

EARLY COMPLICATIONS IN BARIATRIC SURGERY: incidence, diagnosis and treatment

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ABSTRACT - Context - Bariatric surgery has proven to be the most effective method of treating severe obesity. Nevertheless, the acceptance of bariatric surgery is still questioned. The surgical complications observed in the early postoperative period following surgeries performed to treat severe obesity are similar to those associated with other major surgeries of the gastrointestinal tract. However, given the more frequent occurrence of medical comorbidities, these patients require special attention in the early postoperative follow-up. Early diagnosis and appropriate treatment of these complications are directly associated with a greater probability of control. **Method** - The medical records of 538 morbidly obese patients who underwent surgical treatment (Roux-en-Y gastric bypass surgery) were reviewed. Ninety-three (17.2%) patients were male and 445 (82.8%) were female. The ages of the patients ranged from 18 to 70 years (average = 46), and their body mass indices ranged from 34.6 to 77 kg/m². **Results** - Early complications occurred in 9.6% and were distributed as follows: 2.6% presented bleeding, intestinal obstruction occurred in 1.1%, peritoneal infections occurred in 3.2%, and 2.2% developed abdominal wall infections that required hospitalization. Three (0.5%) patients experienced pulmonary thromboembolism. The mortality rate was 0.55%. **Conclusion** - The incidence of early complications was low. The diagnosis of these complications was mostly clinical, based on the presence of signs and symptoms. The value of the clinical signs and early treatment, specially in cases of sepsis, were essential to the favorable surgical outcome. The mortality was mainly related to thromboembolism and advanced age, over 65 years.

HEADINGS - Bariatric surgery, adverse effects. Obesity morbid, mortality.

INTRODUCTION

Bariatric surgery has proven to be the most effective method of treating severe obesity⁽¹⁵⁾. In recent years, the number of surgeries performed in Brazil has increased exponentially, reflecting the high demand generated by the obesity epidemic that affects Brazil and much of the world^(1, 17). The positive effect of such treatment has been demonstrated in prospective and retrospective studies with long-term follow-ups regarding weight control, the control of comorbidities, the decrease in mortality, and improvements in the quality of life^(2, 5, 13).

Nevertheless, the acceptance of bariatric surgery is still questioned by the medical community and among the general population, who do not recognize obesity as a disease that exhibits great complexity, is of multifactorial origin, and is difficult to control⁽⁸⁾. This prejudice is reinforced when severe complications arise from surgery and is certainly enhanced by the occurrence of mortality, given that young and supposedly "healthy" individuals are often subjected to surgery.

The risk of complications and mortality in bariatric surgery is associated with certain factors that are common to other patients and procedures, including age above 65 years, the presence of associated diseases (cardiovascular and pulmonary disease, chronic renal failure, liver cirrhosis, etc.), prior abdominal surgery, and the experience of the surgeon and the institution, especially concerning the ability to make an early diagnosis and address complications^(9, 16).

The surgical complications observed in the early postoperative period following surgeries performed to treat severe obesity are similar to those associated with other major surgeries of the gastrointestinal tract. However, given the more frequent occurrence of medical comorbidities (such as diabetes, arterial hypertension, and sleep apnea), as well as the difficulty in making an early diagnosis of the complications (due to limitations of the clinical abdominal workup and imaging methods, such as ultrasonography and computed tomography, particularly in highly obese patients with body mass indices >50 kg/m²), these patients require special attention in the early post-

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operative follow-up^(3, 10). Pulmonary thromboembolism, a complication associated with bariatric surgery, also requires greater attention from the medical team given the high mortality rate associated with this condition⁽¹⁴⁾.

Early diagnosis and appropriate treatment of these complications are directly associated with a greater probability of control⁽¹¹⁾.

The present study aimed to retrospectively assess the incidence, diagnostic criteria, treatments, and clinical outcomes of early complications in morbidly obese patients subjected to surgical treatment for obesity at the Metabolic and Bariatric Surgery Unit of the Discipline of Surgery of the University of São Paulo Medical School, São Paulo, SP, Brazil.

