

# Evaluation of Health Status and Quality of Life after Bariatric Surgery: Comparison of Standard Roux-en-Y Gastric Bypass, Vertical Banded Gastroplasty and Laparoscopic Adjustable Silicone Gastric Banding

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**Background:** This study is a trial to compare the effects and outcomes of three different bariatric procedures performed in two centers. Standard Roux-en-Y gastric bypass was performed by Dr. Norman Samuels in Fort Lauderdale (Florida); vertical banded gastroplasty and laparoscopic adjustable silicone gastric banding were done in Hallein (Salzburg) by Dr. Emanuel Hell and Dr. Karl Miller.

**Methods:** In a prospective comparative study 30 matched patients from each group were followed to assess post-operative improvement in health status and quality of life, to compare the three different techniques. The Bariatric Analysis and Reporting Outcome System (BAROS) as described by Oria and Moorehead has been used for evaluation.

**Results:** The observation time was at least 3 years (3 to 8 years) in each individual case. A significant increase in quality of life and health status in 75% of the surgically-treated patients was observed when compared with a non-operated control group of morbidly obese patients.

**Conclusions:** By utilizing BAROS it has been found possible to compare the results of different procedures done by different surgeons with different techniques, utilizing patients from different cultures and with different languages. The results of this comparative study favor the standard gastric bypass for the treatment of morbid obesity. This operation is superior to purely gastric restrictive procedures in

weight loss and improvement of quality of life.

*Key words:* Morbid obesity, Roux-en-Y gastric bypass, vertical banded gastroplasty, laparoscopic adjustable silicone gastric banding, weight loss, co-morbidity, quality of life.

## Introduction

Two types of operations are in use for treating severe obesity. These can be classified as simple gastric restrictive operations and more complex procedures in which a part of the digestive tract is bypassed to produce malabsorption. While in Europe the vertical banded gastroplasty (VBG) and the adjustable silicone gastric band (ASGB) as restrictive procedures are the most often performed operations, in the USA the gastric bypass is the gold standard. The gastric bypass has gained little or no acceptance in Europe.

This study is a trial to compare the effects and outcomes of three different bariatric procedures performed in two centers. Standard Roux-en-Y gastric bypass (RYGBP) was performed by Dr. Norman Samuels at the Center For Severe Obesity in Fort Lauderdale (Florida). Vertical banded gastroplasty and laparoscopic adjustable silicone gastric banding were done in Hallein (Salzburg) by Dr. Emanuel Hell and Dr. Karl Miller.

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## Methods

In a prospective comparative study, 30 matched patients from each group were followed-up in order to assess any post-operative increase in health status and quality of life and to compare the three different techniques.

Stratification (Table 1) was performed for sex, BMI and age. We were using mainly consecutive cases operated on in 1995, and we excluded only a few for matching reasons. The observation time was at least 3 years in each individual case.

## Statistical Methods

All data was further analyzed by use of an "IBM-586" personal computer using the software programs from IDV-Versuchsplanung und Datenanalyse, Gauting, Munich, F.R.G. In each group, median, standard deviation, standard error, range, upper and lower quartile, and total mean values were calculated. Univariate analyses were performed using the Wilcoxon-Mann-Whitney-U-test for continuous variables and by using a chi-square test on 2 x 2 table for binary variables (Fisher exact). The p values are those computed for each comparison and statistically significant variables as predictors at the 0.05 level (two tailed).

The gastric reservoir of the VBG is stapled with a four-row stapler.<sup>1</sup> The encirclement of the gastroplasty outlet channel is effected with a Gore-Tex® band 5 cm long with an average operation time (from skin to skin) of 48 minutes. In the laparoscopic procedures<sup>2</sup> the adjustable band was inserted via 5 trocars in the upper abdomen and placed in a bluntly dissected tunnel within the gastrophrenic ligament on the posterior wall of the stomach, and was fixed by at least four stitches on the greater curvature and anterior wall of the stomach. The 20 ml pouch size was always measured

with a calibration balloon.

