

## **Bariatric Surgery: Postoperative Concerns**

*This information is to be used as a guide to the care and concerns of the bariatric surgical patient and is only to be used as information to discuss with your bariatric and/or family physician to decide your appropriate care.*

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### **Roux-en-Y Gastric Bypass and Dumping Syndrome**

Dumping syndrome is a common side effect after Roux-en-Y Gastric Bypass (RNYGB) surgery. About 85% of gastric bypass patients will experience dumping syndrome at some point after surgery. The symptoms can range from mild to severe.

Dumping usually occurs due to poor food choices. It is related to the ingestion of refined sugars (including high fructose corn syrup) or high glycemic carbohydrates. It can also occur with dairy products, some fats, and fried foods. These foods rapidly empty from the gastric pouch into the small intestine which triggers a cascade of physiologic events.

The effect of dumping is twofold. It is both good and bad. The benefit is that if dumping occurs after eating these foods the patient is less likely to eat that food again. It is a built in mechanism that says, "I shouldn't have eaten it the first time, and I definitely won't eat it again." This is called negative reinforcement. The fact is these foods will interfere with long-term weight loss and should not be eaten anyway.

The bad news is that dumping makes you feel awful; it can be confused with other problems; it is scary and sometimes difficult to manage; and it may have some short-term physiologic consequences.

There are two types of dumping:

1. Early dumping which occurs 30-60 minutes after eating and can last up to 60 minutes. Symptoms include sweating, flushing, lightheadedness, tachycardia, palpitations, desire to lie down, upper abdominal fullness, nausea, diarrhea, cramping, and active audible bowels sounds.
2. Late dumping which occurs 1-3 hours after eating. Symptoms are related to reactive hypoglycemia (low blood sugar) which include sweating, shakiness, loss of concentration, hunger, and fainting or passing out.

Early dumping occurs as a result of rapid emptying of sugars or carbohydrates from the gastric pouch into the small intestine which causes the release of hormones (gut peptides) that effect blood pressure, heart rate, skin flushing and intestinal transit, leading to a light-headed, rapid heart rate and flushing sensation often accompanied by diarrhea. Late dumping symptoms are related to increased insulin after oral glucose (sugar) with subsequent hypoglycemia (low blood sugar).

The diagnosis of dumping syndrome is primarily made by obtaining a history of the presence of classic symptoms related to food intake. Management of early dumping can be relatively straightforward. First, the symptoms should be discussed with the Bariatric Surgeon. Dietary compliance with avoidance of refined sugars, high glycemic carbohydrates, or other foods that may be associated with the syndrome would be the primary treatment.

Management of late dumping that persists in spite of the above dietary measures may be treated with a small amount of sugar (such as one-half glass of orange juice) about one hour after a meal, which may prevent the attack. Medications such as Acarbose or Somatostatin may be helpful if still symptomatic despite dietary changes. - . One should consider the rare possibility of insulinoma or neisidioblastosis of the pancreas if late dumping remains refractory to medical management.

In summary, although bothersome and sometimes worrisome, dumping syndrome is not a life-threatening problem. Repetitive patient education about what to eat and what not to eat can manage early and late dumping syndrome. Also patients need to learn about and read basic nutrition labels. The benefit is that it teaches patients

quickly that certain foods and additives cannot be tolerated. Patient compliance and commitment to long-term follow-up are mandatory.

### **Bowel Function Changes After Bariatric Surgery**

Bariatric surgery can have an effect on different bodily functions, and this does include bowel function. The effects on bowel function can be acute and short-lived, or chronic and more problematic. These changes are related to and dependent upon which type of bariatric operation has been performed.

#### **Diarrhea**

Diarrhea or loose stools is mainly a potential side effect of Sleeve Gastrectomy with Duodenal Switch (also known as Biliopancreatic Diversion with Duodenal Switch). Diarrhea may be seen with Roux-en-Y Gastric Bypass (RNYGBP), but would not be associated with the Laparoscopic Adjustable Gastric Banding (LAGB).

