

Abstract for virtual poster

Title: Short term outcomes of two laparoscopic procedures for morbid obesity

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Objective. To compare the short term (i.e., two years) outcomes of laparoscopic Roux-Y gastric bypass (lap RYGB) and laparoscopic gastric banding (lap banding) for morbidly obese patients in Ramathibodi hospital.

Methods. Medical records of patients who underwent laparoscopic surgery for morbid obesity in Ramathibodi hospital between November 2003 and November 2008 were reviewed. Baseline data including demographics, baseline anthropometric and biochemical measurements were recorded. Patients were followed and the body weight was measured every three to six months. Follow up biochemical measurements were also recorded. After approximately six months to one year after the primary operation, the Bariatric Analysis and Reporting Outcome System (BAROS) scores were also obtained, and re-evaluated every six months. The differences in the series of body weight measurement data between the two laparoscopic procedures were tested within the modeling framework where the measurements within an individual were assumed to have a multivariate Normal distribution with first order autoregressive correlation structure. The differences in the percent of excess body weight loss (EBWL) data between the two groups were tested within a similar framework. The differences in the BAROS scores were tested using an ordinal logistic regression with clustering within individuals and Huber-White sandwich estimator of the standard error.

Results. There were 65 patients in the series, 31 underwent lap banding and 34 lap RYGB. Characteristics and baseline status of patients in the two laparoscopic groups are presented in table 1.

Table 1. Characteristics of patients in the two laparoscopic surgery groups.

Characteristic	Lap banding (n = 31)	Lap RYGB (n = 34)	p-value
Age (years): mean (SD)	32.0 (11.3)	31.4 (9.8)	0.823
Sex: male:female	15:16 (48:52)	13:21 (38:62)	0.409
Operative time (min): mean (SD)	164 (88.1)	301.6 (58.3)	< 0.001
Blood loss (ml.): median (range)	0 (0 to 200)	100 (0 to 400)	< 0.001
ICU stay (yes): number (%)	6 (19)	23 (68)	< 0.001
Length of hospital stay (days): median (range)	3 (2 to 11)	6 (3 to 11)	< 0.001
Baseline body weight (kg): mean (SD)	128.4 (19.6)	134.1 (27.4)	0.340
Height (m): mean (SD)	1.69 (0.10)	1.68 (0.10)	0.571
BMI (kg/m ²): mean (SD)	44.7 (5.0)	47.4 (7.0)	0.091
Ideal Body Weight (kg): mean (SD)	71.4 (7.6)	70.2 (7.6)	0.519
Excess Body Weight (kg): mean (SD)	57.0 (15.3)	64.0 (22.9)	0.160
Baseline Hb (gm%): mean (SD)	14.1 (1.5)	13.6 (1.4)	0.235
Baseline FBS (mg%): median (range)	107 (72 to 360); n = 26	94 (63 to 164); n = 31	0.091
Baseline creatinine (mg%): median (range)	0.8 (0.5 to 1.2); n = 26	0.8 (0.6 to 1.3); n = 33	0.340
Baseline albumin (gm/L): median (range)	4.2 (3.7 to 5.1); n=25	4.0 (3.0 to 5.3); n = 32	0.047
Baseline cholesterol (mg%): median (range)	207 (146 to 270); n=27	203 (112 to 388); n=29	0.883
Baseline triglyceride (mg%): median (range)	146 (80 to 600); n = 26	140 (51 to 273); n = 26	0.062
Underlying medical illnesses: number (%)			

All illnesses (yes)	23 (74)	27 (79)	0.618
Type 2 DM	7 (23)	4 (12)	0.245
Hypertension	11 (35)	12 (35)	0.987
Dyslipidemia	5 (16)	3 (9)	0.371
Osteoarthritis	3 (10)	9 (26)	0.081
Sleep apnea	15 (48)	22 (65)	0.184
Hypoventilation	0	2 (6)	0.170

p-values by unpaired t-test, ranksum test and chi-square test as appropriate

Except for differences due to the greater technical difficulty of the Lap RYGB operation, no clear differences can be seen between the two groups of patients at baseline.

The outcomes of treatment are compared between the two groups in figure 1, in terms of average weight loss. There seemed to be significant differences in weight loss between the two groups (favoring the Lap RYGB group) at one year after operation, but the differences tended to decrease with time, becoming non-significant after two years. However, the number of losses to follow-up was considerable after one year.

