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Current Opinion

Choosing an Operation for Weight Control, and the Transected Banded Gastric Bypass

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Obesity and particularly morbid obesity is a lifelong problem that currently cannot be cured but can be controlled. Attempted control of obesity non-surgically results in 98% recividism. Weight loss is readily attainable, but weight loss maintenance is recalcitrant. Surgery currently provides the only long-term control of obesity. Surgery at best is a tool that the patient can use to effect the weight loss and weight loss maintenance. We have celebrated the golden anniversary of bariatric surgery in 2004. Obesity surgery is thus a relatively young field which is evolving. Operations currently used for the treatment of obesity fall into 3 categories: 1) restrictive operations such as vertical banded gastroplasty, silastic ring gastroplasty and gastric banding; 2) malabsorptive operations which include all the variations of the intestinal bypass; and 3) combined operations which utilize both restriction and malabsorption which include all the variations of short-limb gastric bypass, long-limb or distal gastric bypass and biliopancreatic diversion. The choice of the operation will be guided by the extent of the patient's obesity, the age of the patient, other co-morbid conditions of the patient, the cost of the operation, the patient's choice, and the surgeon's choice based on training, experience and geographical location. First and foremost, the operation chosen should be effective in causing weight loss and providing long-term weight loss maintenance with acceptable morbidity and mortality. Recommendations are made for choosing an operation for weight control based on effectiveness and safety.

Key words: Morbid obesity, surgical weight control, ramifications of obesity, bariatric surgery

"Weight control" is the most important phrase in this topic. Weight control entails weight loss and weight loss maintenance. Most times the phrase "weight loss" is used. Weight loss can be easily attained by various modalities, but the second component of weight control, weight loss maintenance, is very difficult. Obesity, particularly morbid obesity, is a lifelong condition that is recalcitrant to treatment. In all published studies, non-surgical modalities for weight control have a 5-year recidivism rate of 98%, i.e. 98% of people who have lost weight when followed for 5 years had regained all the weight loss and more.[1-4]

At this time, surgery offers the only long-term weight control.[5] Surgery at best is a tool that a patient can use to effect and maintain weight loss. The results from any operation, even the least effective in terms of weight control, are superior to any non-surgical treatment modality when evaluated over a 5-year period.[6,7]

Up to now, there has not been a standard definition of what is acceptable weight control, i.e. how much weight loss and for how long it should be maintained. This has left this phrase wide open for misuse. It is any weight loss maintained for any time that suits the purpose of the definer, ranging from a couple of days to a week, 2 weeks, 1 month, 3 months, 6 months, 1 year, 2 years and up to 5 years. No reports, nor advocates for weight control have thus far specified a certain amount of weight loss

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that has to be maintained over a certain time period.

In this paper, surgical weight control will be defined as 50% excess weight loss (EWL) in >75% of the patients that is maintained for 5 years. Admittedly, this standard may be high, but the rational is manyfold: 1) any operation entails some risks and a certain outcome must be expected to warrant the risks; 2) obesity is a lifelong problem, and a minimum time interval of 5 years is the least we can set to determine the effectiveness of any intervention; 3) there are operations that currently meet this criteria; 4) obesity, particularly morbid obesity, has medical, economic, psychological and social ramifications,[8-13] that are collectively improved only by a significant amount of weight loss.

Adequate weight control should significantly address all if not most of these four ramifications. To most physicians, the significance of the ramifications is in the order presented, but for most of the patients it is in the reverse order. For example, it has been our finding that a patient who presents with a weight of 136 kg (300 lb), an excess weight of 73 kg (160 lb), with both diabetes type 2 and hypertension both needing medications for control, if given two options, 1) to make 68 kg disappear or 2) to make the diabetes and hypertension disappear, will choose the former. On the other hand, many doctors consider weight control to be adequate if the weight loss controls only the medical co-morbid conditions such as diabetes, hypertension, and sleep apnea.[13-16] An operation for weight control should therefore meet the basic criteria of 50% EWL in at least 75% of the patients, maintained for a minimum of 5 years, in order to be considered effective.

