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Infectious Complications in Bariatric Surgery

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Abstract

We have several nowadays several procedures of bariatric surgeries aiming to treat severe obesity and its metabolic and cardiovascular complications. This followed observing substantial weight loss following gastric operations for ulcers nearly four decades ago. But, these patients suffer already comorbidities: type 2 diabetes mellitus, asthma, cardiac diseases and sleep apnea syndrome. Therefore post surgical infectious complications are not only intra-abdominal but extend to the skin, cardiovascular system, pulmonary system, neurological system causing readmissions with the risk of healthcare associated morbidity and mortality they depend on the type of the surgical procedure and on the peri operative preventive measures as skin preparation, nomothermia and tailored targeted antibiotic prophylaxis.

The diagnosis is essentially clinical but, in this particular setting of insidious or delayed symptoms, ultrasound and CT scanning are of major help in establishing a rapid diagnosis and prompt treatment. Abdominal rigidity, SIRS manifestations and signs of hypoperfusion are indicative of severe sepsis and often warrant urgent reoperation.

Intra abdominal infectious complications are frequently procedure-dependant; port infections and band erosions in Laparoscopic Adjustable Gastric Banding, internal hernias and laparoscopic surgery even though this last brought down the rate of all infectious complications. Fistulas, abdominal abscess, hepatic abscess and anastomotic strictures are also encountered and manageable.

Anastomotic leaks are the most life threatening occurring in nearly 6% of bariatric surgeries and leading to severe sepsis, ICU admission and high mortality rate.

Tailored preparation, judicious antibioprophylaxis, accurate diagnosis, adherence to basic surgical principles, and effective surgical reintervention when necessary with proper medical treatment are the keys in preventing and immediate management of post bariatric surgery infectious complications.

Keywords: Bariatric surgery; Infection; Complication; Treatment

Introduction

The original gastric bypass operation was conceived as a variation of gastric ulcer surgery more than four decades ago after observing that patients who had undergone a partial gastrectomy for treatment of peptic ulcer disease experienced a substantial amount of weight loss [1].

Bariatric surgery has proven to be the most effective method of treating severe obesity. The surgical complications observed in the early postoperative period are similar to those associated with other major surgeries of the gastrointestinal tract [2].

All different surgical operations surgery carries some degree of risk and the decision to operate is made after a careful balance of the risks versus the benefits [3].

Bariatric surgery in obese individuals with diabetes is safe, although management strategies to avert postoperative cardiac, infectious, and renal complications in this population might be warranted [4]. 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.

Complications occurring up to the 30th postoperative day (POD) are considered to be early complications. The surgical complications are bleeding, intestinal obstruction, digestive fistulas and associated peritoneal complications, and deep infections of the abdominal wall that required hospitalization. Peritoneal infections occur in 3.2% of patients, and 2.2% patients develop abdominal wall infections that required hospitalization [2].

Fistulas and peritoneal infections are 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 radiological CT scanning signs and with biological assessment of peritoneal and systemic cytokines, inflammatory markers and cultures [5].

The criteria for hospitalization due to deep surgical wound

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infections included the presence of cellulitis or signs of peri-incisional necrosis [2].

Long-term complications include internal hernia, adhesions and anastomotic stenosis which common causes of intestinal obstruction after gastric bypass surgery and band slippage and erosion after gastric banding [6].

Prevention

The contamination of the peritoneal cavity occurring during surgeries, but this does not lead to an increased risk of infectious complications. Similarly, patients receiving PPIs have an increased gastric bacterial load and increased contamination but not an increased risk of infectious complications [7].

Christouet alidentified the use of epidural analgesia and delay in the appropriate timing of prophylactic antibiotics to be associated with a higher risk of SSI [8].

A case–cohort study at the Detroit Medical Center during a 2-year study period (2006–2008) determined morbid obesity (defined by the authors as BMI ≥50), asthma, smoking, sleep apnea, increased duration of surgery, presence of urinary incontinence in the preoperative, type 2 diabetes setting and needing assistance with ambulation in the preoperative setting as risk factors for SSI following open RYGB surgical procedures [4,8].

