

Impact Of Obesity On The Functional Recovery After Lumbar Discectomy

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Abstract

Aim: evaluation of the disability and functional recovery after lumbar discectomy in obese patients.

Materials and Methods: Disability has been prospectively evaluated in 172 patients treated by lumbar discectomy due to refractory symptomatic lumbar disc prolapse between July 2010 and July 2013. Patients were divided in to 4 groups according to their body mass index. Oswestry disability index scale and prolo working scale have been used for assessment of the disability and functional recovery in the daily activities and working status. Final Post-operative disability and functional recovery have been evaluated one year after surgery.

Results: Patient improvement has been detected in 78.6%, 77.2% and 97.3% for normal weight, overweight and obese patients respectively while it was only 28.6% in patients with morbid obesity. The economic condition and functional return to work scale for normal weight, overweight and obese patients is 4.79, 4.39 and 4.73 respectively while it is only 2 ± 1.1 for patients with morbid obesity.

Conclusion: Surgical treatment for refractory symptomatic lumbar disc prolapse leads to significant improvement in the disability with significant functional recovery for overweight and obese patients, yet no improvement could be detected in patients with morbid obesity.

INTRODUCTION

Obesity has emerged as a global major health problem in the last decades with subsequent multisystem drawbacks and adverse consequences on the populations and communities (4, 14, 21). Obesity is affecting more than 300 million people in the world (7, 14) and is diagnosed when a body mass index is $\geq 30 \text{ Kg/M}^2$ (20)

The impact of obesity on the spinal disorders involves low back pain, facet arthritis, and degenerative disc diseases (21, 25).

Lumbar discectomy for obese patients is challenging and is still debatable as there is no clear evidence of superiority of lumbar discectomy over the conservative (3, 8).

Treatment of symptomatic lumbar disc prolapse in obese patients usually has refractory symptoms even with maximum medical treatment and physiotherapy, whereas surgical intervention is associated with higher surgical risk and complications (4).

MATERIALS AND METHODS

Disability has been prospectively evaluated in 172 patients, 93 male and 79 female who have been treated by lumbar discectomy due to refractory symptomatic lumbar disc prolapse between July 2010 and July 2013.

Patients were divided in to 4 groups according to the body mass index (BMI) (8) into; Normal weight (18.5–24.99), overweight (25–29.99), obesity (>30 –34.99) and morbid obesity ($\text{BMI} \geq 35$).

All patients were evaluated clinically and the diagnosis was confirmed by MRI study.

The Disability and functional status have been evaluated using The Oswestry Disability Index (ODI) (6) and prolo economic outcome scale (24).

Patients with past history of spinal surgery, spinal instability, and chronic disease affect the patient recovery or functional status was excluded.

In this study Data were entered checked and analyzed using

SPSS for Windows version 11.5 and office excel version 2010 .We used descriptive statistics, comparing means and correlation studies to analyze the results .For all statistical tests the threshold of significance is fixed at 5% level.

Study groups and patient criteria were summarized in Table (1).

Table 1

The patient criteria

	Normal weight	Overweight	Obesity	Morbid obesity
Number	42(24.4%)	79(45.9%)	37(21.5%)	14(8.1%)
age	34.2±11.1	35.7±7.5	35.8±7.1	46±8.1
Sex(M/F)	25/17(59.5%)	43/36(54.4%)	21/16(56.8%)	4/10(28.6%)
BMI	22.9±1.5	27.4±1.4	32±1	39.4±2.8
prolo scale	2.48±0.67	2.63±0.68	2.89±0.73	1.86±0.53
Initial ODI	59.4±16.8	56.5±10.7	52.6±10.6	70.8±10
Radiological findings				
Single disc	30(71.4%)	43(54.4%)	6(16.2%)	1(7.1%)
Double Discs	12(28.6%)	26(32.9%)	30(81.1%)	6(42.9%)
Multiple discs	0	10(12.7%)	1(2.7%)	7(50%)

RESULTS

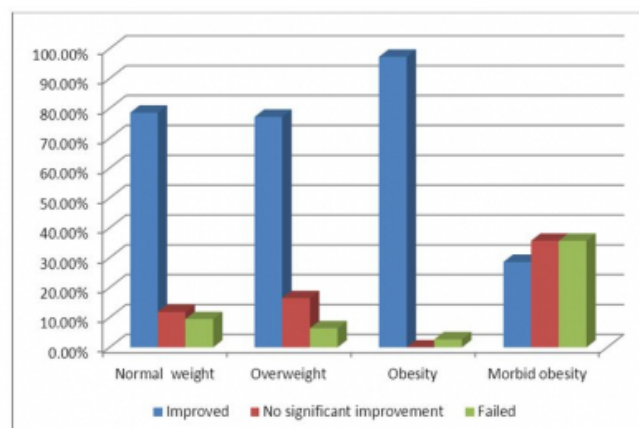
The mean age of patients in this study is 36.24±8.9 years old ranging between 21 and 59 years .out of the 172 patients 93 were male and 79 were female. Most of them (75.6%) have abnormal body weight and only 24.4% has normal body weight. 45.9% of the patients have over weight, obesity was found in 21.5% and morbid obesity represented 8.1% of the patients.