The jejuno-ileal (JI) and duodeno-ileal bypass operations meet this criteria; however, there has been a moratorium on performing these operations because of the long-term unpredictable and unpreventable complications (Figures 1A and B, and 2).[17-21]

The gastroplasty operations in many publications have <50% EWL in 75% of the patients after 2 years of follow up (Figures 3A and B).[22-26] Similarly, the banding operations in all the published series except one have a <50% EWL in 75% of the patients in <3 years of follow-up (Figures 4A and B).[27-29] The sleeve gastrectomy is being increasingly used as one of a possibly two-stage operation in certain patients

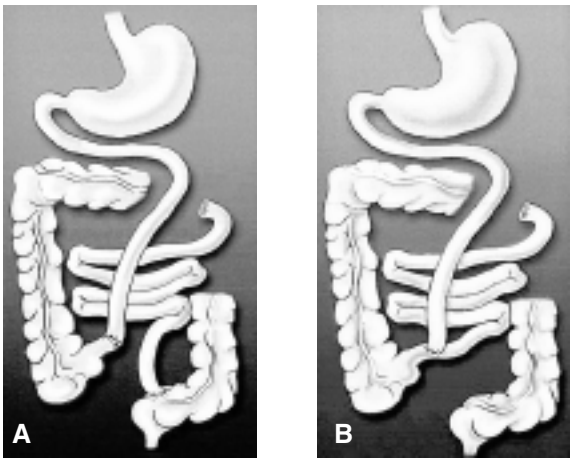

Figure 1A and B. A. Jejuno-ileal bypass end-to-end (Scott). B. Jejuno-ileal bypass end-to-side (Payne).[17]

with very high operative risk. There are no long-term reports at this time of its effectiveness (Figure 5).[30]

The sleeve gastrectomy, gastroplasty and banding operations in a subset of patients may produce 50 %EWL that is maintained over 5 years, but at this time there is not a selection criteria for these patients. Hopefully, further studies may help to select these patients, because these operations carry less morbidity and mortality.

Some surgeons advocate a selection process of using the operations with the least morbidity and mortality in all patients as the first operation and

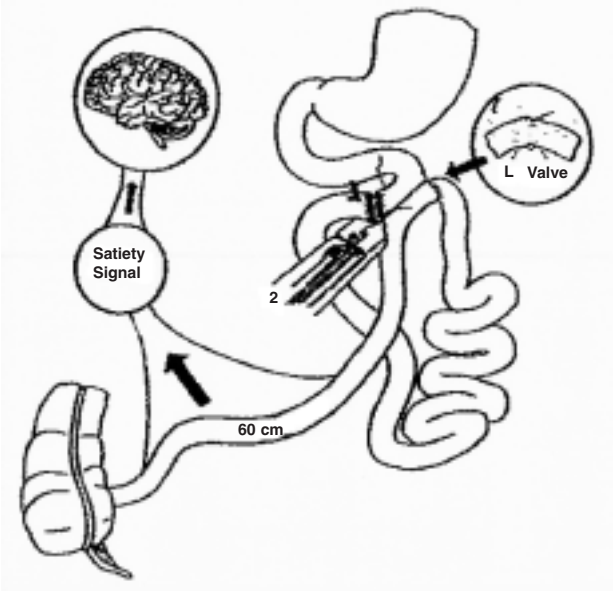

Figure 2. Duodeno-ileal bypass (Dorton).[19]