SSI following RYGB was associated with an increased risk for emergency department visits for all causes, hospital re-admissions, outpatient procedures and 30-day mortality.

SSI prevention measures include:

a) Treating all existing infections prior to surgery,

b) Minimizing hair removal preoperatively (and if required, removing hair immediately prior to surgery using clippers),

c) Achieving appropriate glucose control during the preoperative period,

d) Maintaining normothermia during the perioperative period,

e) Applying antiseptic skin preparation appropriately prior to surgery,

f) Ensuring proper hand/forearm antisepsis for surgical team members,

g) Maintaining a sterile field in the operating room and providing appropriate antimicrobial prophylaxis.

h) Expert surgical technique, including methods of wound closure.

The incidence of SSIs with open bariatric surgeries can be as high as 16%. However, the incidence of SSIs has decreased with the introduction of laparoscopic procedures with rates of SSI incidence following this approach at 4%, probably due to smaller incisions, shorter hospital stay and minimal blood loss, compared with open procedures [8-10].

As to antibiotic prophylaxis, the benefits of perioperative antimicrobial prophylaxis in preventing SSIs have been clearly demonstrated through numerous trials and endorsed in various guidelines. The goal of perioperative antimicrobial prophylaxis is to ensure that adequate antibiotic levels are maintained above the minimum inhibitory concentration (MIC) from the time of incision and throughout the procedure.

The selection of appropriate prophylactic antibiotic regimens requires consideration of the expected microbial flora at the surgical site, patient-specific factors such as allergy and exposure to resistant bacteria, institution-specific factors such as local antibiograms and antibiotic formulary availability and drugs [8].

Intravenous antimicrobial prophylaxis is the most extensively studied route and remains the preferred route of administration. One of the most important determinants of antimicrobial levels in the serum and tissues at the time of surgical incision is antimicrobial dosing so it is recommended that the highest dose of prophylactic antimicrobial agent that can be safely administered, after being adjusted for renal function, with time to redosing be used for surgical prophylaxis and this within 30 min to 1 h before incision [8].

As is the case for most procedures, the duration of antimicrobial prophylaxis for bariatric surgery should not exceed 24h after surgery is completed.

Diagnosis

Given the more frequent occurrence of medical comorbidities, the patients require special attention in the early postoperative follow-up with early diagnosis and appropriate treatment directly associated with a greater probability of control.

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, especially in cases of sepsis, were essential to the favorable surgical outcome [2].

Complicated intra-abdominal infections diagnosis is mainly a clinical diagnosis.

Initially, the abdominal pain may be dull and poorly localized (visceral peritoneum) and often progresses to steady, severe, and more localized pain (parietal peritoneum). Abdominal rigidity suggests peritonitis and the need for urgent laparotomy.

Systemic manifestations are SIRS manifestations: Core body temperature > 38°C or < 36°C, heart rate > 90 beats per minute, respiratory rate > 20 breaths per minute (not ventilated) or PaCO2 < 32mmHg (ventilated), WBC > 12,000 < 4,000 or > 10% immature forms (bands).

Hypotension and hypoperfusion signs such as lactic acidosis, oliguria and acute alteration of mental status are indicative of evolution to severe sepsis.

Accurate diagnosis often relies on high-quality contrast and cross-sectional imaging, and effective surgical intervention necessitates a broad understanding of the altered anatomy, advanced surgical skills and liaison with specialists in the field when necessary [6].

The diagnostic approach to confirm abdominal infection source in septic patients depends on the hemo-dynamic stability of the patient; unstable patients may not perform studies that require trips

away from the ICU or emergency department and intra-abdominal septic source may be detected by ultrasound (US).

