Antecolic Laparoscopic Roux-en-Y Gastric Bypass Is Not Associated with Higher Complication Rates

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Since its introduction in 1994, laparoscopic Roux-*en*-Y gastric bypass (LRYGB) has rapidly gained popularity for the treatment of morbid obesity. Historically, the operation is performed in a retrocolic fashion; however antecolic LRYGB has been advocated as a safe alternative. We reviewed our experience with both techniques. From January 2003 to November 2004, the new UCLA Laparoscopic Bariatric Surgery Program performed 341 LRYGBs. In March 2004, our program transitioned from a retrocolic to an antecolic approach for all gastric bypass procedures. Institutional review board approval was obtained, and the data for all patients was collected into a prospective database. The patient characteristics for the two groups were similar. The significant differences between the two groups were average body mass index and the percentage of patients with diabetes and sleep apnea. The complication profiles for the two groups were also similar. There were significant differences between the two groups in the reoperation rate, antecolic 2.0 per cent *versus* retrocolic 7.8 per cent, and length of stay, antecolic 2.57 *versus* retrocolic 2.89 days. There were no anastomotic leaks or deaths in either group. Antecolic LRYGB is safe and may be associated with fewer complications. Only long-term weight loss results and complication rates will provide a definitive answer.

OBESITY IS AN EPIDEMIC in the United States that plagues more than 10 million Americans. Surgical therapy for morbid obesity (known as bariatric surgery) following the 1991 NIH consensus statement guidelines has achieved consistent, safe results for the treatment of obesity.[1] Unfortunately, the specific surgical modality performed has received much debate. Bariatric surgery has changed significantly from Mason's first account of a gastric bypass in 1967.[2] Numerous operations have been devised to treat morbid obesity during this time; however, the Roux-*en*-Y gastric bypass remains the gold standard for bariatric surgery. Wittgrove and Clark's description of a laparoscopic Roux-*en*-Y gastric bypass in 1994 ushered in the era of minimally invasive surgical techniques for bariatric surgery.[3] Since 1994, the laparoscopic approach has evolved with multiple variations of each major aspect of the operation. One area of continued debate is the orientation of the Roux limb, retrocolic/retrogastric (RC/RG) *versus* antecolic/antegastric (AC/AG). Mirroring the traditional open operation, LRYGBs were initially performed in a RC/RG fashion. However, several groups have described their transitions from the RC/RG approach with excellent results.[4, 5] Proponents of the AC/AG approach site the potential benefits of decreased operative time, ease of teaching, technically easier reoperations for complications, and decreased incidence of internal hernias as the main advantages to the technique. We will describe our experience with the transition from RC/RG to AC/AG approach for LRYGB, and we will compare the outcomes of both groups.

Patients and Methods

From January 2003 to November 2004, the new UCLA Laparoscopic Bariatric Surgery Program performed 341 LRYGBs. Patient selection criteria followed NIH consensus statement 1991 guidelines for surgical management of morbid obesity.[1] This included a multidisciplinary approach focused on ag-

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gressive patient screening, thorough preoperative patient education and preparation, tight control of comorbidities, clinical pathways for inpatient hospital course, and close postoperative follow-up. All procedures were performed by four surgeons with extensive minimally invasive surgery backgrounds. The steps to each procedure included the formation of a 30-mL gastric pouch, linear totally stapled gastrojejunostomy, 80-cm Roux-limb length, and side-side linear stapled jejuno-jejunostomy. The mesocolic, Petersen, and jejunal mesenteric defects were all closed in the retrocolic group. None of the defects were closed in the antecolic group. In March 2004, our program transitioned from a retrocolic to an antecolic approach for all gastric bypass procedures. This constitutes the only major difference in the management of the two groups.

Institutional review board approval was obtained, and the data for all patients was entered into a prospective database. Patients were followed postoperatively at 2 weeks, 3 months, 6 months, 9 months, 1 year, and yearly thereafter. Student's *t* test was used for statistical comparison of parametric values, and the χ^2 test was used for nonparametric values. The differences were considered statistically significant if $P < 0.05$.

