (22)         3.27 (12)           Commont Distriction         3.04 (2)         3.00 (22)         3.02 (2)           Commont Distriction         3.02 (2)         4.00 (2)         3.02 (2)           Commont Distriction         3.02 (2)         4.00 (2)         3.02 (2)	0.134				Number of decompressed levels
Sphol Frinkey         2.3% (2)         0.0% (0)         5.9% (2)           Berninde Ger         4.15 (7)         0.0% (0)         5.9% (2)           Berninde Ger         4.15 (7)         0.0% (47)         3.5% (2)           Commit dennin         4.15 (7)         4.0% (47)         3.3% (50)           Formund 1000         0.0% (10)         3.0% (10)         3.0% (10)           Length of Stay Doors         2.06 (2)         2.00 (2)         2.00 (2)           Length of Stay Doors         2.06 (2)         2.00 (2)         3.0% (2)           OVO OVAS Pin         3.92 (2)         4.00 (2)         3.0% (2)		74.1% (20)	88.1% (37)	82.6% (57)	One
Degenerative goodyloikhesis         2.3% (2)         0.0% (9)         5.9% (2)           Heminat die         84.3% (4)         90.5% (4)         75.9% (2)           Central rameinie         84.3% (4)         90.5% (4)         33.9% (3)           Perminati traneini         69.3% (4)         76.9% (4)         33.9% (3)           Opconiver Trane (nine)         31.14/23         20.0222         22.711/8           Interned Ribord Loss (ntl.)         246.12         248.13         243.13           Leigh of Stay (brean)         2.064         2.005         2.007           OPO VAN Pan         39.21         40.02         38.21		25.9% (7)	11.9% (5)	17.4% (12)	Two
Hemisted dir.   84.15 (74)   90.45 (47)   75.95 (27)					Spinal Pathology
Certial summis         84.15 (74)         14.65 (44)         83.35 (39)           Frominish stressis         69.35 (43)         76.95 (40)         35.35 (21)           Operative Time (min.)         31.12.02         500.1222         52.71.17 0           Instituted Blood Loss (ml.)         24.64.26         24.81.15         23.83.18           Length of Stry (bosts)         2.60.6         2.00.5         1.00.27           NO 0 VAS Pim         39.21         40.20         38.21	0.086	5.6% (2)	0.0% (0)	2.3% (2)	Degenerative spondylolisthesis
Formunal steessis 69.3% (61) 76.9% (40) 58.3% (21) Operative Time (min.) 51.1202 50.0222 52.217.0 Stimmard Bibool Loss (ml.) 24642.6 28.84.15 24.34.3.7 Leugh of Sity (bourn) 2.04.06 2.04.05 2.04.0.7 POD 0 VAS Pain 3.942.1 4.042.0 3.842.1	0.052	75.0% (27)	90.4% (47)	84.1% (74)	Herniated disc
Operative Time (min.)         51.1x20.2         50.0x22.2         52.7x17.0           Britimated Blood Loss (ml.)         24.6x2.6         24.8x1.5         24.3x3.7           Lengeh of Stuy (boars)         2.0x0.6         2.0x0.5         2.0x0.5           DO D VAS Psin         3.9x2.1         4.0x2.0         3.8x2.1	0.873	83.3% (30)	84.6% (44)	84.1% (74)	Central stenosis
Estimated Blood Loss (mL)         24.642.6         24.841.5         24.343.7           Length of Stay (hours)         2.940.6         2.040.5         2.940.7           POD 0 VAS Pain         3.942.1         4.042.0         3.842.1	0.063	58.3% (21)	76.9% (40)	69.3% (61)	Foraminal stenosis
Length of Stay (bours)         2.0±0.6         2.0±0.5         2.0±0.7           POD 0 VAS Pain         3.9±2.1         4.0±2.0         3.8±2.1	0.538	52.7±17.0	50.0±22.2	51.1±20.2	Operative Time (min.)
POD 0 VAS Pain 3.9±2.1 4.0±2.0 3.8±2.1	0.462	24.3±3.7	24.8±1.5	24.6+2.6	Estimated Blood Loss (mL)
	0.946	2.0±0.7	2.0±0.5	2.0±0.6	Length of Stay (hours)
	0.683	3.8±2.1	4.0±2.0	3.9±2.1	POD 0 VAS Pain
	0.605	14.4±5.5	13.8±5.6	14.0±5.5	POD 0 Narcotic Consumption