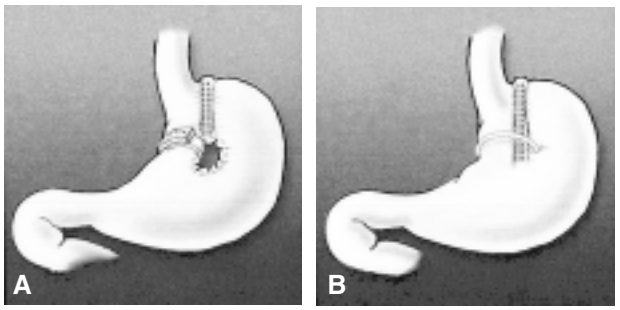

Figure 3A and B. A. Vertical banded gastroplasty (Mason); B. Silastic ring vertical banded gastroplasty (Laws).[22,23]

then adding a more complex component in the patients with inadequate weight control.[30-32] At this time, there are no 5 year reports on this two-stage approach for it to be recommended. Initial reports thus far show some merit to this approach. The cost factor and the added morbidity from the two-stage approach have not been analyzed. The two-stage approach should definitely be considered in certain high-risk patients. Other surgeons advocate the use of the less complicated but less effective operations in children and patients with a BMI between 35 and 40 with no medical co-morbidities. We await long-term outcome from these surgeons.

We are now left with choosing an operation for weight control among operations that have been documented to effect surgical weight control, i.e. >50% EWL in >75% of patients, maintained for at least 5 years. That leaves us with the gastric bypass (GBP) (Figure 6);[33-45] this includes the short-limb, long-limb, distal, micro-pouch, mini and banded gastric bypass, the biliopancreatic diversion (BPD) (Figure 7)[46] and the BPD with the duodenal switch (DS) (Figure 8).[47] The BPD is performed mostly in Europe. The distal Roux-en-Y gastric bypass

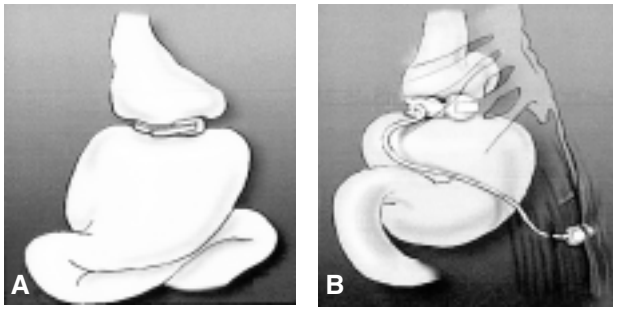

Figure 4A and B. A. Non-adjustable gastric banding (Molina); B. Adjustable gastric band – LapBand (Kuzmak).

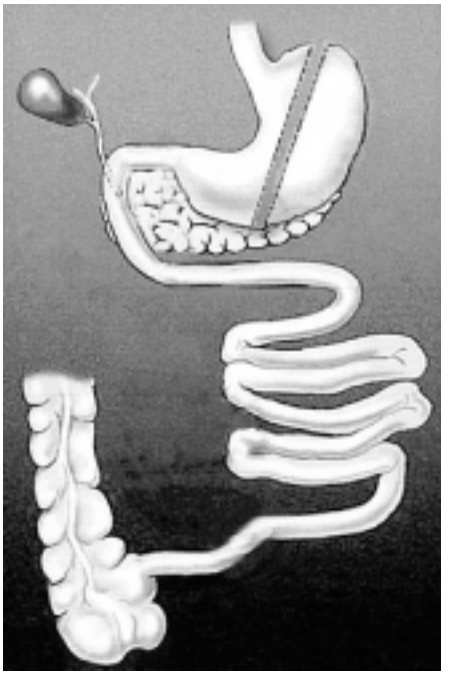

Figure 5. Sleeve Gastrectomy (Anthone/Gagner).[30]

(DRYGBP), a modification of the BPD, is done in the USA but mainly as a revision operation.

The choice of which of these operations the surgeon performs will thus depend on his/her training, expertise, follow-up set-up, and the patient's co-morbidity and his/her informed choice.