Abdominal ultrasound, that has the advantage of being portable, may be helpful in the evaluation of right upper quadrant (e.g. perihepatic abscess, cholecystitis, pancreatitis), right lower quadrant, and pelvic pathology (e.g. appendicitis, tubo-ovarian abscess, Douglas abscess), but the examination is sometimes limited because of patient discomfort, abdominal distension, and bowel gas interference.

When patients are stable, computerized tomography (CT) is the imaging modality of choice for most intra-abdominal processes.

CT of the abdomen and the pelvisremains the diagnostic study of choice for intra-abdominal infections detecting small quantities of fluid, areas of inflammation, and other GI tract pathology, with a very high sensitivity.

An option in the diagnosis of critically ill patients in ICU is bedside diagnostic laparoscopy. It avoids patient transport, may be very accurate, maintains ICU monitoring and has high diagnostic accuracy.

The accuracy of diagnostic laparoscopy is very high. In the last years studies have reported definitive diagnosis rates of between 86-100% in unselected patients [11].

Besides from the clinical presentation and the classic blood inflammatory indicators that do not accurately predict the onset of infectious complications before the third postoperative day, blood and peritoneal effluent from the drain cytokine levels (interleukin-1beta and interleukin-6) were early markers of these complications [5].

Complications

The prevalence of obesity surgery is increasing rapidly and general surgeons on-call may be faced with the complications of such surgery and need to have an understanding about how to manage them, at least initially [12].

Infectious complications are not only intra-abdominal but extend to the skin, cardiovascular system, pulmonary system, neurological system and readmissions with the risk of healthcare associated morbidity and mortality.

Skin architecture and immunity change after bariatric surgery and may lead along with vitamin and mineral deficiencies to inflammation and increased susceptibility to pathogens contributing to dermatological complications [13]. Crosti et al. published in 2012 the case of young male patient who developed coexisting disseminated PG, typical suppurative hidradenitis and acneiform eruption on the face, after he had undergone bowel bypass surgery for obesity [14]. The cutaneous manifestations associated with bowel bypass syndrome often mimic pyoderma gangrenosum or other neutrophilic dermatoses, suggesting a pathogenesis related to neutrophil-mediated inflammation for this condition.

Moreover, patients may present with wound cellulitis and sepsis. The most frequent organisms are *Staphylococcus aureus, Enterococcus* spp. and α-haemolytic *Streptococcus* spp. Patients who suffer a wound infection are at high risk of developing an incisional hernia and early, aggressive treatment with antibiotic therapy can help prevent fascial dehiscence (incidence of 1%). Recurrent access port-site infection is concerning, and can represent an infected or eroded band. This should be referred to the bariatric unit after antibiotic therapy [15].

Garrido et al. published a case of pyogenic liver abscess formation resulting from band erosion as a complication of LAGB weight loss surgery. Bacteria might enter into the liver parenchyma from an unusual cause of pylephlebitis (infective suppurative thrombosis of the portal vein [1].

Another rare complication is infection of the neurologic system. A case of extensive infectious myelitis with abdominal and cerebral abscesses presented with pyramidal symptoms and autonomic dysfunction one year post bariatric surgery [16].

Guerrero-silva et al. described a case of gastrobronchial fistula initially handled as infectious respiratory symptoms. It is a rare complication in gastroesophageal surgical procedures, difficult to diagnose and handling is complex managed initially by endoscopy with satisfactory results in the medium and long term [17].

Another indirect bacterial complication in bariatric surgery is the major increase in microbiota 0 dependant proatherogenic metabolite (TMAO) that increases approximately twofold after bariatric surgery causing a rise in cardiovascular diseases risk [18].

In the Laparoscopic adjustable gastric banding (LAGB), port complications are minor leading to system leaks and infectious problems requiring operative correction as band removal, and replacement [19].

Band erosion is relatively rare (incidence 4% or less) but can be a cause of bleeding, pain or infection [15].

