White Paper: Common Complications in Gastric Bypass Surgery

For Hospital Groups, ASCs, and Specialty Medical Facilities

Executive Summary

Optimal patient outcomes depend on numerous factors, including the surgeon’s demonstrated operative skill, quality outcomes, and multidisciplinary support. The presence of comorbid conditions, such as diabetes, has been shown to increase risk for complications. Careful selection of candidates for gastric bypass surgery may not only improve the efficacy of these procedures, but also prevent the significant potential risks and complications.

Introduction

The increase in the number of bariatric operations performed in the recent years results from a handful of factors: the obesity epidemic, the recognition of obesity as a health hazard, the poor results with nonsurgical methods, the reproducible good results with surgical techniques, and the introduction of laparoscopic techniques. More than one third of adults in the United States are obese. Obesity-related conditions include heart disease, stroke, type 2 diabetes, and certain types of cancer, some of the leading causes of preventable death.

In the United States, gastric bypass is the most common operation performed to treat extreme obesity, which is defined as a body mass index (BMI) of 40 kg/m2 or higher (normal BMI range: 18.5-24.9 kg/m2). Postoperative complication rates range between 10% and 25%. A better understanding of the severity or spectrum of complications and the predictors of complications after gastric bypass can be used to develop strategies to prevent complications, thereby improving overall results.

Common Obesity-Related Comorbidities

Obesity is the precursor for many other conditions and diseases that affect essentially every organ system (Table 1). Being overweight or obese puts individuals at higher risk of morbidity from hypertension, dyslipidemia, type 2 diabetes, coronary heart disease, stroke, gallbladder disease, osteoarthritis, sleep apnea, and respiratory problems, as well as endometrial, breast, prostate, and colon cancers. Higher body weights are also associated with increases in all-cause mortality, and obese individuals may also suffer from social stigmatization and discrimination. Studies have shown that obesity-related diseases dramatically resolve or improve after bariatric surgery.

Bariatric Surgery Procedures Involving Gastric Bypass

There are three types of approaches to bariatric surgery:

- Restrictive: limits the amount of food intake by reducing the size of the stomach
- Malabsorptive: limits the absorption of food intake in the intestinal tract by bypassing a portion of the small intestine to varying degrees
- Combination of both restrictive and malabsorptive

Purely restrictive bariatric surgeries are called gastric banding or gastric stapling. Gastric bypass surgery is a combination of both restriction and malabsorption. Bariatric surgical procedures that involve gastric bypass to some degree are described below.
# Gastric Bypass with Roux-en-Y Anastomosis (RYGB)

This procedure, which is also known as proximal or short limb gastric bypass, is currently considered the gold standard for weight loss surgery. The procedure involves both restrictive and malabsorptive components. A small gastric pouch is created from the upper part of the stomach by segmentation or resection to restrict the amount of food that can be ingested. The mid-portion of the jejunum is divided, and the cut end of the distal limb (≤150 cm) is attached to the gastric pouch outlet (Roux limb). The cut end of the proximal limb (the limb consisting of the duodenum and proximal jejunum) is attached to the side of the Roux limb (the limb connected to the pouch). This creates the Y configuration of the small intestine, allowing food to bypass the duodenum and proximal jejunum, resulting in malabsorption.

# Distal (Long Limb) Gastric Bypass

This procedure involves both restrictive and malabsorptive components and is a variant of the standard gastric bypass with the longer (>150 cm) Roux limb. The longer the Roux limb, the greater the bypass of the small intestine and, consequently, the degree of malabsorption.

# Biliopancreatic Diversion (Bypass) Procedure

This procedure, which is also known as the Scopinaro procedure, also involves both restrictive and malabsorptive components. Subtotal (distal) gastrectomy creates a small gastric pouch at the top of the stomach to limit food intake. A long limb Roux-en-Y anastomosis (>150 cm) results in the biliopancreatic juices being diverted into the distal ileum, significantly increasing malabsorption. The biliopancreatic diversion is designed to preferentially inhibit the absorption of fat, and is only partially reversible.

# Biliopancreatic Diversion (Bypass) with Duodenal Switch (BPD-DS)

The BPD-DS is an adaptation of the standard biliopancreatic bypass. The restrictive component involves subtotal gastrectomy, resulting in a tube or sleeve-like stomach remnant that leaves the pyloric valve and the initial segment of duodenum intact. The long limb Roux-en-Y anastomosis (>150 cm) provides malabsorption in this variant as well, but the distal ileum is connected to the duodenal segment leading from the stomach sleeve, instead of the stomach pouch itself.

# Mini-Gastric Bypass (MGB)

The MGB is a variant of the gastric bypass, also involving both restrictive and malabsorptive components. The stomach is segmented to create a small gastric pouch similar to traditional gastric bypass. However, instead of creating a Roux-en-Y anastomosis, the loop of jejunum is Anastomosed directly to the stomach pouch.
Indications for Gastric Bypass Surgery

Weight loss surgery should be considered as a treatment of last resort after dieting, exercise, psychotherapy, and drug treatments have failed. According to the 1998 clinical guidelines from the National Institutes of Health (NIH), candidates for surgery must have a body mass index (BMI) greater than or equal to 40 kg/m², or a BMI greater than or equal to 35 kg/m² with comorbid conditions (e.g., cardiovascular disease, sleep apnea, uncontrolled type 2 diabetes) or weight-induced physical problems interfering with performance of daily life activities.