METHOD

The medical records of 538 morbidly obese patients who underwent surgical treatment between January 2006 and September 2011 were reviewed. Ninety-three patients were male (17.2%), and 445 were female (82.8%). The ages of the patients ranged from 18 to 70 years (average = 46), and their BMIs (body mass indices) ranged from 34.6 to 77 kg/m². All patients studied were included in the schedule for bariatric surgery at the "Hospital das Clínicas", the medical facility of the University of São Paulo Medical School, an university hospital part of Brazil's public health system program, and the major hospital complex in Latin America.

All patients signed an informed consent form before surgery. The technical aspects of the surgical technique were standardized (Figure 1). The Roux-en-Y gastric bypass surgery was performed by midline laparotomy, by 5 cm gastric

pouch, without a constriction ring, with 50-70 cm biliopancreatic limb and 100-120 cm Roux limb, and retrocolic-retrogastric manual gastroenteroanastomosis. The enteroanastomosis were also made manually, terminolateral. All patients received a gastrostomy, made by Stamm-Witzel technique, and drainage with silastic laminar or tubulolaminar drain. The mesenteric defect and the Petersen's space were closed by nonabsorbable sutures. All patients received prophylactic antibiotics for 48 hours, and low molecular weight heparin until 21st postoperative day, which was suspended in case of bleeding. The oral intake was started in most cases on postoperative day 1.

Complications occurring up to the 30th postoperative day (POD) were considered to be early complications. The surgical complications assessed were bleeding, intestinal obstruction, digestive fistulas and associated peritoneal complications, and deep infections of the abdominal wall that required hospitalization. The clinical complication assessed in this study was pulmonary thromboembolism (PTE).

Criteria for the diagnosis of bleeding included intraoperative injury of a major vessel or viscera with blood loss greater than 500 mL and hemorrhage causing hemodynamic instability and/or a decrease in hemoglobin of at least 2.0 g/dL. The origin may be intraluminal (manifested by hematemesis, melena, or rectal bleeding) or intraperitoneal (manifested by bleeding from the abdominal drain).

The diagnosis of intestinal obstruction was based on clinical criteria (pain and/or abdominal distension, vomiting, bilious or stasis fluid flow through the gastrostomy tube greater than 1000 mL in 24 hours) and was sometimes supplemented by diagnostic imaging (computed tomography with a contrast agent administered orally, through the gastrostomy tube or intravenously).

Fistulas and peritoneal infections were diagnosed based on clinical signs (tachycardia, tachypnea, fever, or abdominal pain) associated with changes in the appearance of the draining fluid (pus, bilious, enteric, or salivary), or extravasation of dye administered orally (Methylene Blue test), or with evidences on diagnostic imaging (computed tomography or radiography with a water-soluble contrast media) of abdominal fluid collection, or detection of extravasation of a contrast media.

The criteria for hospitalization due to deep surgical wound infections included the presence of cellulitis or signs of peri-incisional necrosis.

Pulmonary thromboembolism was confirmed by computed tomography using a specific protocol or autopsy⁽⁴⁾.

RESULTS

Early complications occurred in 52 (9.6%) patients and were distributed as follows: 14 (2.6%) patients presented with bleeding, intestinal obstruction occurred in 6 (1.1%) patients, peritoneal infections occurred in 17 (3.2%) patients, and 12 (2.2%) patients developed abdominal wall infections that required hospitalization. Three (0.5%) patients experienced pulmonary thromboembolism.