Anastomotic leak occurs in up to 5.8% of bariatric surgeries and is considered one of the most life-threatening complications of bariatric surgery. It is reported to be even more common than pulmonary embolism and can lead to peritonitis, severe intra-abdominal sepsis, intensive-care unit admission and high mortality [8].

Anastomotic stricture can follow any gastrointestinal anastomosis and is procedure-dependant. Causes of stricture include technical error, ischemia, sub-clinical leak, tension or delayed fibrosis secondary to ulceration. Patients present with dysphagia, nausea and/or bowel obstruction, typically between 3 weeks and 3 months after surgery. Diagnosis is made on history and confirmed by endoscopy. An anastomosis of less than 10 mm in diameter requires endoscopic balloon dilation.

Internal hernias are a major cause of morbidity and mortality in the postoperative obese patient and appear to be much less frequent after open surgery than following laparoscopic surgery. It can result in intestinal obstruction, ischaemia or both; these usually present with intermittent abdominal pain and, less commonly, vomiting [15].

Nearly half of the patients with intra-abdominal infectious complications (IIC), have a fistula in the small gastric pouch mostly occurring after the 5th POD, in majority diagnosed on observed changes in the appearance of the draining liquid and confirmed by contrast radiography of the esophagus and stomach with very rare significant clinical effects (tachycardia or symptoms of sepsis), and computed

tomography reveals no evidence of an abdominal collection of fluids, which results in conservative treatment (hemodynamic management, broad-spectrum antibiotic, and diet through gastrostomy).

Fistula in the small gastric pouch presenting with early symptoms of sepsis and is subject to surgical treatment involving washing and draining of the abdominal cavity.

Almost 1% of patients present abdominal abscesses with no signs of associated fistulas [2].

Intra-abdominal abscess is another possible complication after laparoscopic sleeve gastrectomy LSG. It usually presents with symptoms of abdominal pain, fever/chills or nausea and vomiting. If there are clinical suspicions, one should obtain a computed tomography scan of the abdomen to rule out the presence of intra-abdominal abscess. Treatment includes percutaneous drainage and antibiotics [20].

Infectious complications account for one quarter of readmission stays of 72h or less of the operated patients [21].

HIV Patients

Among HIV-infected patients undergoing bariatric procedures for the management of morbid obesity; the proportion of undetectable HIV viral load levels did not change after the bariatric procedures, although rarely patients did require temporary cessation of medications due to procedure-related complications [22]. Consequently bariatric surgery may provide an effective treatment modality for obesity and its related comorbidities in the HIV-infected population while not sacrificing virologic suppression [23].

Conclusion

The immediate management of bariatric patients presenting with complications outside the immediate postoperative period requires adherence to basic surgical principles. Accurate diagnosis often relies on high-quality contrast and cross-sectional imaging, and effective surgical intervention necessitates a broad understanding of the altered anatomy, advanced surgical skills and liaison with specialists in the field when necessary [6].

