

CHANGES IN COMORBID DISEASES IN MORBIDLY OBESE PATIENTS TREATED BY LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING

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ABSTRACT

Objectives: Morbid obesity is often accompanied by several comorbid diseases which reduce lifespan and impair quality of life. Laparoscopic adjustable gastric banding (LAGB) is a minimal invasive procedure effective in the treatment of morbid obesity. The aim of this study was to determine the change in comorbidities in patients treated by LAGB who achieved weight loss.

Methodology: Among 134 morbidly obese patients treated by LAGB, 127 patients who were followed regularly and evaluated regarding the change in comorbidities, and laboratory and clinical measurements were recorded. Excess weight loss (EWL) and the percent improvement in comorbid diseases (PICD) were calculated by using the Friedman's test. P value of <0.05 was considered statistically significant.

Results: Of 127 cases with a mean age of 29.51±6.7 years. Pre-operative BMI was 48.38±7.81 kg/m². Comorbid disease was present in 62 (48.8%) patients. The mean follow-up duration was 23.83±8.78 months. The EWL was 52.6% (p<0.05) and the PICD was 74.8% (p<0.05). Complications were noted in 34 patients (26.8%).

Conclusions: LAGB is a minimally invasive procedure which is effective in the treatment of morbid obesity, and reduces the length of hospital stay. Comorbid diseases are significantly improved in patients who achieve weight loss by the LAGB procedure.

KEY WORDS: Obesity Treatment, Obesity, Obesity Surgery.

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INTRODUCTION

Weight loss can rarely be accomplished and often cannot be maintained in morbidly obese patients by non-surgical methods, such as diet, exercise, medical treatment. In contrast, long-

term weight loss has been established in patients treated by bariatric surgery.¹

Laparoscopic adjustable gastric banding (LAGB) is one of the most frequently preferred procedures in bariatric surgery since it allows adjustment of stoma, can be performed via a laparoscope, and is reversible.^{2,3} Morbid obesity is often accompanied by several comorbid diseases. These comorbid diseases reduce the lifespan and impair the quality of life. Lifespan is increased 29%-40% in the long-term follow-up of patients in whom weight loss has been established by bariatric surgery.⁴ Efficacy of the surgical treatment technique is determined by

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weight loss, an improvement in comorbidity, and a reduction in complications.

The aim of this study was to determine the change in comorbidity in patients treated by LAGB using laboratory and clinical measurements.

METHODOLOGY

Of 134 patients in whom LAGB was performed at the Ankara Numune Training and Research Hospital 6th General Surgery Clinic between September 2006 and January 2009, 127 patients were under regular follow-up. The surgical indication was based on inclusion criteria recommended by the International Federation for the Surgery of Obesity ([IFSO] BMI >40 or e"35 with obesity-related comorbidity). Waist circumference was measured at the midpoint between the lower margin of the ribs and the iliac crest.

Following surgery, all patients were mobilized on the same day and oral liquid feeding was initiated. Patients were generally discharged on postoperative day one. Patients were followed 1, 3, 6, and 12 months during the first year, and then every 6 months regarding changes in weight and comorbidities. Clinical measurements and related laboratory tests were conducted during the follow-up visits. The ideal weights of the patients were calculated using the "1983 Metropolitan Height Weight Tables," as prepared by the Metropolitan Life Insurance Company.⁵ The difference between the actual weight and the ideal weight of the patients was considered excess weight. Excess weight loss (EWL) during follow-up was compared with the initial weight and expressed as a percentage.

Whether or not the pre-operative laboratory or clinical findings associated with comorbidities were present during the post-operative period were evaluated and recorded during the follow-up visits. Percent improvement in comorbid diseases (PICD) was calculated by dividing the number of comorbid diseases in which the findings were improved or resolved by the number of pre-operative comorbid diseases and multiplying by 100.

Friedman's test was used to analyze the change in variables over time and a p value <0.05 was considered statistically significant.