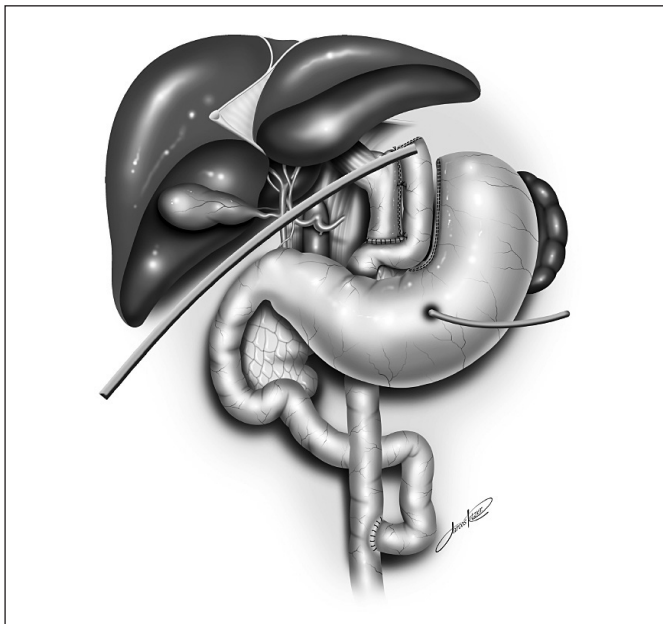


FIGURE 1. Scheme of surgery: Roux-en-Y gastric bypass surgery with gastrostomy and silastic laminar drainage

Among the 14 patients with bleeding, 3 of the incidents resulted from an intraoperative injury to the spleen. Two of these patients were subjected to conservative treatment, and one (0.18%) underwent a splenectomy, performed in association to the bariatric procedure. Eleven patients presented with bleeding in the postoperative period. Bleeding was exteriorized by the abdominal drain in six (1.1%) of these patients. These six patients were subjected to conservative treatment under clinical supervision with no need for reoperation, and two of them received red blood cell transfusions due to tachycardia and a decrease in hemoglobin levels greater than 4 g/dL. Five (0.9%) patients exhibited gastrointestinal bleeding, two of whom were subjected to conservative treatment under clinical monitoring. One patient with hemodynamic instability (tachycardia and hypotension) underwent endoscopic hemostatic treatment for the bleeding vessel in gastrojejunal anastomosis. The two remaining patients exhibited bleeding of the excluded stomach associated with obstruction of the entero-entero anastomosis by clots, thus requiring reoperation to clear the biliopancreatic loop and hemostasis of the staple line of the excluded stomach. In all cases of bleeding the thrombosis prophylaxis with low molecular weight heparin was suspended. No mortality was associated with this complication.

The diagnoses of the six patients with intestinal obstruction were based on clinical signs and elevated gastrostomy outputs. Computed tomography was performed in five cases to confirm the diagnosis. Five patients were clinically monitored for an average of 3 days (fasting, hydration, open gastrostomy), and four of these patients were subjected to a new surgery due to elevated gastrostomy output. One patient was held under clinical management and presented a gradual reduction of the output and improvement of symptoms. One of the six patients underwent repeat surgery on the 3rd POD based on clinical criteria, without the use of computed tomography. Anastomosis was performed in the five patients who underwent a second surgery. In all six cases, the obstruction occurred at the entero-entero anastomosis due to its angulation, edema, or the formation of early adherence. No mortality was associated with this complication.

Among the 17 patients with intra-abdominal infectious complications, 8 (1.5%) patients had a fistula in the small gastric pouch. The diagnoses of five of these cases were based on observed changes in the appearance of the draining liquid and confirmed by contrast radiography of the esophagus and stomach. None of these cases exhibited significant clinical effects (tachycardia or symptoms of sepsis), and computed tomography revealed no evidence of an abdominal collection of fluids, which resulted in conservative treatment (hemodynamic management, broad-spectrum antibiotic, and diet through gastrostomy). Upper gastrointestinal endoscopy was indicated for one of these patients, who maintained drain output and a positive Methylene Blue test after 2 weeks of conservative treatment. In this case, a fistulous orifice was observed near the angle of His, and Histoacryl® was successfully injected into it. The three remaining patients with a fistula in the small gastric pouch presented early symptoms of sepsis