Results

Patient Characteristics

There were 141 retrocolic and 200 antecolic operations performed. All patients were followed for a minimum of 2 months. Characteristics of the patient population are detailed in Table 1. There were no significant differences between the two groups with respect to age, per cent of male patients, and the per cent of patients with hypertension or previous abdominal surgery. There were significant differences in the two groups with respect to average body mass index (BMI) (antecolic 50.6 *vs* retrocolic 48.6), the percentage of patients with diabetes (antecolic 26% *vs* retrocolic 16%), and the percentage of patients with sleep apnea (antecolic 28.0% *vs* retrocolic 18.4%).

TABLE 1. *Patient Characteristics*

	Antecolic (n = 200)	Retrocolic (n = 141)	*P* Value
Average age	43	45	0.137
Average BMI	50.7	48.6	0.0013
Male (%)	13.5	9.2	0.226
Diabetic (%)	26.5	16.3	0.033
Hypertensive (%)	49.0	44.7	0.431
Sleep apnea (%)	28.0	18.4	0.012
Previous abdominal surgery (%)	62.0	62.4	0.939

Complications

The complication profile for the two groups was similar and is detailed in Table 2. There were no deaths or anastomotic leaks in either group. The two groups were statistically similar with respect to overall complication rate and readmission rate. There was a statistically significant difference between the groups with respect to reoperation rate (antecolic 2.0% *vs* retrocolic 7.8%) and length of stay (antecolic 2.57 days *vs* retrocolic 2.89 days).

Discussion

Antecolic LRYGB can be performed safely and may have an improved complication profile over its retrocolic counterpart. Our results indicate that an established bariatric program can transition from a retrocolic, retrogastric LRYGB to an antecolic, antegastric LRYGB with acceptable early morbidity and mortality rates. The biggest strength of our study is the prospective collection of data before and after this transition point, which provides a clear look at what occurs during this transition. Our study would be significantly strengthened if it were performed in a randomized fashion over equal time periods. In addition, the retrocolic, retrogastric operations were performed in the earlier stages of our new bariatric program at the UCLA School of Medicine. Therefore, several of the early complications and reoperations can be attributed directly to the learning curve of the group. Furthermore, at this point in time we do not have long-term data, 1, 2, and 5 years, to adequately address the issue of internal hernias. The majority of internal hernias occur greater than 9 months after surgery, therefore we will have to wait for our data to mature.[6] The main proponents of the antecolic approach feel this is the area of greatest potential benefit, because the elimination of the mesocolic space should prevent the majority of internal hernias.[7] Finally, because we do not have long-term data, we cannot address the issue of weight loss with respect to position of the Roux limb. Likely, the two are unrelated because several groups

TABLE 2. *Complication Profile*

	Antecolic (n = 200)	Retrocolic (n = 141)	*P* Value
Overall complications (%)	12.5	15.6	0.425
Readmission (%)	4.5	9.2	0.083
Reoperation (%)	2.0	7.8	0.010
Length of stay (average days)	2.57	2.89	0.0052
Anastomotic leak	0	0	0.1
Death	0	0	1.0

have published excellent results with either approach.[8–10]

Our results compare favorably to previous descriptions by Schauer et al. and Champion et al. of their transition from retrocolic to an antecolic LRYGB.[4, 5] Both Champion and Schauer have transitioned safely from the retrocolic to antecolic Roux-limb position. In addition, Champion has demonstrated a significant reduction in the occurrence of internal hernias, and both authors have demonstrated a decrease in operating time and ease in performing and teaching of the operation. However, Champion's results were retrospective, and the Schauer group has not published their long-term data for the antecolic approach. To date, our paper is the first prospective look at this transition.

Our study adds to the growing body of literature demonstrating the antecolic Roux-limb position for LRYGB to be a safe alternative to the retrocolic position. However, with the maturation of our data, we hope to demonstrate that the antecolic approach is actually superior to its retrocolic counterpart with respect to operating time, ease of teaching, and complication profile. At this time, we cannot make these claims. A randomized, prospective study directly comparing the two techniques would answer the question. Until then, surgeons should perform the laparoscopic Roux-*en*-Y gastric bypass in a manner that is comfortable and can achieve consistent and safe results.

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