At the Center for Surgical Treatment of Obesity (CSTO), we recommend and choose the transected silastic ring vertical gastric bypass (TSRVGBP), because it results in more weight loss in more patients including the super- obese, for a longer time than the short-limb or long-limb gastric bypass.[48] The banded TSRVGBP produces as much weight control as the BPD and the DS, with lesser incidence of diarrhea, gas bloat syndrome, protein malnutrition, foul body odor, stool odor, flatus and without the questionable unpredictable and unpreventable complications of liver and kidney disease that have been reported after the BPD, the DS, the Micro-pouch and DRYGBP akin to those seen in the JI bypass.[49] Long-term medical monitoring is required after the TSRVGBP but not as stringent as with the BPD, DS, Micro-pouch and the DRYGBP. The loop GBP and potentially the mini-GBP have the inherent unpredictable and unpreventable complication of bile reflux gastritis.

Patients with the TSRVGBP followed for >5 years

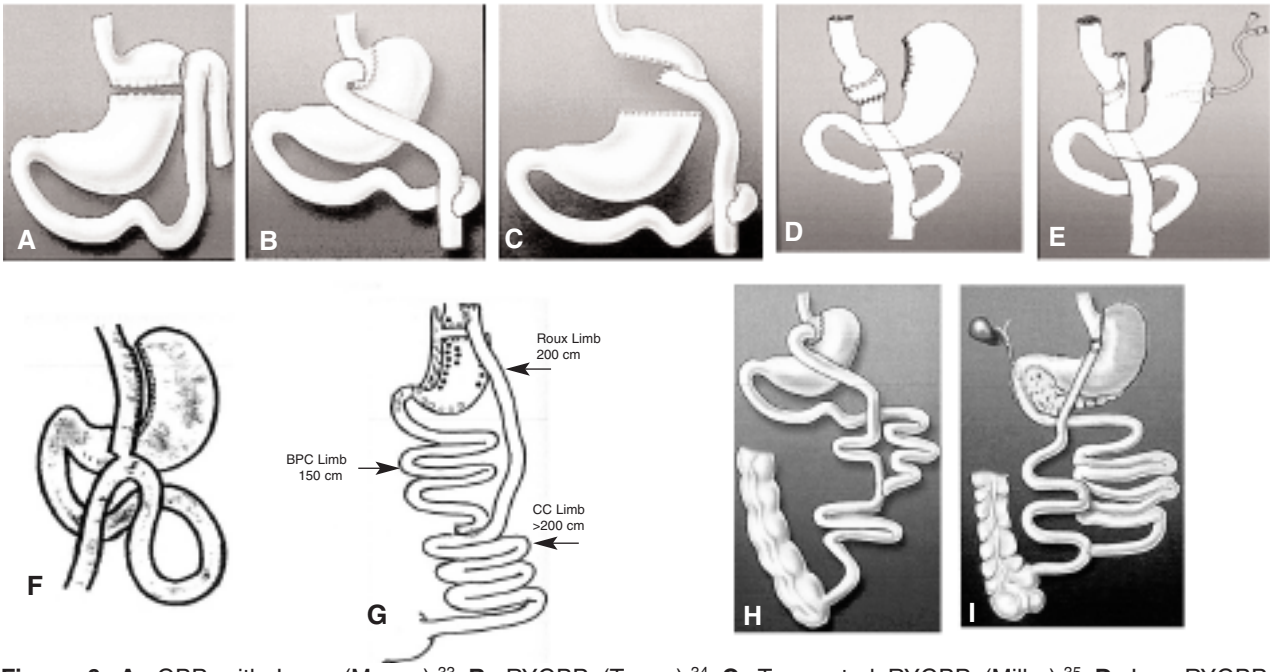

Figure 6. A. GBP with Loop (Mason);[33] **B.** RYGBP (Torres);[34] **C.** Transected RYGBP (Miller);[35] **D.** Lap RYGBP (Wittgrove);[36] **E.** TSRVGBP (Fobi);[37,38] **F.** Mini-GBP (Rutledge);[45] **G.** Micropouch-GBP (Sapala);[44] **H.** Long-limb GBP (Brolin);[43] **I.** DRYGBP (Torres, Fobi).[35]