and were subjected to surgical treatment involving washing and draining of the abdominal cavity. Four (0.74%) patients presented abdominal abscesses with no signs of associated fistulas. The clinical manifestation was fever, which appeared after the 7th postoperative day when the abdominal drain had already been removed. These diagnoses were confirmed by computed tomography. Abscess puncture and drainage guided by computed tomography was performed in two of these patients. The other two patients, one with a small abscess and one with a difficult percutaneous access, did not exhibit any signs or symptoms of sepsis and were subjected to conservative treatment. Three (0.5%) patients presented an overflow of contents from the excluded stomach through the gastrostomy orifice. In all cases, these complications occurred after the 7th postoperative day, and the fistula was directed onto the surgical wound. All three cases received conservative treatment (hemodynamic management, antibiotics, open gastrostomy, and dressings). Two (0.37%) female patients presented a fistula in the excluded stomach associated with an obstruction of the biliopancreatic loop by clots. These patients had three associated surgical complications (bleeding from the excluded stomach, obstruction of the biliopancreatic loop, and gastric fistula). Both patients underwent repeat surgery to remove the clot, resuture the excluded stomach, and drain the abdominal cavity. No mortality was associated with these complications.

Twelve (2.2%) patients developed abdominal wall infections that required hospitalization (intravenous antibiotics and/or surgical debridement). One female patient, who was 65 years old and diabetic, evolved to necrotizing fasciitis and died. The mortality associated with this complication was 8.3% (1/12 cases).

Three (0.55%) patients had pulmonary thromboembolism. The clinical presentation consisted of respiratory failure, and in two cases, the diagnosis was confirmed by computed tomography. One of these patients was 70 years old and died on the 3rd POD, when the diagnosis was made. The other patient was diagnosed on the 30th POD and had a favorable outcome. One patient died at home on the 7th POD, and the diagnosis was confirmed by autopsy. The mortality associated with this complication was 66% (2/3 cases).

The overall mortality rate in this cohort was 0.55% (3/538). A summary of the assessed complications is presented in Table 1.

DISCUSSION

The standardization of surgery for the treatment of morbid obesity has contributed significantly to the low rates of complications and mortality. Institutional experience in dealing with complications has led to improvements in the early detection and efficient management of complications. The incidence of early complications observed in the present study was similar to that reported in the literature^(7, 9, 16).

The reported incidence of bleeding is quite variable and depends largely on the rigor with which the assessment is made. Staple lines are the most common sources of bleeding

TABLE 1. Casuistic of the Service of Metabolic and Bariatric Surgery of the Discipline of Digestive Surgery – HCFMUSP (January 2006 to September 2011) – 538 patients

Complication	n	%	Treatment and outcome
Intestinal obstruction	6	1.12	5 surgical treatments and 1 medical treatment 0 deaths
Bleeding	14	2.6	3 intraoperative (1 splenectomy and 2 conservative treatments) 11 postoperative (6 through the drain, 5 upper gastrointestinal bleeding-UGIB) 0 deaths
Fistula of the gastric pouch	8	1.5	5 conservative treatments 3 reoperations 0 deaths
Fistula of the excluded stomach	2	0.37	2 reoperations 0 deaths (associated with bleedings in the excluded stomach)
Gastrostomy fistula	3	0.56	3 conservative treatments, drainage of the wound
Intra-abdominal abscess	4	0.74	2 treated by puncture 2 conservative treatments
Wound infection (requiring hospital treatment)	12	2.2	11 medical treatments, intravenous antibiotics 1 case of necrotizing fasciitis - death
Pulmonary thromboembolism	3	0.55	1 at the 3rd postoperative day (POD) - death 1 at the 7th POD - death 1 at the 30th POD - death
Total of early complications	52	9.6	
Mortality	3	0.55	

and can indicate complications in the peritoneal cavity or the gastrointestinal lumen. The presence of abdominal drains aids in the diagnosis by allowing the blood collected in the cavity to be monitored and emptied. Bleeding into the gastrointestinal lumen is usually self-limited, though it may require endoscopic intervention as in the above-mentioned case or even surgical intervention in cases of hemodynamic instability and worsening of clinical signs. The patient subjected to endoscopic treatment in this study exhibited hemodynamic instability and a 6-point decrease in hemoglobin levels from preoperative values (12.5 g/dL to 6.5 g/dL). Endoscopy enabled the accurate detection and adequate control of the source of bleeding.