Male predominance is detected in our study groups except in morbid obese patients as it represented 59.5%, 54.4% and 56.8% in normal weight, overweight and obese patients respectively while it represented only 28.6% of the patients with morbid obesity.

Preoperative Clinical assessment and disability evaluation of the patient revealed significant higher disability index in the morbid obese patients than other groups.

Figure 1

patient improvement after surgical treatment



Preoperative radiological assessment revealed increased multiplicity of the prolapsed disc levels with the increase in the BMI as the mean number of involved disc levels is 1.29 in the patients with normal weight while it increase gradually with the increase in the body weight.

Table 2

Preoperative and post-operative ODI

	Normal weight	Overweight	Obesity	Morbid obesity
Initial ODI	59.4±16.8	56.5±10.7	52.6±10.6	70.8±10
final ODI	34.5±17.7	31.6±9.5	28±10.2	63.6±14.9
Mean ODI improvement	25±13	24±15	25±11	7.3±18
P-Value	0.001	0.03	0.009	0.97

The mean ODI at the end point of the study is 34.12±15.4 with mean improvement 23.6±15 with significant improvement in the first three groups (figure 2a.2b and 2c) but in patient with morbid obesity the mean improvement is only 7.3±18 as shown in .

At the end point of the study clinical improvement have been detected in 78.6% , 77.2% and 97.3% for the patient with normal weight , overweight and obese patient respectively while it was only 28.6% in patient with morbid obesity.

Table 3

Improvement after surgical treatment

	Normal weight		Overweight		Obesity		Morbid obesity	
	Number	%	Number	%	Number	%	Number	%
Improved	33	78.6%	61	77.2%	36	97.3%	4	28.6%
No significant improvement	5	11.9%	13	16.5%	0	0%	5	35.7%
Failed	4	9.5%	5	6.4%	1	2.7%	5	35.7%
Total	42	100%	79	100%	37	100	14	100

At the end point of the study prolo economic scale which reflect the functional recovery and work status is 4.79, 4.39 and 4.73 in patient with normal weight, overweight and obese patient respectively while it is only 2 ± 1.1 in patient with morbid obesity.

Table 4

Preoperative and post-operative prolo Economic scale

	Normal weight	Overweight	Obesity	Morbid obesity
Preoperative	2.48 ± 0.67	2.63 ± 0.68	2.89 ± 0.73	1.86 ± 0.53
post-operative	4.79 ± 0.84	4.39 ± 0.77	4.73 ± 0.77	2 ± 1.1
P-Value	<0.001	<0.001	<0.001	0.655

Figure 2a

Preoperative and post-operative ODI in patient with normal weight P value (0.001)

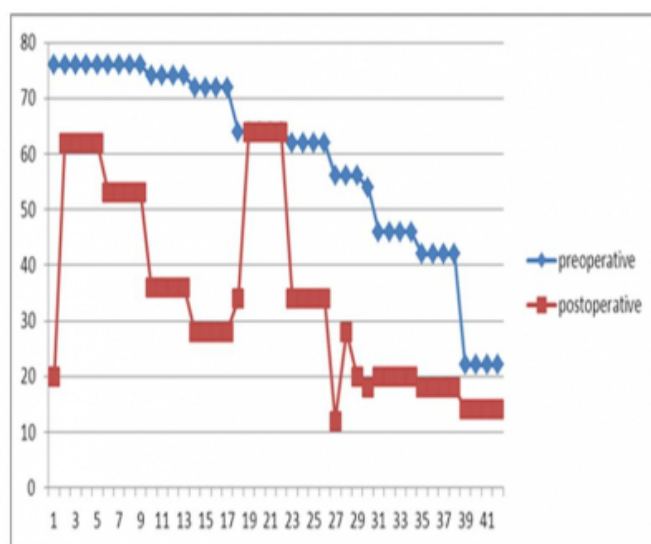


Figure 2b

Preoperative and post-operative ODI in patient with overweight weight P value (0.03)