With the Duodenal Switch (DS), bowel movements are more commonly affected, and the usual alteration is the likelihood of developing soft or loose stools. Frank diarrhea is related to fatty acids passing directly into the colon. These fatty acids would normally have been absorbed in the small intestine. Once in the colon they induce irritation. Diarrhea can also be produced by relatively undigested food passing rapidly through the gastrointestinal tract. A third contributing factor is sorbitol, found in fruits, berries, and also used as an artificial sweetener. Sorbitol is not well absorbed in the GI tract, and when in the colon, it is fermented. This fermentation will result in increased gas and diarrhea.

The average patient after the DS has 2-3 soft bowel movements per day. However, as with most side effects, there is a wide spectrum. At one end of this spectrum are patients who have a single bowel movement a day. At the other end are patients who have more than ten (and sometimes up to twenty) bowel movements a day. For the majority of patients after the DS, the bowel movements are only a mild inconvenience, but for those at the high end of the spectrum the diarrhea can be quite problematic. DS patients may also have a problem with foul-smelling flatus, which can be a serious issue.

Diet is a major influence on bowel movements after a DS. Reducing the amount of fat will usually have a direct beneficial effect on the number and quality of bowel movements a patient may have. Usually, with close questioning, it can be revealed that a patient has not been watching his or her diet as carefully as he or she should. If they can be identified, there are other "trigger" type foods that may induce diarrhea, and the patient should attempt to avoid or minimize these foods.

Both the DS and the RNYGBP may unmask previously unidentified lactose intolerance. This can result in diarrhea and gas complaints. An early step in the assessment of diarrhea after surgery is to eliminate dairy products from the diet completely.

Management of diarrhea (provided there is no identifiable pathologic etiology or dietary factor) is varied. A dose of Imodium at bedtime can decrease the number of early morning bowel movements. It may also delay the onset in those who have been previously awakened early in the morning by urgent bowel movements. If beneficial, some patients may stay on a maintenance dose of Imodium® or Lomotil® for long term control.

Many patients will benefit from a course of probiotics. They are a form of natural colonic flora that is administered orally to restore the natural bacterial milieu toward the normal state. Typical probiotic products include Lactobacillus Acidophyllus® and Ultraflora® lactose-free. The more complex and inclusive the product, the better it seems to work. Unfortunately, these products may not be covered by third party payer insurance companies. However, the probiotics usually only need to be taken for a brief period of time to restore the colon to a more normal bacterial state.

In any postoperative patient with especially watery diarrhea, extremely foul flatus, and abdominal cramping, one needs to consider a Clostridium difficile (C. diff.) colitis or antibiotic-associated diarrhea (AAD). This may occur after DS, RYGBP or LAGB. It may manifest itself early after surgery, or it may take 2 or 3 months. Treatment of AAD is with a 10-14 day course of Flagyl®. Not uncommon relapses can be treated with a repeat course of Flagyl® or with oral Vancomycin®. In treating C. diff. colitis, it is important to replenish the colonic flora as the therapy is proceeding with probiotics as described above. Flagyl® is effective in the management of bacterial overgrowth not related to C. diff. infections as well.

Cholestyramine (Questran®) and similar products such as Welchol® and Cholestid® are used to bind bile salts. This may decrease the frequency of diarrhea and the severity of gas. Start with a low dose and gradually

increase weekly until a beneficial effect is seen. Cholestyramine has been used to treat C. diff. infections as well, but only with Flagyl® not Vancomycin®.

Rarely, with the above management strategies a patient may continue to have an unacceptably high frequency of bowel movements. It is reasonable to give the bowel time to compensate and adapt, so that fat absorption increases. This will allow diarrhea to improve. If after one year there is no improvement in diarrhea, then the situation requires intervention. Surgical lengthening of the common channel can be entertained. This is usually a relatively straightforward surgical procedure that may be done laparoscopically with an overnight hospital stay. Subsequently, diarrhea will be controlled without causing significant weight regain.