Intestinal obstruction resulted from technical problems (angulation of the anastomosis) in four cases, from early adherence in one case, and most likely occurred due to edema of the anastomosis in another case. The latero-lateral technique was used in the four cases that presented angulation of the anastomosis, and the termino-lateral technique was used in the other two cases. The presence of gastrostomy facilitated the diagnosis and clinical management of the patients until the operation was repeated, allowing the biliopancreatic loop to be decompressed. Gastrostomy enabled conservative treatment of one patient with edema in the termino-lateral anastomosis. However, the routine performance of gastrostomy is controversial, given that it is not useful in most patients and carries a risk of complications.

The incidence of fistulas and peritoneal infectious complications was similar to that reported in the literature^(7,9,16). Fistulas of the gastric pouch mostly occurred after the 5th POD, which may be why conservative treatment was

possible in most cases, as all patients were drained and the fistula was well directed by the drain in five patients. Three patients with fistulas of the gastric pouch exhibited early signs of sepsis and underwent reoperation without diagnostic imaging. Two of the patients presented symptoms while they were still hospitalized and had more favorable outcomes. In one female patient, the onset of symptoms occurred after hospital discharge, and she underwent a second surgery after 2 days. This patient had a more complicated outcome and remained in the intensive care unit (ICU) for 15 days due to respiratory complications. It is currently generally accepted that patients with signs of sepsis in the early postoperative period of bariatric surgery (persistent tachycardia after analgesia and fluid replacement, hypotension, and tachypnea) should be carefully evaluated for early indications of reoperation for cleaning and improved drainage of the abdominal cavity. The three cases in which the fistula was associated with peritonitis demonstrate the importance of the diagnosis and early surgical intervention, which reduce the associated morbidity and mortality in this type of complication. There were three cases of severe complications associated with gastrostomy. Although the fistula had been directed onto the surgical wound and thus did not result in peritonitis, this complication required prolonged hospitalization for its management. While the routine use of gastrostomy is questionable, its presence can be of great value in maintaining a nutritional route in cases involving fistulas and as a means of decompression in cases of intestinal obstruction, especially when there is a high prevalence of comorbidities and therefore a greater risk for complications.

The deep surgical wound infections had a similar incidence to that reported in the literature for open or conventional surgery^(10,13). Given the increasing trend of performing bariatric surgery through videolaparoscopy, the incidence of this complication is currently decreasing. In our case series, patients with wound infections and signs of complications (fever, peri-incisional cellulitis, and/or tissue necrosis) were hospitalized for intravenous antibiotic therapy and surgical treatment of the wound in some cases (drainage, debridement). One female patient exhibited signs of infection in the 1st postoperative days followed by rapid clinical deterioration. She was subjected to an exploratory laparotomy on the 8th postoperative day, with a diagnosis of abdominal wall infection associated with necrotizing fasciitis. Surgical debridement was performed; however, the 65-year-old patient died on the 9th postoperative day. Our attention was drawn to the unfavorable and unusual outcome of this type of complication, which is rarely reported in the literature, although it may have been related to the patient's risk factors (age above 65 years and diabetes).