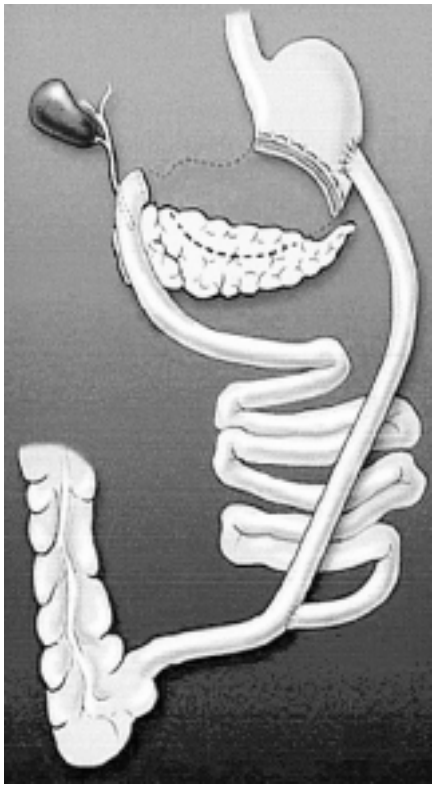

Figure 7. Biliopancreatic diversion (Scopinaro).[46]

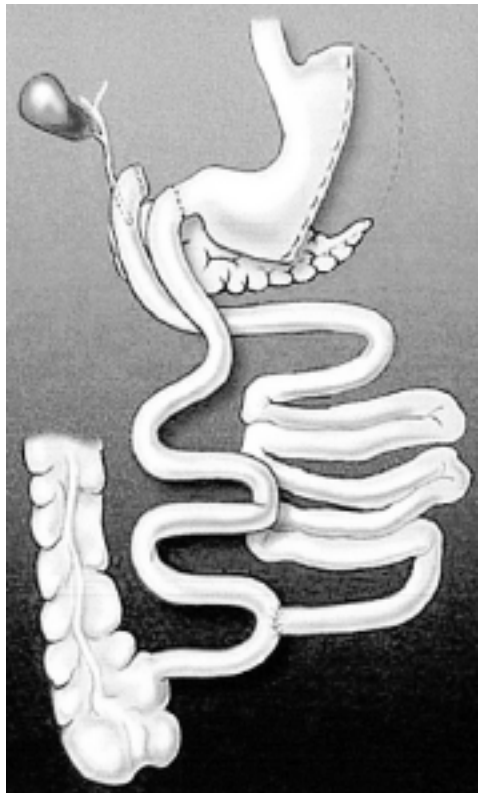

Figure 8. Biliopancreatic diversion with duodenal switch (Hess).[47]

have lost and maintained more than 50% EWL in >90% of the patients with a perioperative morbidity of 10%, mortality of 0.44%, a late complication rate of <6% and a revision rate of <6% over a 7-year period (Figures 9 and 10) (Tables 1-4).

The TSRVGBP is currently done by many surgeons laparoscopically with an operating-time of <200 minutes and a hospital stay of <3 days. The perioperative morbidity and mortality is 10% and 0.75% respectively. The most common morbidity and mortality in the open operation is wound problems and pulmonary embolism. In the laparoscopic series, the common morbidity as well as cause of mortality is from leaks (Table 5) (Figures 12 and 13).