We have been using both bands, the Swedish from Obtech and the ASGB from BioEnterics. We were able to demonstrate in a comparative prospective study<sup>3</sup> that as regards outcome there is no difference between the two products. As far as open versus laparoscopic banding is concerned, we have previously presented a comparative prospective study<sup>4</sup> with an observation time of more than 2 years and found that the only advantage is perioperative. This means better mobility, less nursing care, a shorter hospital stay and shorter recovery with the laparoscopic procedure. The laparoscopic procedure also avoids the potential problem of incisional hernia formation with open surgery. The average operation time in 1995 was 88 minutes, but is now about 1 hour.

The standard RYGBP<sup>5</sup> is a gastric bypass with a vertical banded gastric pouch. Although we now divide the stomach, we were not doing so at the time of this study and were using a Gore-Tex band of 6.5 cm. The average operation time was 135 minutes. No unusual perioperative or long-term complications have been observed in the three series.

As an evaluating system, the Bariatric Analysis and Reporting Outcome System (BAROS) as described by Oria and Moorehead has been used<sup>6</sup> (Table 2). This system is based on a scoring table that adds or subtracts points, while evaluating three main areas. These are percentage of excess weight loss, changes in medical conditions and assessment of quality of life. Patients are divided into five outcome groups from failure to fair, good, very good and excellent. Points are deducted for complications and re-operative surgery. In each of the above areas, it is possible to obtain a maximum of 3 points.

The final scoring is indicated in the table, and ranges from failure with 1 point or less to excellent with more than 7 to 9 points.

## Results

For the 30 patients in the VBG group (Table 3), 50% lost between 50% and 74% of the excess weight, with only 2 patients losing between 75% and 100% of the excess weight. All major medical conditions were resolved, and others improved in 73% of the patients. Of the patients, 60% reported much more improvement in their quality of life.


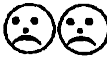























The laparoscopic ASGB group (Table 4) showed

**Table 1.** Patients' Characteristics

	VBG (n=30)	ASGB (n=30)	RGB (n=30)
Age (at surgery)	35.1 ± 6.2	36.4 ± 4.8	41.26 ± 5.9
BMI (kg/m <sup>2</sup> )	46.9 ± 9.9	46.9 ± 7.8	45.18 ± 8.2
BW (kg)	139 ± 33.3	133 ± 22.7	135.74 ± 23.9
EW (kg)	79.2 ± 29.8	77.4 ± 33.3	75.7 ± 27.4
Follow-up (months)	40.1 ± 8.3	39.7 ± 7.6	60 ± 8.2

BMI=body mass index; BW=body weight; EW=excess weight

**Table 2.** Bariatric Analysis and Reporting Outcome System (B.A.R.O.S.)

WEIGHT LOSS % OF EXCESS (points)	MEDICAL CONDITIONS (points)	QUALITY OF LIFE QUESTIONNAIRE				
Weight gain (-1)	Aggravated (-1)	1. SELF-ESTEEM				
		 -1.0	 -0.50	 0	 +0.50	 +1.0
0-24 (0)	Unchanged (0)	2. PHYSICAL				
		 -0.50	 -0.25	 0	 +0.25	 +0.50
25-49 (1)	Improved (1)	3. SOCIAL				
		 -0.50	 -0.25	 0	 +0.25	 +0.50
50-74 (2)	One major resolved Others improved (2)	4. LABOR				
		 -0.50	 -0.25	 0	 +0.25	 +0.50
75-100 (3)	All major resolved Others Improved (3)	5. SEXUAL				
		 -0.50	 -0.25	 0	 +0.25	 +0.50
Subtotal:	Subtotal:	Subtotal:				

**COMPLICATIONS**

Minor: Deduct 0.2 point  
Major: Deduct 1 point

**REOPERATION**

Deduct 1 point

**TOTAL SCORE**

**OUTCOME GROUPS  
SCORING KEY**

Failure	1 point or less
Fair	> 1 to 3 points
Good	> 3 to 5 points
Very Good	> 5 to 7 points
Excellent	> 7 to 9 points

**Table 3.** Vertical banded gastroplasty

I. Weight loss						
weight loss % of excess	number of patients		percentage			
weight gain	0		0			
0-24	1		3			
25-49	12		40			
50-74	15		50			
75-100	2		7			
Total	30		100			

II. Medical conditions						
outcome groups	aggravated	unchanged	improved	one major resolved, others improved	all major resolved, others improved	Total
Number of patients	0	2	1	5	22	30
Percentage	0	7	3	17	73	100