Before making changes in diet, vitamins and medications, be sure to consult your physician.

### **Constipation**

Constipation is also seen in patients following bariatric surgery. This occurs more commonly after LAGB and RNYGBP and is less likely with DS, although it may occur in rare cases with DS. It is usually due to insufficient intake of water, and may be corrected by diligent attention to water ingestion and the addition of fiber products like Metamucil or Fibercon. Also, it is helpful to avoid diuretics such as caffeine. Some nutritional supplements, including calcium and iron, may contribute to constipation. Narcotic (pain medication) ingestion can slow bowel function resulting in constipation as well. In addition to increasing water intake, supplementing the diet with healthy fiber can assist in overcoming the difficulties of constipation after surgery.

It is important to recognize that some bowel function problems are not related to bariatric surgery, and a relationship should not be automatically assumed. Therefore, a recent change in bowel function that is not readily attributable to the bariatric operation or that is not easily corrected requires further diagnostic measures for complete evaluation. As always, other etiologies need to be considered.

Before making changes in diet, vitamins and medications, be sure to consult your physician.

### **Dysphagia**

Dysphagia, is a medical term for "difficulty swallowing". This may be a side effect of any operation that causes restriction: LAGB, RYGB and even DS. This is caused by eating too fast, too much or not chewing well enough when the stomach has been made smaller. Therefore, the food backs up into the esophagus and causes chest pressure or even a tightness in the throat. It is important to stop eating and drinking if you have dysphagia, otherwise regurgitation or vomiting may ensue. Dysphagia can be avoided by chewing very well (approximately 15 times), eating slowly (putting the fork down for 1 minute between swallowed bites) and avoiding tough foods such as doughy bread, overcooked steak or dry chicken breast.

Patients who have gastric banding may feel dysphagia after having their band tightened, or "adjusted". To avoid this feeling, it is recommended that the patient stays on 2 days of liquids, 2 days of mushy foods and then progress to solid foods on the 5<sup>th</sup> day after band adjustment. This will allow the patient to get used to their new band tightness. If the dysphagia is severe, the band can be loosened.

After gastric bypass, dysphagia may occur during the first 6 months, but improves if the stoma stretches. Occasionally, dysphagia may be severe 4-6 weeks after surgery, to the point where it is difficult to drink fluids. This may be a stomal stricture, which can be treated with endoscopy.

Before making changes in diet, vitamins and medications, be sure to consult your physician.

## **Nutritional Aspects of Bariatric Surgery: General Practice Guidelines**

The goal of weight loss procedures in general is to either reduce the amount of consumed calories (restrictive) per day or to alter the absorption of the fat (malabsorption) in the food one consumes.

There are three widely recognized categories of weight loss surgery:

- Restrictive operations
- Primarily malabsorptive procedures with some restriction
- Primarily restrictive procedures with some malabsorption

## **Restrictive procedures**

- [Vertical banded gastroplasty \(VBG\)](#)
- [Laparoscopic Adjustable Gastric Banding \(LAGB\)](#)

This group of procedures reduces the effective capacity of one's stomach. By placing a band or constrictive device like a belt around the very top portion of the stomach, the passage of food from the upper stomach to the lower stomach is delayed. A patient will feel full quickly and stop eating after smaller portions each meal.

The food will eventually pass from the upper stomach to lower stomach, and from there will pass through the normal digestive tract. Henceforth, there is no malabsorption effect.

The adjustable band (LAGB) can be tightened according to the patient's appetite and feeling of satiety with small portions. If the patient experiences frequent hunger and is eating large portions, the band can be tightened; this results in lessening of appetite and increased restriction. Band tightening can be done either in the doctor's office or in the radiology department.