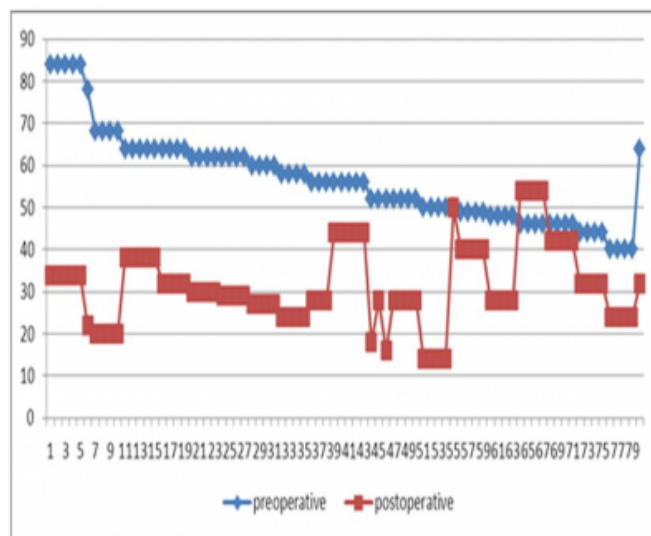


Figure 2c

Preoperative and post-operative ODI in patient with obesity P value (0.009)

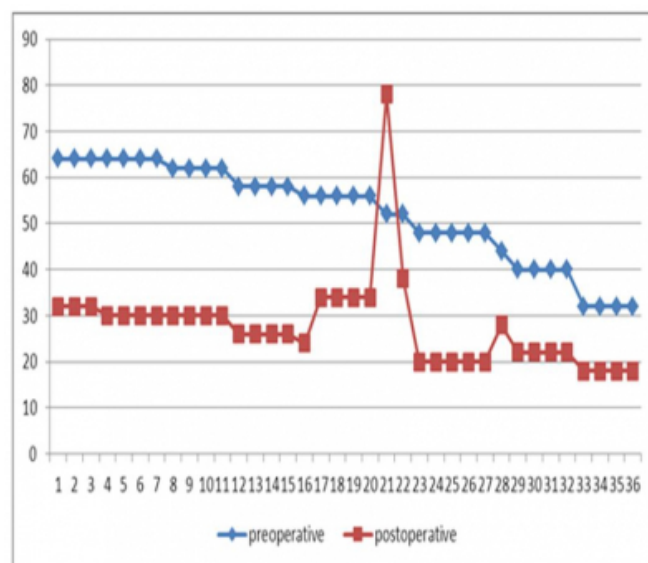


Figure 2d

Preoperative and post-operative ODI in patient with morbid obesity P value (0.97)

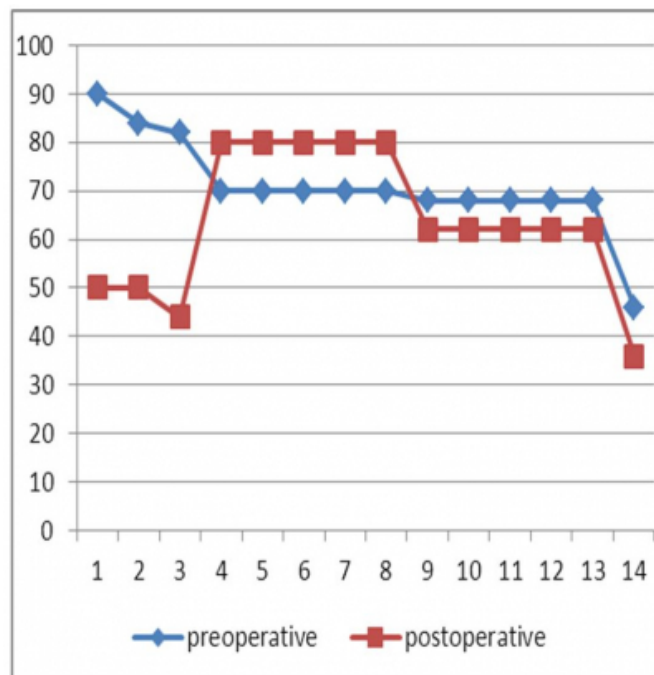
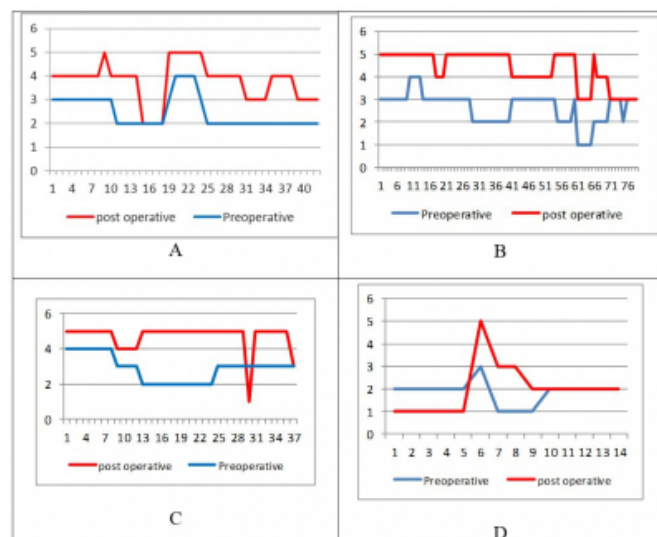


Figure 3

Preoperative and post-operative prolo scale A: in patient with normal body weight, B: in patient with overweight, C: in Obese patients and D: in patient with morbid obesity



DISCUSSION

Obesity is becomes global health problem affecting more than 300 million person in the world (7, 14) involving not only the developed countries but also Asian and developing countries (2).