III. Quality of life (Moorehead-Ardelt)						
Total outcome						
Quality of life	much less	less	the same	more	much more	Total
Number of patients	1	0	0	11	18	30
Percentage	3	0	0	37	60	100

**Table 4.** Laparoscopic adjustable silicone gastric banding

I. Weight loss						
weight loss % of excess	number of patients		percentage			
weight gain	0		0			
0-24	1		3			
25-49	13		43			
50-74	15		51			
75-100	1		3			
Total	30		100			

II. Medical conditions						
outcome groups	aggravated	unchanged	improved	one major resolved, others improved	all major resolved, others improved	Total
Number of patients	0	2	2	6	20	30
Percentage	0	7	7	20	66	100

III. Quality of life (Moorehead-Ardelt)						
Total outcome						
Quality of life	much less	less	the same	more	much more	Total
Number of patients	1	1	1	9	18	30
Percentage	3	3	3	30	64	100

a 50% to 74% loss of excess weight in 15 patients or 50%. Only 1 patient lost between 75% and 100% of the excess weight. All major medical conditions were resolved, and others improved in 20 patients or 66%. Nineteen or 64% report that their quality of life was much improved.

The standard RYGBP patients (Table 5) lost between 50% and 74% of the excess weight in 20%. Of these patients, 73% lost 75% to 100% of the excess weight. All major medical conditions were resolved, and others improved in 40% of the patients, and quality of life was much better in 19 or 63% of the patients.

BAROS total score outcome was as follows:

- For the VBG group (Table 6), 33% were considered excellent and 48% very good. Three percent were failures.

- For the laparoscopic ASGB group (Table 7), 23% were excellent, 50% were very good and again 3% were failures.

- For the standard RYGBP group (Table 8), 63% were excellent, 20% were very good and there were no failures.

Summarizing these results (Table 9), the BAROS scoring for the VBG group were 6.13 or very good, the ASGB group were 5.99 or very good, and the RYGBP group were 7.15 or excellent.

The RYGBP group averaged a 90% excess weight loss compared with only approximately 60% in the VBG and ASGB groups. This difference is statistically significant. In addition, the RYGBP group had a better improvement in quality of life, but not in decrease of comorbid conditions.

**Table 5.** Standard Roux-en-Y gastric bypass

I. Weight loss						
weight loss % of excess	number of patients		percentage			
weight gain	0		0			
0-24	0		0			
25-49	2		7			
50-74	6		20			
75-100	22		73			
Total	30		100			

II. Medical conditions						
outcome groups	aggravated	unchanged	improved	one major resolved, others improved	all major resolved, others improved	Total
Number of patients	1	5	4	8	12	30
Percentage	3	17	13	27	40	100

III. Quality of life (Moorehead-Ardelt)						
Total outcome						
Quality of life	much less	less	the same	more	much more	Total
Number of patients	0	2	3	6	19	30
Percentage	0	7	10	20	63	100

**Table 6.** Vertical banded gastroplasty

BAROS	Number of patients	%
Failure	1	3
Fair	1	3
Good	4	13
Very good	14	48
Excellent	10	33
Total	30	100

**Table 7.** Laparoscopic adjustable silicone gastric banding

BAROS	Number of patients	%
Failure	1	3
Fair	2	7
Good	5	17
Very good	15	50
Excellent	7	23
Total	30	100

**Table 8.** Standard Roux-en-Y gastric bypass

BAROS	Number of patients	%
Failure	0	0
Fair	2	7
Good	3	10
Very good	6	20
Excellent	19	63
Total	30	100

**Table 9.** BAROS points

	VBG n = 30	ASGB n = 30	RYGBP n = 30	
Weight loss	1.6	1.5	2.7	p<0.05
Medical conditions	2.57	2.48	1.9	ns
QoL	1.96	2.01	2.55	ns
BAROS scoring	6.13	5.99	7.15	p<0.05
	very good	very good	excellent	

## Conclusions

The results of this comparative study favor the standard gastric bypass for the treatment of morbid obesity. This operation is superior to the purely gastric restrictive procedures in terms of weight loss, and not so much in improvement in the quality of life and not at all in decrease of comorbidities. BAROS has made it possible to compare the results of different procedures done by different

surgeons with different techniques, utilizing patients from different cultures and with different languages.

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