Because volume of food intake is reduced overall, nutritional deficiencies may occur. Therefore, it is recommended that these patients take at least a complete multivitamin daily. However, if too little food is being consumed and the patient becomes underweight, for example in pregnancy, the band can be loosened to allow for more nutritional intake.

## **Primarily Malabsorptive Procedures With Some Restriction**

- [Biliopancreatic Diversion \(BPD\)](#)
- [Biliopancreatic Diversion with Duodenal Switch \(DS\)](#)

This group of procedures produces weight loss primarily through malabsorption. There is a minor restrictive effect because of some reduction in the size of the patient's stomach, but relative to the malabsorption effect this is minimal.

There are two mechanisms by which the malabsorption effect is created. First, the food stream is rerouted so that approximately 60% of the small intestine (the primary site for the absorption of nutrients) is bypassed. This means that food is in contact with the absorptive surface of the intestine for less time, thereby leaving less opportunity for the nutrients to be extracted in by the body. Second, by virtue of this food rerouting, there is less mixing with bile and pancreatic enzymes. Contact with bile is necessary for absorption of fat, and pancreatic enzymes are necessary to break down proteins, fats and complex carbohydrates for absorption. The mixing of bile and pancreatic enzymes with food after this type of surgery occurs in only 10% of the most distal small intestine. Therefore, only a small amount of protein and fat are efficiently absorbed.

These alterations in the intestinal tract create challenges to maintaining healthy levels of certain nutrients including protein, vitamins, and minerals. Specifically, there can be deficiencies in levels of the fat-soluble vitamins A, D, E, and K. Therefore, it is essential for patients to consume a protein and nutrient-rich diet, and to take specially formulated vitamins (A, D, E, and K in water-soluble form) as well as a multivitamin.

Calcium and Iron deficiencies occur as well. Elemental calcium supplements should be taken in amounts that meet and maybe exceed daily recommended levels due to the body's limited ability to absorb calcium. An acidic environment is needed for calcium absorption; therefore, a citrated form of the calcium is recommended. For maximal absorption, the elemental calcium should be taken in divided doses not to exceed 500 mg, three times daily. Iron is best absorbed in the elemental form as well, and should not be taken with the calcium since they compete for absorption. Pre-menopausal women should take higher dosages (prenatal amounts) since ongoing blood loss with menstrual cycles can increase the risk for anemia.

Frequent loose stools can potentially be a side-effect of malabsorptive procedures. Since this can increase the risk of dehydration, it is critical that patients drink at least 8 eight ounce glasses of water per day (more in hotter and dryer environments).

Before making changes in diet, vitamins and medications, be sure to consult your physician.

## **Primarily Restrictive Procedures –With Some Malabsorption**

- [Roux-en-Y Gastric Bypass \(RNYGBP\)](#)
- [Vertical Banded Gastric Bypass](#)

Gastric bypass procedures produce weight loss primarily by gastric restriction, combined with an element of malabsorption. A small gastric pouch is created at the upper normal stomach. This small pouch (less than 1 ounce immediately following surgery) results in a significant reduction in the amount of food a patient can consume in one sitting. Then ingested food bypasses the rest of the stomach, the entire duodenum (first portion of the small intestine), and a short segment of jejunum (second portion of small intestine). This bypass results in mild fat and protein malabsorption due to a slight delay in mixing of food with bile and pancreatic enzymes.

One impact on digestion affected by this type of surgery is reduction in the absorption of calcium, iron, and B-complex vitamins. Another change is with ingestion of foods rich in carbohydrates or fats which may produce an unpleasant combination of side effects known as “dumping syndrome.” Due to the nature of this transient condition, patients quickly learn to avoid the foods associated with this condition.

After gastric bypass, patients must prioritize the foods they eat, emphasizing various sources of protein, such as fish, dairy products, meat, beans, legumes, and soy. Fats and carbohydrates become secondary, but patients should still try to eat fresh vegetables and fruits. Daily vitamin and mineral supplementation is a must for these patients since they will not be getting adequate amounts from the small quantity of foods they eat. B-complex vitamins, iron, and calcium must be supplemented at higher than daily recommended levels, because of the impact of the bypass on their absorption.