RESULTS

Of 127 cases with a mean age of 29.51±6.7 years and a mean follow-up duration of 23.83±8.78 months, 98 (77.2%) were women and 29 (22.8%) were men. The mean pre-operative BMI, weight, and waist circumference were 48.38±7.81 kg/m², 134.39±20.84 kg, and 125.70±13.70 cm, respectively. The mean post-operative BMI, weight, and waist circumference were reduced to 35.04±5.92 kg/m², 99.92±15.22 kg, and 119.80±11.20 cm, respectively, after a follow-up period of at least 6 months (Table-I). One hundred fifteen comorbid diseases during the pre-operative assessment (medical history, physical examination and laboratory findings; Table-II).

Following the LAGB procedure, findings related to comorbid diseases were either improved or completely resolved in 86 patients during the follow-up period. The PICD was 74.8%. Clinical improvement was observed in 29 (78.4%) of 37 patients with GERD (p=0.057). Cholecystectomy was performed in the same

Table-I: Clinical characteristics of the patients

		<i>Pre-operative</i>	<i>Post-operative</i>	<i>P value</i>
Age (years)		27(18-55)		
Gender [n (%)]	F	98(%77.2)		
	M	29(%22.8)		
Follow-up duration (months)		23.83±8.78		
BMI (kg/m ²)		48.38±7.81	35.04±5.92	0.005
Weight (Kg)		134.39±20.84	99.92±15.22	0.841
Waist circumference (cm)		125.70±13.70	119.80±11.20	<0.001

F: Female M: Male

Table-II: Comparison of pre- and post-operative comorbid diseases in patients treated by LAGB

Disease	No. of patients n (%) [*]	No. of improved patients n (%) [*]	P value
GERD	37 (29.1)	29(78.4)	0.057
Hyperlipidemia	23 (18.1)	17(73.9)	0.926
Diabetes mellitus	12 (9.4)	6(50)	<0.001
Joint complaints	12 (9.4)	9(75)	0.155
Cholelithiasis	7 (5.5)	6(85.7)	<0.001
Hypertension	9 (7.1)	7(77.7)	0.026
Asthma	8 (6.3)	6(75)	0.010
Sleep disorders	7 (5.5)	6 (85.7)	0.810
Total	115	86	

* Proportion of patients with comorbid diseases in all patients

** Proportion of improved patients in all patients with the disease

session in 6 of 7 patients (85.7%) with cholelithiasis, as the patients had severe symptoms and signs. Complaints were improved in 9 (75%) of 12 patients with meniscopathy and/or gonarthrosis in the post-operative period without the need of any medical treatment ($p=0.155$). Antihypertensive treatment was no longer necessary in 7 (77.7%) of 9 patients with hypertension in the post-operative period ($p=0.026$). There were 12 cases of type 2 DM in the pre-operative period; 3 patients were under subcutaneous insulin and 9 patients were under oral anti-diabetic treatment. Insulin treatment was no longer necessary in one patient and anti-diabetic treatment was no longer necessary in 6 patients during the post-operative period ($p<0.001$). The laboratory results related with comorbid diseases are presented in Table-III.

During the pre- and post-operative periods, complications related to surgery were encountered in 34 (26.8%) patients (Table-IV).

DISCUSSION

Morbid obesity is often accompanied by social and physical problems associated with comorbid diseases. Significant improvement and reduction in comorbidity is observed as a result of surgical methods.⁶

In a meta-analysis conducted in 33 different studies involving LAGB⁷, improvement has been reported in 60% of patients with type 2 DM, 43% of patients with hypertension, 70% of patients with dyslipidemia, and >85% of patients with sleep apnea. In the same meta-analysis, the mortality rate has been reported to be <1%. In 838 patients treated by LAGB, Brancatisano et al.⁸ have reported an improvement or a resolution in 79% of patients with type 2 DM, 67% of patients with hypertension, 66% of patients with GERD, and 70% of patients with joint pain after a mean follow-up duration of 13 months. In 413 patients. Schouten et al.⁹ have reported that comorbid diseases were improved

Table-III: Comparison of laboratory results of the patients treated by LABG after at least 6 months of follow-up Laboratory test