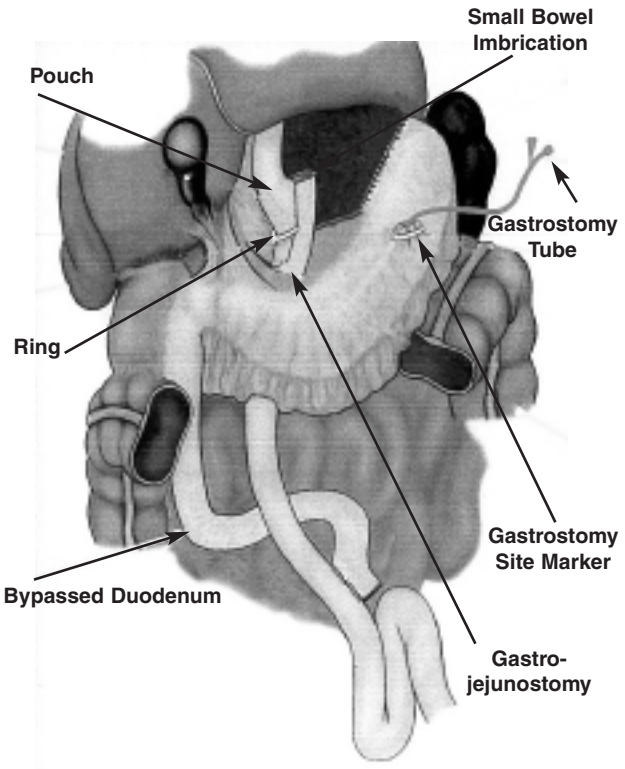

Figure 9. Transected silastic ring vertical gastric bypass (TSRVGBP).[37,38]

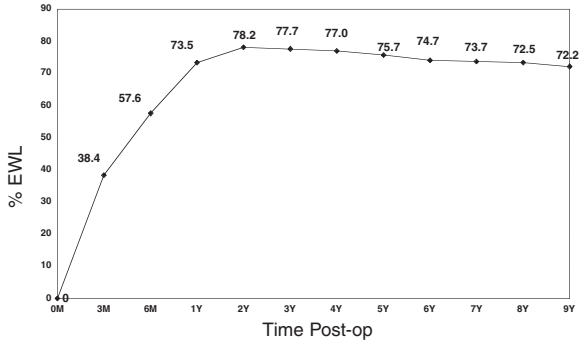

Figure 10. Mean %EWL after TSRVGBP in the 576 patients followed for 7-10 years (22 patients at 10 years – see Table 4).

Table 1. TSRVGBP: Characteristics – 3,632 patients

Average age	40.2 yrs
Average weight	136 kg
Average ideal weight	62.6 kg
Average excess weight	68.0 kg
Average height	1.66 m
Average BMI	47 kg/m^2

Table 2. TSRVGBP: Concurrent operations – 3,632 patients

Cholecystectomy	61%
Panniculectomy	29%
Ventral incisional hernia repair	7%
Ovarian cystectomy	4%
Bilat. tubal ligation	2.5%
Hiatal hernia repair	2.5%

Table 3. TSRVGBP: Perioperative complications – 3,632 patients

Wound complications	320	8.80%
Deep vein thrombosis	92	2.50%
Leaks	61	1.60%
Pulmonary embolus	31	0.85%
Mortality	16	0.44%

Table 4. TSRVGBP: Long-term follow-up in 576 patients followed for 7-10 years

Time	No. being followed	Eligible for Follow-up	%
0 Mo	576	576	100.0
3 Mo	554	576	96.2
6 Mo	534	576	92.7
1 Yr	514	576	89.2
2 Yr	475	576	83.0
3 Yr	450	576	78.1
4 Yr	401	576	69.6
5 Yr	354	576	61.5
6 Yr	327	576	56.8
7 Yr	299	576	52.0
8 Yr	194	373	52.0
9 Yr	64	166	38.6
10 Yr	22	51	43.1

Table 5. Open vs laparoscopic TSRVGBP at CSTO: Perioperative Complications (Jan 2002 - Aug 2004)