Vitamin B-12 is very poorly absorbed when swallowed as a pill. Therefore, it must be taken in a very high daily dosage if taken in this form. There are other alternative forms for B-12 administration which includes monthly intramuscular injection, sublingual (under the tongue) liquids or sprays, or nasal spray which more adequately enable absorption.

Elemental calcium supplementation should be taken in amounts that preferably exceed daily recommended levels as mentioned to prevent early osteoporosis. An acidic environment is needed for calcium absorption. The lower stomach where most of the acid for digestion is produced is bypassed with surgery. Therefore, a citrated form of calcium is recommended. Maximal absorption may be achieved with the elemental calcium taken in divided doses not to exceed 500 mg three times daily.

Iron also requires an acidic environment for optimal absorption, such as with Vitamin C. Iron deficiency anemia may occur if supplemental iron is not taken. Iron is also best absorbed in the elemental form. However, it should not be taken with calcium since the two will compete for absorption. Pre-menopausal women should take even higher dosages (prenatal amounts) since ongoing blood loss with menstrual cycles will increase the risk for anemia.

**Specific signs and symptoms of protein deficiency:**

Hair loss, fatigue, leg swelling

**Specific signs and symptoms of common vitamin and mineral deficiencies:**

Calcium: bone pain

Magnesium:

Iron: fatigue

Zinc: brittle nails

Vitamin A: inability to see in the dark

Vitamin D:

Vitamin E: poor wound healing

Vitamin K: easy bruising

Vitamin C:

Vitamin B1 (Thiamin): numbness and tingling in the hands and feet

Vitamin B2 (Riboflavin):

Vitamin B3 (Niacin):

Vitamin B6 (Pyridoxine):

Folic Acid:

Vitamin B12 (Methylcobalamin): fatigue

Biotin:

Pantothenic Acid:

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## Reaching a Plateau

Following weight loss surgery, patients may lose weight fairly rapidly at first, and then as time passes the weight loss becomes more gradual. Commonly, weight will stabilize at about 18 months after RYGB and DS. During these 18 months, weight loss does not follow a predictable trend, but can be erratic with alternating periods of significant weight loss followed by no weight loss. Charting this weight loss may give the appearance of a stairway. It is not uncommon for patients to question why their weight loss has stalled at times, and wonder if they are doing something wrong or if the operation is not functioning properly. This same weight loss trend may be seen after LAGB, however the weight loss will be more gradual and steady, averaging 5-10 lbs per month, but continuing for up to 3 years. Plateaus may occur if the band is not appropriately tightened, and therefore if this happens, the patient should consult with their surgeon for a possibly band adjustment.

Day to day or even week to week, fluctuations in weight loss occur due to other factors beyond just loss of fat mass. Water weight is probably the most common cause of this variability. This is dependent upon hydration status. Other factors other than fat mass that may result in inaccurate weights are current contents of the gastrointestinal tract, gaining muscle mass, or menstrual cycles. It is thus recommended that patients should not weigh themselves too frequently due to inherent inaccuracies due to these factors.

There are also specific activities of patients that may alter weight loss. Exercise frequency and intensity may affect your metabolic rate resulting in weight loss plateaus. The exercise may increase muscle mass, which although beneficial in many ways, may result in slower weight loss. Eating habit adjustments that may seem innocuous can affect weight loss as well. It is recommended that a patient eat several small meals a day high in protein. An increase in the meal frequency to high (grazing) or a decrease in the frequency by starving during the day and binge eating at night may reduce one's ability to lose weight.

For the operations that have a malabsorptive component (Roux-en-y gastric bypass and Duodenal switch), the gastrointestinal tract may adapt over time to its new anatomic change. This adaptation may allow for better absorption of the consumed food, especially fats reducing the benefit of the surgery. Unfortunately, nothing short of further surgery can avert this adaptation effect. However, once again adhering to eating small meals high in protein may limit this effect.