References

1. Garrido D, Bush LM. Liver abscess as a complication of laparoscopic gastric banding bariatric surgery. Surg Infect (Larchmt). 2013; 14: 464-469.
2. Marco AS, Denis P, Daniel R, Roberto C, Flavio K, Ivan C. Early complications in bariatric surgery: incidence, diagnosis and treatment. Arq Gastroenterol. 2013; 50: 50-55.
3. SJW Monkhouse, JDT Morgan, and SA Norton. Complications of Bariatric Surgery: Presentation and Emergency Management – a Review. Ann R Coll Surg Engl. 2009; 91: 280–286.
4. Steele KE, Prokopowicz GP, Chang HY, Richards T, Clark JM, Weiner JP, et al. Risk of complications after bariatric surgery among individuals with and without type 2 diabetes mellitus. Surg Obes Relat Dis. 2012; 8: 305-330.
5. Salgado W Jr, de Queiroz Cunha F, dos Santos JS, Barbosa Nonino-Borges C, Kumar Sankarankutty A, de Castro E Silva O Jr, et al. Early identification of infectious complications in bariatric surgery by the determination of peritoneal and systemic cytokines. Obes Surg. 2009; 19: 867-872.
6. Hamdan K, Somers S, Chand M. Management of late postoperative complications of bariatric surgery. Br J Surg. 2011; 98: 1345-1355.
7. Memark VC, Anderson JB, Nau PN, Shah N, Needleman BJ, Mikami DJ, et al. Transgastric endoscopic peritoneoscopy does not lead to increased risk of infectious complications. Surg Endosc. 2011; 25: 2186-2191.
8. Chopra T, Zhao JJ, Alangaden G, Wood MH, Kaye KS. Preventing surgical site infections after bariatric surgery: value of perioperative antibiotic regimens. Expert Rev Pharmacoecon Outcomes Res. 2010; 10: 317-328.
9. Varela JE, Wilson SE, Nguyen NT. Laparoscopic surgery significantly reduces surgical-site infections compared with open surgery. Surg Endosc. 2010; 24: 270-276.
10. The impact of laparoscopy on infectious complications after bariatric surgery.
11. Massimo Sartelli. A focus on intra-abdominal infections. World J Emerg Surg. 2010; 5: 9.
12. SJW Monkhouse, JDT Morgan, and SA Norton. Complications of Bariatric Surgery: Presentation and Emergency Management – a Review. Ann R Coll Surg Engl. 2009; 91: 280–286.
13. Zouridaki E, Papafragkaki DK, Papafragkakis H, Aroni K, Stavropoulos P. Dermatological complications after bariatric surgery: report of two cases and review of the literature. Dermatology. 2014; 228: 5-9.
14. Marzano AV, Ishak RS, Colombo A, Caroli F, Crosti C. Pyoderma gangrenosum, acne and suppurative hidradenitis syndrome following bowel bypass surgery. Dermatology. 2012; 225: 215-219.
15. SJW Monkhouse, JDT Morgan, and SA Norton. Complications of Bariatric Surgery: Presentation and Emergency Management – a Review. Ann R Coll Surg Engl. 2009; 91: 280–286.
16. Haddad E, Joukhadar C, Chehata N, Nasnas R, Choucair J. Extensive infectious myelitis post bariatric surgery. BMC Infect Dis. 2015; 15: 182.
17. Guerrero-Silva LA, López-García S, Guardado-Bermúdez F, Ardisson-Zamora FJ, Medina-Benítez A, Corona-Suárez F. Gastro-bronchial fistula major complication of sleeve gastrectomy. Cir Cir. 2015; 83: 46-50.
18. Trøseid M, Hov JR, Nestvold TK, Thoresen H, Berge RK, Svardal A, et al. Major Increase in Microbiota-Dependent Proatherogenic Metabolite TMAO One Year After Bariatric Surgery. Metab Syndr Relat Disord. 2016; 14: 197-201.
19. Keidar A, Carmon E, Szold A, Abu-Abeid S. Port complications following laparoscopic adjustable gastric banding for morbid obesity. Obes Surg. 2005; 15: 361-365.
20. Sarkhosh K, Birch DW, Sharma A, Karmali S. Complications associated with laparoscopic sleeve gastrectomy for morbid obesity: a surgeon's guide. Can J Surg. 2013; 56: 347-352.
21. Doumouras AG, Saleh F, Hong D. 30-Day readmission after bariatric surgery in a publicly funded regionalized center of excellence system. Surg Endosc. 2016; 30: 2066-2072.
22. Zivich S, Cauterucci M, Allen S, Vetter M, Vinnard C. Long-term virologic outcomes following bariatric surgery in patients with HIV. Obes Res Clin Pract. 2015; 9: 633-635.
23. Selke H, Norris S, Osterholzer D, Fife KH, DeRose B, Gupta SK. Bariatric surgery outcomes in HIV-infected subjects: a case series. AIDS Patient Care STDS. 2010; 24: 545-550.

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