

Bariatric surgery: an answer to Type 2 diabetes?

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Interest in bariatric surgery for the treatment of obesity and obesity-related diseases such as diabetes continues to grow. Adjustable gastric banding (AGB) and roux-en-Y-gastric bypass surgery (RYGBP) are currently two popular bariatric surgery procedures.

AGB restricts the size of the stomach by placing a plastic inflatable band laparoscopically – also known as key-hole surgery – around the upper portion of the stomach to create a small pouch (Figure 1).

This small pouch mechanically restricts the volume of food coming into the digestive system and thus helps reduce overall energy (calories/kilojoules) consumption.

Nutrients (vitamins, protein and minerals) and energy continue to be absorbed normally as the food passes through the entire digestive system. Therefore, there is little risk of nutritional deficiency.

The band will require periodic re-inflation with saline via a port to remain effective, a simple procedure performed by a nurse/surgeon. AGB is reversible as the band can be surgically removed if desired.

The RYGBP procedure involves creating a small stomach pouch by separating the top portion of the stomach from the rest of the stomach and sewing the stomach pouch to the small intestines half way down the small intestinal tract (Figure 2).

Like AGB, RYGBP involves restricting the volume of food which can be eaten. The RYGBP surgery can also be done laparoscopically in the majority of cases, but is not reversible.

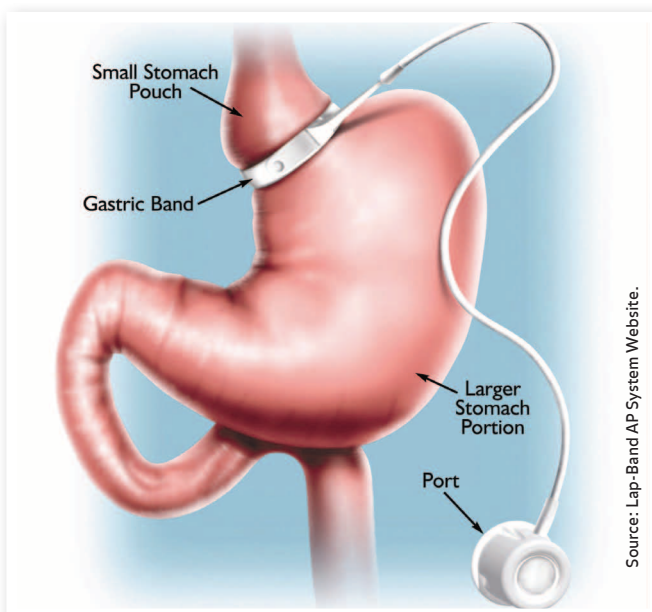


Figure 1: Adjustable Gastric Band (AGB),

Additionally, in RYGBP, absorption of food and nutrients is altered as only part of the intestines is involved in nutrient absorption, increasing risk of malnutrition. Thus, everyone who has had RYGBP surgery requires to be placed on life-long daily nutritional supplements (multivitamins with minerals) and medical monitoring.

Both AGB and RYGBP surgeries can cause effective weight loss long-term with approximately 25% and 14% of baseline weight loss at 10 years after AGB and RYGBP procedure, respectively.

Subsequently the surgery can help decrease obesity-related disorders (such as Type 2 diabetes) and improve health. Type 2 diabetes resolves in 48% of people after AGB and 84% of those after RYGB.

In those not cured of the diabetes after surgery, there is significant improvement in blood sugar control with less anti-diabetes medication required. This is secondary to the fact that weight loss decreases insulin resistance which allows the insulin that is produced by the person to work normally to control blood sugars.

RYGB may also have an added effect of changing the production of gut hormones that can help decrease insulin resistance and may improve internal insulin production.

The chances of being cured of diabetes after surgery diminish the longer a person has had diabetes (i.e. >10 years) and the less internal insulin production there is.

These people generally require insulin injections to maintain blood sugar control. In such cases, one of the main defects is death of the beta-cell – the pancreatic cell that makes insulin – and this generally cannot be remedied with surgery. However, weight loss will reduce insulin resistance and blood sugar levels which, in turn, will decrease diabetes complications.

In our experience, virtually all the people on insulin prior to surgery continue to have diabetes after surgery. Of these people, 60% were able to discontinue insulin after surgery.

Other health benefits after surgery are improvements in or resolution of hyperlipidaemia (high cholesterol and triglycerides) and obstructive sleep apnoea in the majority of people. Hypertension resolves in about half of the cases after surgery.

RYGBP tends to have a higher rate of resolution of obesity related disorders compared to AGB, given the higher weight loss with RYGBP. A large Swedish study (4,047 people) has shown that the 10 year mortality rate after receiving bariatric surgery is 30% less than the rate seen in similarly obese people who did not receive surgery and were unable to lose weight.