Anatomic factors exist which may limit one's ability to lose weight. With the Roux-en-Y Gastric Bypass, the size of the gastric pouch may change over time. If it enlarges, it will accommodate larger meals. -- - In addition, anastomotic dilatation between the stomach pouch and the intestine may allow quicker emptying of the pouch reducing its effect on satiety and potential weight loss. Once pouch expansion or anastomotic dilatation occur, they cannot be reversed, and correction can only be obtained through surgical revision. With the gastric band, the stoma may widen due to weight loss at which point the band should be tightened with an adjustment. Weight loss can be resumed after this.

For the same reason, after gastric bypass, a patient should not drink during meals. This activity will result in more rapid transition of solid food from the gastric pouch eliminating the sensation of fullness and resulting in ingestion of larger portions.

In general, it is normal to have periods of plateaus through all phases of weight loss after surgery. It is important for the patient to recognize these plateaus as being normal. Expecting these fluctuations in weight loss to occur can avert patient depression or exasperation with the surgery. Adhering to the basic rules of eating correctly and exercising regularly may shorten the duration of a plateau and lead ultimately to greater long-term weight loss.

What is most important to remember is that weight loss surgery does not guarantee easy and consistent weight loss. The operation is a tool that if used appropriately by the patient can help one achieve successful weight loss. However, if used inappropriately, overall weight loss may fall below expectations.

## Exercise

Exercise is defined as exertion of the body for sake of health. Exercise should never be considered a chore, but incorporated into one's regular daily activities like brushing your teeth, eating your meals, or going to work. This philosophy applies to everyone obese or thin, man or woman, young or old, before or after bariatric surgery.

### Preoperative exercise

Mild exercise (20 min./day 3-4 times/week) may be beneficial for reducing surgical complications, facilitate healing, and enhance post-operative recovery. Every patient should consider exercise prior to surgery.

Regimen:

1. Improve lung capacity by blowing up balloons
2. Improve aerobic conditioning with walking, swimming, or bike riding. Gradually increase distance with each outing. Within one month exercise capacity will be greater and surgery will, therefore, be safer.
3. Increase your strength with light weights or resistance training with rubber bands

**Postoperative exercise**

Exercise after surgery is absolutely imperative, and it may be the most important factor that can help a patient achieve long-standing and successful weight loss.

Regimen:

1. Start walking from day 1.
2. Increase your walking each day. Add other aerobic exercises like swimming and bicycle riding as your surgeon permits and as you feel so inclined.
3. Start light weight training and sit-ups as your surgeon allows. Increase weights and number of reps gradually. This type of exercise will increase muscles mass which improves strength, increases bone density, and increases metabolism.
4. Consider using a personal trainer to educate one about exercise, improve motivation, and help assure proper routines.

Independent of what phase a patient may be in before or after surgery, there are certain basic safe and reliable rules to follow in regard to exercise:

1. Consider your goals and how you want to accomplish them. You can achieve it!
2. Use exercise in combination with weight loss surgery to maximize results.
3. Remember everyone starts from a different state of physical ability and strength. Gradually increase your activity and exercise capacity. Mild discomfort from exercise is acceptable, but pain should be avoided. Ignore the cliché, "No pain no gain."
4. Drink plenty of water before, during, and after exercise.

In addition to loss of fat mass, there are other numerous benefits to exercise. These benefits include prevention of loss of muscle mass when losing weight rapidly after surgery, and improved overall weight loss. One's immune system is enhanced by exercise and this will help maintain overall general health. Exercise may also reduce a person's appetite. Fatigue, which sometimes is problematic after surgery, may be reduced. Finally, there can be improved balance, improved self-confidence, and overall improved sense of well being.

**From ASBS Public/Professional Education Committee**