Peri-op Comp	Open (Pann)	Open (No Pann)	Open Total	Laparoscopic	Total
Wound	15 (25.00%)	24 (4.76%)	39 (6.91%)	0 (0.00%)	39 (4.02%)
Leaks	1 (1.67%)	6 (1.19%)	7 (1.24%)	17 (4.2%)	24 (2.47%)
Pulm Emb	1 (1.67%)	3 (0.60%)	4 (0.71%)	0 (0.00%)	4 (0.41%)
DVT	1 (1.67%)	0 (0.40%)	3 (0.53%)	1 (0.24%)	4 (0.41%)
OS	0 (0.00%)	1 (0.20%)	1 (0.18%)	10 (2.48%)	11 (1.13%)
SBO	0 (0.00%)	2 (0.40%)	2 (0.35%)	2 (0.49%)	4 (0.41%)
Post-op bleed	1 (1.67%)	1 (0.20%)	2 (0.35%)	2 (0.49%)	4 (0.41%)
Marginal ulcer	0.(0.00%)	0 (0.00%)	0 (0.00%)	3 (0.73%)	3 (0.31%)
Mortality	0 (0.00%)	2 (0.40%0	2 (0.35%)	3 (0.74%)	5 (0.52%)
Total Comp	19 (31.67%)	41 (7.45%)	60 (10.64%)	44 (10.89%)	104 (10.78%)
Total operations	60	504	564	404	968

Pann = panniculectomy. Comp = complications. SBO=small bowel obstruction. OS = outlet stenosis.

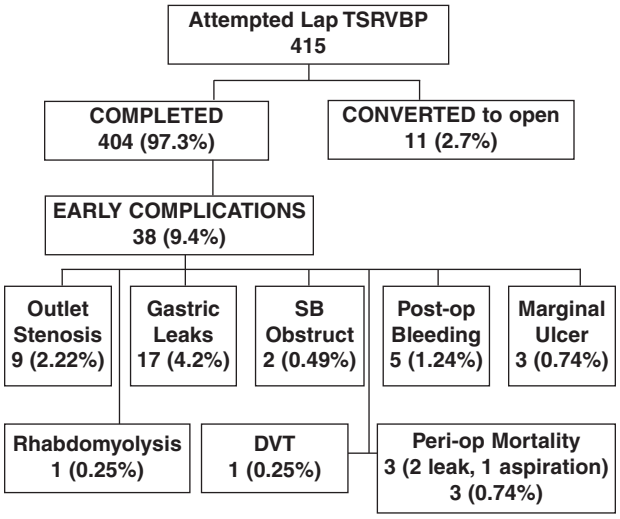

Figure 12. Experience and early complications after laparoscopic TSRVGBP at CSTO (Jan 2002 – Aug 2004).

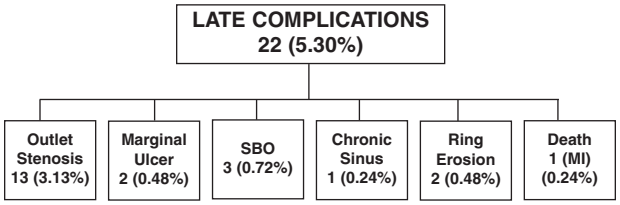

Figure 13. Late complications after laparoscopic TSRVGBP at CSTO (Jan 2002 – Aug 2004).

Summary

Choice of an operation for weight control should be based first and foremost on effectiveness, and then on the risk-benefit ratio. Surgical weight control should adequately address all the ramifications of morbid obesity. The choice of operation at this time for the general bariatric surgeon should be limited to the gastric bypasses, biliopancreatic diversion and the duodenal switch, depending on the geographical location and the surgeon's training, experience and follow-up set-up. The other operations should be done at centers where prospective studies can be adequately conducted. A two-stage approach using one of the less complicated and less effective operations followed by a more definitive and effective operation may be considered in certain high-risk patients.

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