The incidence of pulmonary thromboembolism following bariatric surgery ranges from 0.05% to 1.0% in the literature^(7,14). Mortality associated with PTE has been as high as 75% in some case series, and it was the third leading cause of mortality, after sepsis and cardiac causes, in a prospective multicentric study conducted on over 60,000 patients. In the present study, PTE was diagnosed in three (0.55%) patients, and it was the primary cause of death. All three patients received prophylaxis for deep venous thrombosis: elastic stockings, early ambulation, and prescription of an antithrombotic drug until the 21st postoperative day. Despite prophylactic measures, PTE occurred early (3rd and 7th postoperative days) in both cases and resulted in death. One of the patients was over 65 years of age and did not respond to the therapeutic measures adopted. The other patient

died at home, and the diagnosis was confirmed by autopsy. Neither of these patients had a prior history or preoperative signs of deep venous thrombosis. These data demonstrate the need for better stratification of the risk of deep venous thrombosis in patients eligible for bariatric surgery.

The overall mortality in our case series was 0.55%. The mortality reported in other studies ranges from 0.1% to 1.0% and depends on factors such as the profile of the operated patients (age, average BMI, and comorbidities)⁽⁶⁾. Different studies have described mortality rates that were 3 to 10 times higher in patients over 65 years of age than in younger individuals⁽¹²⁾. In the present study, the mortality rate of patients over 65 years of age was 20% (2 deaths among 10 elder patients). These results indicate the need for a better risk-benefit assessment of the surgical treatment of obesity in the elderly population. The role of the experience of the medical institution is often evaluated as a factor that may reduce the incidence of complications, especially through provision of integrated care for morbidly obese patients, including adequate preoperative preparation, standardization of the surgical procedure, and postoperative care aimed at early detection and immediate management of complications⁽¹¹⁾.

CONCLUSION

The incidence of early complications in the present study can be considered low and is similar to that reported in the literature. The diagnosis of these complications was mostly clinical, based on the presence of signs and symptoms such as pain, vomiting, bleeding, fever, tachycardia, and tachypnea. The value of the clinical signs, especially in cases of sepsis, and early treatment, sometimes at the expense of complementary exams, was essential to the favorable outcome of the surgical complications. The mortality rate was mainly related to thromboembolism and advanced age (over 65 years).

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RESUMO - Contexto - A cirurgia bariátrica tem mostrado ser o método mais eficaz de tratamento da obesidade grave. No entanto, sua aceitação como terapia padrão-ouro ainda é questionada. As complicações cirúrgicas observadas no início do período pós-operatório de cirurgias para o tratamento da obesidade grave são semelhantes aos associados a outras cirurgias de grande porte do trato gastrointestinal. Não obstante, dada a ocorrência mais frequente de comorbidades associadas à obesidade mórbida, esses pacientes necessitam de atenção especial no pós-operatório. O diagnóstico precoce e o tratamento adequado dessas complicações estão diretamente associadas a maior probabilidade de controle clínico. **Método** - Os prontuários de 538 pacientes obesos mórbidos submetidos a tratamento cirúrgico (bypass gástrico em Y-de-Roux) foram revisados. Noventa e três (17,2%) pacientes eram do sexo masculino e 445 (82,8%) eram do sexo feminino. As idades dos pacientes variaram de 18 a 70 anos (média = 46) e seus índices de massa corporal variaram entre 34,6-77 kg/m². **Resultados** - As complicações imediatas ocorreram em 9,6% e foram distribuídos da seguinte forma: 2,6% apresentaram sangramento, obstrução intestinal ocorreu em 1,1%, infecções peritonias ocorreram em 3,2% e 2,2% desenvolveram infecções da parede abdominal requerendo hospitalização. Três (0,5%) pacientes tiveram tromboembolismo pulmonar. **Conclusão** - A padronização de cirurgia para o tratamento da obesidade mórbida tem contribuído significativamente para os baixos índices de complicações e mortalidade. A incidência de complicações precoces foi baixa. O diagnóstico destas complicações foi essencialmente clínico, com base na presença de sinais e sintomas. O valor dos sinais clínicos e tratamento precoce, especialmente em casos de sepse, foram essenciais para o resultado cirúrgico favorável. A mortalidade foi principalmente relacionada com tromboembolismo e idade avançada, acima de 65 anos.

DESCRIPTORIOS - Cirurgia bariátrica, efeitos adversos. Obesidade mórbida, mortalidade.

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