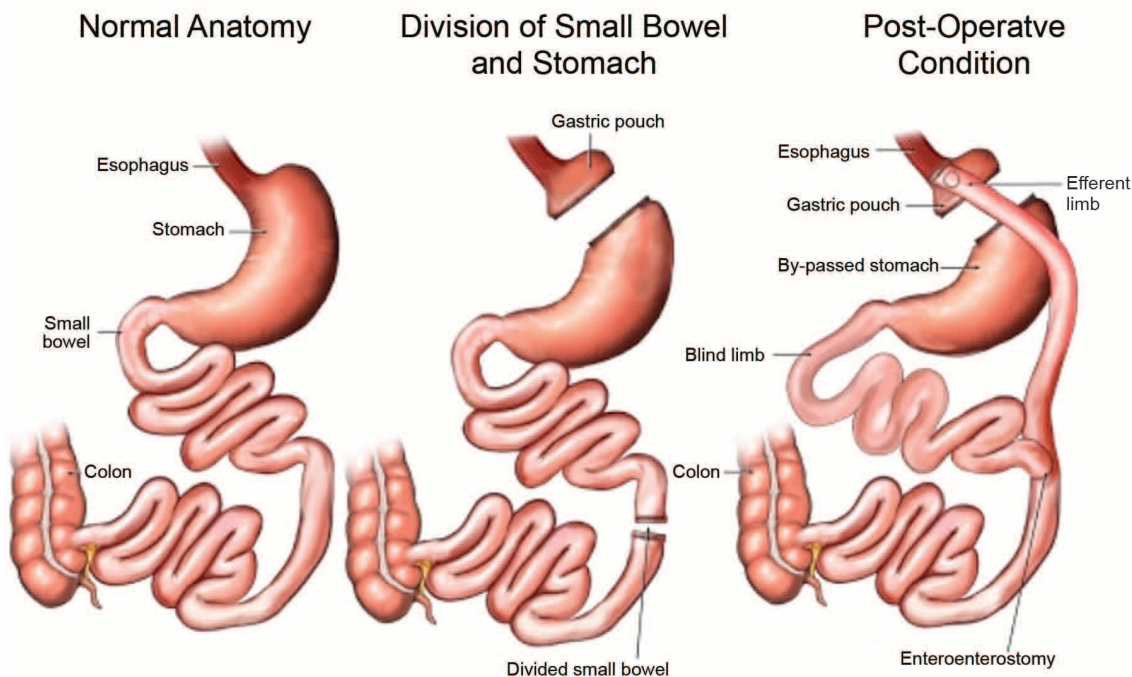


Figure 2: Roux-en-Y-Gastric Bypass Surgery (RYGBP)

Source: Nucleus Medical Art.

Complications

Both procedures can have complications. Death within 30 days of the surgery is 0.1% for AGB and 0.5% for RYGB. Perioperative complications and death are more likely in men, people aged > 50 years, and people with a BMI > 60. [BMI=weight in kg/height in m²]

Common complications after AGB are esophageal (tube between the mouth and stomach) dilatation (up to 71%), gastric prolapse (up to 24%), gastric outlet obstruction (up to 14%), and gastric band redo (up to 14%).

With RYGBP the most common operative complications are anastamotic strictures (excess thickening of the healing wound between the stomach and small intestines) resulting in bowel obstruction (up to 11%), wound infection (up to 9%) and conversion to open procedure (up to 8%).

Less frequent complications are venous blood clots (DVT) with risk of clots travelling to the lungs (pulmonary embolus) and, rarely, anastamotic leakage (poor healing of the stomach and small intestinal wound allowing food to leak into the abdominal cavity).

Nutritional complications of RYGBP are common and are mainly with vitamin B12, iron, vitamin D, folate, thiamine, and protein deficiencies which can lead to neuropathy, anaemia, and organ dysfunction when severe.

Common symptoms for the first year after RYGBP are vomiting, dehydration, hair loss, gallstone formation and dumping syndrome. Dumping syndrome is a

combination of extreme fatigue, weakness, sweating, fast heart rate, and dizziness that can occur after ingesting high GI foods (easily digestible carbohydrates such as regular soft drinks).

These symptoms generally help teach a person to avoid high GI foods which helps people adhere to a healthy diet. Fortunately or unfortunately, people with advanced Type 2 diabetes tend to experience less dumping syndrome.

Bariatric surgery is a powerful tool to help obese people change their eating behaviour to a healthy one which enables weight loss and consequently improves health.

Approximately 10-20 % of people do not lose a significant amount of weight after bariatric surgery. These people tend to snack on calorie-dense foods during the day which nullifies the ability of bariatric surgery to restrict energy intake.

Unfortunately they will be vulnerable to complications of bariatric surgery and risks of nutritional deficiencies after RYGBP surgery and not have the full health benefits of weight loss.

The decision for undergoing such surgery needs to take into account the ability of the person to comply with a healthy diet after surgery lifelong to maintain good nutrition and weight loss and the likelihood that the potential benefits will outweigh the potential complications of the surgery. ●