Criteria for Candidates for Gastric Bypass Surgery:

- BMI > 40kg/m², or >35 kg/m² with significant obesity related disease
- Acceptable operative risk
- Documented failure of nonsurgical weight-loss programs
- Psychologically stable with realistic expectations
- Well-informed and motivated patient
- Supportive family/social environment
- Absence of controlled psychotic or depressive disorder
- No active alcohol or substance abuse

Patients who cannot tolerate general anesthesia because of cardiac, pulmonary, or hepatic insufficiency cannot undergo bariatric surgery. In addition, patients who have ongoing substance abuse or unstable psychiatric illness are poor candidates.

Gastric Bypass Surgery Complications and Risk Factors

Studies have found that clinical diagnosis of diabetes, open approach to surgery, and surgeon experience are independently predictive of complications after gastric bypass surgery. In patients with diabetes undergoing surgery, morbidity is increased as a result of numerous factors, including impaired myocardial and vascular function, a higher incidence of wound infection, and an increased likelihood of postoperative renal failure. Laparoscopic approaches are generally thought to be more challenging than open procedures, but have been shown to decrease operative time, hospital stay, postoperative pain, and recovery times. Surgeon experience and hospital volume are also important variables that influence the frequency of surgical complications.

Although studies have shown that bariatric surgery can be accomplished safely in extremely obese patients, higher BMI should remain an important consideration in patient selection, as it correlates with a higher prevalence of comorbidities, longer operative times, and higher rates of conversion to open procedures.

Potential early complications of gastric bypass surgery include bleeding, anastomotic leak, wound infection, thromboembolism, and anastomotic strictures. Longer-term complications can include marginal ulcers, bowel obstruction, gallstones, and nutritional deficiencies.

Bleeding

Postoperative bleeding may result from mesenteric or omental vessels within the peritoneal cavity or from an anastomosis or staple line. In laparoscopic RYGB, the staple line or suture lines of the gastrojejunostomy and the jejunostomy can bleed.

Anastomotic Leak

An anastomosis is a surgical connection between the stomach and bowel, or between two parts of the bowel. The surgeon attempts to create a watertight connection by connecting the two organs with either staples or sutures, which creates a hole in the bowel wall. If a seal fails to form, for any reason, fluid from within the gastrointestinal tract can leak into the sterile abdominal cavity, causing infection and abscess formation. When this dreaded complication of RYGB occurs, it is associated with a mortality rate of up to 30%.
Common Complications in Gastric Bypass Surgery

**Wound Infection**
Wound infection is more common with the open approach. When laparoscopic port-site infections develop, they are less serious than open wound infections. The laparoscopic approach eliminates the risk of wound dehiscence and evisceration.

**Thromboembolism**
Pulmonary embolism and anastomotic leak are two major causes of death after RYGB, with pulmonary embolism accounting for 50% of postoperative deaths. During laparoscopic surgery, the peritoneum is inflated, which increases the abdominal pressure and impedes venous return, increasing the risk of deep vein thrombosis.

Obesity is a risk factor for venous thromboembolism in general surgery patients. The higher the BMI, the higher the risk of venous thromboembolism in patients undergoing abdominal operations, even with low-dose heparin prophylaxis.

Currently, the American College of Chest Physicians (ACCP) recommends routine perioperative thromboprophylaxis for patients at increased risk, but provides no specific recommendations for bariatric surgery patients.

**Anastomotic Stricture**
As the anastomosis heals, it forms scar tissue, which naturally tends to contract over time, making the opening smaller—this is called a stricture. Usually, the passage of food through an anastomosis will keep it stretched open, but if the inflammation and healing process outpaces the stretching process, scarring may make the opening so small that even liquids can no longer pass through it. Most strictures either result from ischemia at the anastomosis due to tension on the Roux limb, or are associated with a marginal ulcer.

**Marginal Ulcers**
Marginal ulcers are post-surgical ulcers that occur at the gastrojejunostomy anastomosis, usually on the jejunal side. Marginal ulcers may be related to:
- Tension or ischemia on the anastomosis
- Foreign material (staples or nonabsorbable sutures)
- Nonsteroidal anti-inflammatory drug (NSAID) use
- Excessive acid exposure in the gastric pouch due to gastrogastric fistula
- Smoking

**Bowel Obstruction**
Bowel obstruction after RYGB can result from adhesions or internal hernias. Fewer intra-abdominal adhesions form after laparoscopic surgery, likely due to less tissue trauma and bowel manipulation. Interestingly, more internal hernias may develop in a laparoscopic approach (more bile loops of bowel can herniate through a mesenteric defect due to fewer adhesions). Carefully closing the mesenteric defects during the procedure can reduce the incidence of internal hernias.