BMI – Blody Mass Index; ASA – American Seciety of Anosthesiologists; CCI – Charlson Comorbidity Index; Worken' Comp – worken' compensation; POD – postoperative day; SD – standard deviation; VAS – Visual analog scale; OME – oral morphine equivalents

	Total	BMI<30	BMI≥30	*p-value
Complication	(n =88)	(n =52)	(n =36)	
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				

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

	Total	BMI<30	BMI≥0	*p-value
	(a -88)	(n =52)	(a =36)	
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	37,446.3	38.945.5	35.546.9	0.046
PHQ-9	6.015.9	5.614.7	6.617.2	0.549
VAS-BP	5.812.2	5.012.3	6.7±1.8	0.003
VAS-LP	5.642.6	5.2+2.5	6.0+2.7	0.234
ODI	39.3+17.0	37.3+16.2	41.5+15.1	0.308
6-week Peat-Op				
VR-12 PCS	42.019.8	45.2±8.0	37.6+19.4	0.009
VR-12 MCS	54.9+10.3	55,9410.6	53.5+10.1	0.114
PROMIS-PF	44.447.3	46.047.3	41.946.7	0.166
PHQ-9	4.4:5.9	3.515.5	5.416.4	0.095
VAS-BP	2.2+2.4	1.7+2.1	2.8+2.6	0.204
VAS-LP	2.142.3	1.842.2	2.4+2.4	0.321
ODE	23.0+17.0	17.73+13.7	30.4+19.1	0.025
12 Weeks Post-Op				
VR-12 PCS	46,749,7	48.8+8.7	43.4+10.6	0.199
VR-12 MCS	58.147.9	58.8+8.8	57,146,6	0.305
PROMIS-PF	49,019,8	49.749.2	47.9110.9	0.613
PHO-9	4.415.9	3.515.5	5.416.4	0.095
VAS-BP	1.942.1	1.5+2.0	2.5+2.0	0.048
VAS-LP	1.841.9	1.742.1	2.0x1.5	0.377
ODI	16.5117.1	14.4116.8	19.3±17.7	0.324
A Pre-Op to 6-week				
Post-Op				
VR-12 PCS	9.018.9	8.9410.4	9.216.5	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	2.414.8	1.6+5.6	0.683
VAS-EP	3.642.9	3.242.7	4.043.2	0.176
VAS-LP	3.812.7	3.9±3.0	3.602.5	0.813
ODI	17.9±19.16	20.0+18.3	15.1+20.4	0.910
A 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 PROMIS-PF	4,0+12.7 12,3+19.4	7.4+15.7	0.0×7.5 13.1×11.0	0.437
				0.644
PSQ-9	3.464.5	3.11.0	4.015.4	
VAS-BP	4.2±2.6	3.8±2.5	4.8±2.9	0.540
VAS-LP	3.5+2.5	2.842.5	45+23	0.275
ODI	23,6419.8	24.1414.9	22.8+26.8	0.515
VR-12, 12-lters Veter Score: VAS, Visual A				
Reported Outcome Me				
Disability Index; PHO				
*p-value calculated us				
point. At postoperative	time points and o	hanges in PROs, p	-values were calcul	ated using

<sup>\*</sup>p-value calculated using Student's t-test for continuous variables and Cht-square analysis for categorical variable

Raldfure indicates significance (rect) (%)