Obesity is associated with adverse consequences and

multiple health problems (23).The impact of obesity on the spinal disorders involves low back pain, facet arthritis, and degenerative disc diseases (21, 25) because body weight in obese patient lead to mechanical stress on the spine and disturbance in the biomechanics of the spine while the excess adipose tissues produces cytokines which activate biochemical changes in the discs, joints and ligaments of the spine (18).

The problem of obesity and its effect on the spinal disorders was detected in our community as in this study most of patients has abnormal body weight where overweight , obesity and morbid obesity were representing 45.9%,21.5%,8.1% of the patients respectively.

Management of lumbar disc prolapse in obese patient is challenging and still debatable although it is well known that obese patient has worse outcome than non-obese in both operative and conservative treatment (25) but there is no clear evidence of superiority of lumbar discectomy over the conservative treatment in those patients.

Gender do not affect the presence or the extent of the lumbar disc diseases (26),however in our study males with symptomatic lumbar disc prolapse is more common than females (54%)and (46%)respectively which is in agreement with Silverplats and his colleagues (22)who reported 56% male and 44% female in their study.

Obesity is more common in females than males due to biological and socioeconomic factors(13) but this was found only in our morbid obese group in which female represented 71.4% of the patients while male were more common than females in other groups .

The upper age limit affecting the outcome after lumbar surgery was considered above 45 years (5,12)but Scott and Harrison(23) found that there is no adverse effect on the outcome above 45 years and the mean age of the patients in our study is 36.24 ± 8.9 without significant difference between the first three groups which is 34.2 ± 11.1 , 35.7 ± 7.5 and 35.8 ± 7.1 respectively but there is significant higher mean age in morbid obese patients (46 ± 8.1).

The radiological changes in the intervertebral lumbar disc was detected in patients with abnormal body weights while Persistent overweight is associated strongly with an increased risk of the numbers of lumbar discs (17,21) and in this study Single disc disease have been noticed in 70% of patient with normal body weight while the multiplicity of disc diseases have been noticed in obese patients.

The severity of symptoms in lumbar disc diseases can be affected by the patient's pain threshold, psychological status, Gender, age, degree of compression, number of affected discs and duration of compression.

Nerve root compression due to lumbar disc prolapse is increasing by obesity (16) but in our study this effect did not appear except in the morbid obese patients as the mean Oswestry disability index (ODI) at presentation was 59.4, 56.5 and 52.5 respectively without significant difference while it was 70.8 in morbid obese patients.

The primary outcome measures were significantly less for obese patient in both operative and non-operative groups (25) yet the lumbar discectomy in obese patient is still debatable and challenging.

In this study Patient improvement have been achieved in 78.6%, 77.2% and 97.3% for the patient with normal weight, overweight and obese patient respectively while it was only 28.6% in patient with morbid obesity and although the mean ODI at the end point of the study is 34.12 ± 15.4 with mean improvement 23.6 ± 15 , the change in the ODI between the preoperative measurement and the final ODI in morbid obese patient is only 7.3 ± 18 .

Multiple studies have assessed the effect of obesity on outcomes of lumbar surgery but with contradicting findings. Furukawa et al (9), LaCaille (15) and Patel et al (20) reported negative effect of obesity on the outcome after surgery and there was or increased complications rate in the SPORT study (21) while Andreshak et al (1) and Gepstein et al (11) reported little or no effect.

These contradictions in the results can be explained by the various prognostic factors, different spinal pathology and different outcome parameters between the studies. Patients with morbid obesity are reluctant to start the early ambulation with higher postoperative pain with subsequent failure of postoperative rehabilitation and instead of losing weight after spinal surgery, those patients had gained weight with subsequent no improvement in the daily activities or returning to work (10).

Functional recovery and return to work in patient with spinal disorder is multifactorial depending on the nature of the job, psychological factors and work consumption and in our study the economic outcome scale revealed significant improvement in the first three groups but surgery was associated with negative effect in morbid obese patients.

CONCLUSION

There is no significant improvement in the functional status of the morbid obese patient after lumbar discectomy while there is significant improvement in patient with overweight and obese patients after lumbar discectomy.

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