**Cholelithiasis**
Weight loss after gastric bypass surgery is associated with an increase in the incidence of gallstones. Symptomatic cholelithiasis at the time of laparoscopic RYGB is an indication for cholecystectomy during the bypass procedure.

**Nutritional Deficiencies**
Because the stomach and duodenum are bypassed, iron, vitamin B12, and other micronutrient deficiencies can occur after standard gastric bypass. Calcium absorption in the duodenum and jejunum and vitamin D absorption in the jejunum and ileum can also become impaired.

**Measuring Performance for Gastric Bypass Surgeries**
Ideally, the surgical center where surgery is to be performed should be accomplished in bariatric surgery with a demonstrated commitment to provide adequate facilities and equipment, as well as a properly trained and funded bariatric
surgery support staff. Minimal standards in these areas are set by the institution and maintained under the direction of a qualified surgeon who is in charge of an experienced and comprehensive bariatric surgery team. This team should include experienced surgeons and physicians, skilled nurses, specialty-educated nutritionists, experienced anesthesiologists, and, as needed, cardiologists, pulmonologists, rehabilitation therapists, and psychiatric staff.

**Proper Documentation**

Thorough physician documentation is critical for reimbursement of gastric bypass surgery. In addition to office notes, including medical history and physical exam findings, there must be detailed documentation regarding the extent and response to first-line treatment with dietary and lifestyle changes. In addition to affecting reimbursement, incomplete documentation also can affect patient outcomes and may increase risk of liability and malpractice claims.

**Measuring Patient Outcomes**

Looking at the length of stay for gastric bypass surgeries is one way of looking at both the efficacy and the safety of care. A shorter average length of stay may indicate that patients are recovering more quickly and experiencing fewer complications. However, it is important to consider the nature and extent of the surgery being performed. Other factors to review to assess patient outcomes are complications arising from surgery and unplanned re-operations and re-admissions.

**Physician Privileging**

Privileging is a process that recognizes that a physician is both qualified and competent. It defines a physician’s scope of practice and the clinical services he or she may provide, and it is based on demonstrated competence and is a data-driven process.

Physician privileging involves gathering information with which to decide the types of care, treatment, and services or procedures that a practitioner will be authorized to perform in a specific setting (e.g., hospital), taking into considering setting-specific characteristics, such as adequacy of the facilities, equipment, and number and type of qualified support personnel and resources. Other criteria that determine the practitioner’s qualifications include the physician’s education, training (residency and/or fellowship), and clinical experience (number of procedures performed with satisfactory outcomes).

Privileging requires qualified and objective physician-controlled peer review, utilizing criteria that have been established through common legal, professional, and administrative practices, endorsed by a formal consensus process, and that are publicly available. These criteria must be directly related to quality of patient care, and documented physician performance should be measured against these criteria. Peer review decisions must be fair and without conflicts of interest and have dated detailed documentation, and should be confidential and protected.

Hospitals with a history or pattern of retaining or contracting with incompetent and low-quality providers may be subject to potential legal liability for any injuries to patients, exclusion from federal and state health benefit program participation, loss of commercial contracts, and loss of accreditation by healthcare standards organizations.

**Role of External Peer Review in Ensuring Quality of Patient Care & Safety**

Ongoing evaluation of hospital practitioners ensures excellence in physician performance and the highest standard of care for patients. External peer review allows hospitals to perform not only in-depth evaluation of sentinel events, but also (re)credentialing, (re)privileging, proctoring, and ongoing measurement and monitoring of physician performance.

Peer review committees composed primarily of in-house hospital personnel often lack the resources to help the hospital achieve their performance improvement goals, and social and professional relationships lead to conflicts of interest. External peer review avoids conflicts of interest that can arise from economic, professional, or social ties among physicians within a single institution. It may also be an effective solution for hospitals that lack adequate physician resources to conduct timely performance analyses.

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When properly executed, external peer review can reduce medical errors through objective evaluations performed in a nonpunitive, educational context that supports a healthy culture of continuous improvement. This results from physicians knowing that board-certified specialists with the same credentials and from similar practice settings will objectively evaluate their work at regular intervals, thereby leading to improved quality of care and patient safety. Ongoing evaluation of physicians can also uncover problematic practice patterns, as well as physician- and hospital-level issues that need to be addressed.

External peer review can also play a key role in reducing or eliminating risks associated with malpractice claims. Unlike internal peer review, which only looks at sentinel events, external peer review can help hospitals to discover, highlight, and deal with physician performance issues quickly and efficiently before they turn into claims.

**Conclusions**

In addition to the presence of comorbidities such as diabetes, other factors may also contribute to increased risk for complications after gastric bypass surgery. Both open surgery and early surgeon experience have been associated with increased risk for certain complications following surgery. Appropriate patient selection, increased use of laparoscopic techniques, and routine proctoring of a surgeon’s early experience may decrease complication rates, thereby helping patients to safely and effectively achieve the expected benefits of gastric bypass surgery, including long-term and sustained weight loss and improvement of obesity-related diseases.

**Bibliography**


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