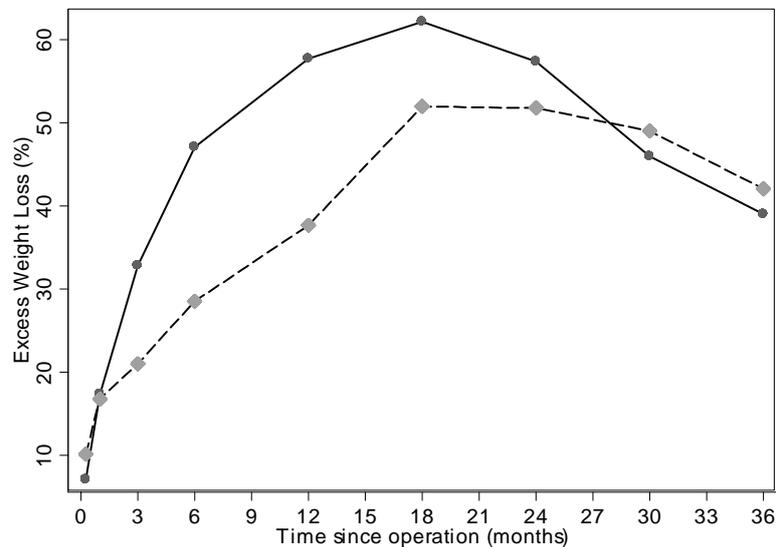


Figure 1. Average difference in the percent excess body weight loss between the lap RYGB group (solid line) and the lap banding group (dashed line).

To increase the sensitivity in detecting true differences between the two laparoscopic operations, a model-based statistical method was used to analyze the data taking into account follow-up as well as baseline data. Confounding effects of relevant factors were adjusted for in multivariable analyses.

Differences in the body weight.

There was a statistically significant but clinically small difference in the body weight between the two operations (table 2), after adjusting for the effect of baseline body weight and age. On the average, patients in the lap RYGB group lost 4 kg. more, after a follow-up of one to two years. In table 3, the weights are explicitly compared between the two groups at various times during follow-up.

Table 2. Effect of operation on the body weight, after adjusting for age and baseline body weight

Variable	Average change in body weight (95% CI)	p-value
Age	0.25 kg / year increase (0.05 to 0.45)	0.013
Baseline body weight	0.87 kg / kg increase (0.79 to 0.96)	< 0.001
Operation	- 4.32 kg. Lap RYGB vs. Lap Banding (- 8.06 to - 0.57)	0.024

Negative numbers refer to a decrease relative to the reference group

Estimated autocorrelation coefficient = 0.735

Table 3. Average difference in the body weight at various times during follow-up

Follow up time	Lap Banding group	RYGB group	p-value (unpaired t-test)
6 months	106.2 (17.2); n = 17	104.4 (22.3); n = 23	0.802
12 months	102.1 (17.0); n = 25	96.7 (15.0); n = 14	0.379
18 months	97.0 (16.4); n = 6	99.8 (15.7); n = 6	0.766
24 months	96.7 (24.2); n = 9	95.5 (31.8); n = 2	0.954

Differences in the percent excess weight loss.

There was a marginally significant but clinically small difference in the percent excess body weight loss (reflecting the same finding as for the absolute body weight loss above), see table 4. The average loss was 6% more in the laparoscopic RYGB group. Only age was adjusted for in this analysis since the baseline body weight was not a significant covariate.

A more realistic model with a statistically significant time-treatment interaction is presented in figure 1, demonstrating a convergence of weight reduction for the two operations after two years. The data in figure 1 is explicitly shown in table 5, where the differences between the two groups at 2 years are shown to be statistically nonsignificant.

Table 4. Effect of operation on the percent excess body weight loss, after adjusting for age

Variable	Average change in body weight (95% CI)	p-value
Age	- 0.37 kg / year increase (- 0.68 to - 0.06)	0.021
Operation	6.39 % Lap RYGB vs. Lap Banding (0.26 to 12.51)	0.041

Negative numbers refer to a decrease relative to the reference group

Estimated autocorrelation coefficient = 0.728

Table 5. Average difference in the % change in body weight at various times during follow-up

Follow up time	Lap Banding group	RYGB group	p-value (unpaired t-test)
6 months	29.0 (18.5); n = 17	48.5 (16.6); n = 23	0.001
12 months	36.8 (22.5); n = 15	57.5 (22.3); n = 14	0.019
18 months	46.3 (18.8); n = 6	58.5 (15.8); n = 6	0.252
24 months	47.8 (30.6); n = 9	50.7 (32.9); n = 2	0.905

Differences in the BAROS score.

There were no significant differences in the change of BAROS scores between the two laparoscopic procedures. Most patients were graded as “fair” and “good”, 1 to 2 years after surgery.

Conclusion. Short term differences between the two laparoscopic operations for morbid obesity tended to marginally favor lap RYGB in terms of weight loss. However, the

BAROS scores were not clearly different between the two groups. All the differences seemed to attenuate with time. The effects of the two operations were similar after two years. The loss of body weight for either operation tended to decrease with time as well, i.e. the effect of both operations tended to decrease with time.