	Pre-operative	Post-operative	P value
Glucose (mg/dl)	118.81±93.24	99.15±15.36	0.500
Insulin (uIU/mL)	12.20±1.74	10.13±4.73	0.736
HbA1C (IU/L)	5.61±0.54	5.42±0.52	<0.001
T-Chol (mmol/L)	172.72±30.46	125.38±16.56	<0.001
LDL-Chol (mmol/L)	158.30±38.25	120.58±24.07	<0.001
HDL-Chol (mmol/L)	43.72±6.54	58.06±15.93	<0.001
TG (mmol/L)	112.22±35.31	71.76±13.95	<0.001

Table-IV: Number of peri- and post-operative complications

	<i>Peri-operative</i>	<i>Post-operative</i>	<i>Total</i>
Band slippage		5	5
Pouch dilatation		3	3
Band opening		3	3
Intractable vomiting		2	2
Band intolerance		2	2
Pulmonary embolism		1	1
Port disconnection, atony, infection		12	12
Migration		2	2
Intra-abdominal hemorrhage		1	1
Suspected gastric perforation	2		2
Gastric serosal defect due to Veress needle insertion	1		1
Total	3	31	34

or completely resolved in 33 patients treated by LAGB and re-operated due to band erosions, intolerance, leaks, dysfunction, or slippage. Spivak et al.¹⁰ have reported that comorbid diseases were improved in 33%-87% or completely resolved in 163 patients treated by LAGB. In the current study, we observed that comorbid diseases were either improved or completely resolved in 27 of 28 patients re-operated due to similar indications.

Obesity increases the risk of cardiovascular disease, in part due to a change in plasma lipid concentrations. A 10%-20% decrease in TC and a 20%-30% decrease in TG can be achieved by a 5-15 kg weight loss.^{11,12} In a randomized study of a low-calorie diet in 36 patients, Marckmann et al.¹³ have reported that there was a 9% decrease in plasma TC, 30% decrease in T, and a 5% increase in HDL-C with a mean weight loss of 13.6 kg in 24 weeks. In the current study, there was a 27.7% increase in the plasma TC, a 36.6% decrease in TG, a 24.1% decrease in LDL-C, and a 34.6% increase in HDL-C were noted.

Ahroni et al.¹⁴ have reported a significant reduction in comorbidity and an improvement in quality of life in 195 patients treated by LAGB at the end of one year. Dixon et al.¹⁵ noted an improvement in comorbid diseases, quality of life, and psychological status in parallel with BMI reduction in patients treated by LAGB.

In 31 patients treated by LAGB, Tolonen et al.¹⁶ determined that reflux symptoms were reduced from 48.4% to 16.1% after a mean follow-up duration of 19 months. Gastric content which

regurgitates into the esophagus due to GERD leads to an increased prevalence of asthma in these patients. Dixon et al.¹⁷ have reported that asthma was noted in 73 of 296 patients (24.6%) treated by LAGB and emphasized that this rate was in excess of the 12%-13% prevalence of asthma in the general Australian population. Twelve months after the LAGB procedure, the asthma score was reduced from 44.5±16 to 14.3±11 in patients who achieved weight loss. This reduction is in close correlation with the reduction in GERD-related complaints. In the current study, there were 37 (29.1%) patients with reflux, and 8 (6.3%) patients with asthma. Herniorrhaphy was performed in the same session in 4 patients with reflux. Reflux complaints were reduced in 29 (78.4%) patients, including these 4 patients, and asthma findings were resolved in 6 (75%) patients.

There is a strong relationship between obesity and glucose intolerance, as well as insulin resistance. The risk for type 2 DM is increased 40 times as BMI is increased to >23 kg/m².¹⁸ Increased fasting plasma glucose and plasma insulin resistance (HOMA value) in morbidly obese patients is decreased by weight loss.¹⁹⁻²³ Moreover, treatment of DM becomes 6.5 times easier when weight loss by bariatric surgery can be established before irreversible loss of pancreatic β cells.²⁴

In conclusion, significant reduction in comorbid diseases can be achieved in addition to establishing excess weight loss by LAGB, which is a safe and effective procedure in the treatment of

morbid obesity. This effect contributes to an increase in lifespan and improvement in the quality of life.

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