v. 5, n. 17, 2025

International Journal of Health Science

Acceptance date: 22/04/2025

BARIATRIC EMERGENCIES

Beatriz Piva Breviglieri de Almeida
Nove de Julho University (UNINOVE)
São Paulo - SP
https://orcid.org/0009-0005-2391-3157

Vittoria Lourdes Geron
Nove de Julho University (UNINOVE)
São Paulo - SP
https://orcid.org/0009-0006-4129-1280

Karine Vitória de Abreu Silva
Faculty of Medical Sciences (UNR)
Rosario, Santa fe - Argentina
https://orcid.org/0009-0009-0987-5253

Ana Clara Araújo Pereira
Petrópolis Medical School (FMP - UNIFASE)
Petrópolis - RJ
https://orcid.org/0009-0001-5799-3619

Emanuelle Fernandes
Unifacisa University Center (UNIFACISA)
Campina Grande - PB
https://orcid.org/0009-0000-2476-8055

Débora Blenda Castelo Branco Mendes
Uninassau College
Teresina - PI
https://orcid.org/0009-0001-4550-3045

José Natallos Casseano de Sousa
State University of Ceará (UECE)
Fortaleza-CE
https://orcid.org/0009-0001-4550-3045

Otávio Aníbal de Andrade Simon
Apparecido dos Santos Central Planalto University Center (UNICEPLAC)
Brasília - DF
https://orcid.org/0009-0002-0306-6921

Daniela Kavlac
Santa Marcelina College (FASM)
São Paulo - SP
https://orcid.org/0009-0001-3133-7250

Júlia Glevinski Queiroz de Santana
University of Southern Santa Catarina (UNISUL)
Tubarão - SC
https://orcid.org/0000-0001-8854-1124

Sofia Morais Tornis
Federal University of Jataí (UFJ)
Jataí - GO
https://orcid.org/0009-0003-4855-2074

Neidejany de Assunção do Sacramento
National University of Rosario (UNR)
Rosario - AR
https://orcid.org/0000-0001-7050-6697

Abstract: Objective: To analyze the main emergencies, urgencies and intraoperative complications associated with bariatric surgery, highlighting the risk factors, management strategies and impact on clinical outcomes. Methodology: Bibliographic review carried out in the PubMed-MEDLINE database. The search terms "bariatric surgery", "urgency", "emergency", "staple line leaks", "anastomotic disruption" and "bleeding" were used. included articles published between 2020 and 2025, available in English and in full text, which addressed the proposed themes. After applying the inclusion and exclusion criteria, 21 articles were selected for detailed analysis. Discussion: The most frequent complications were staple line leaks, intraoperative and postoperative bleeding, intestinal obstructions and venous thrombosis. The use of robotic surgery has shown a reduction in the incidence of complications, such as leaks and obstructions, but still presents challenges, such as high costs and the need for specialized training. Advances in minimally invasive techniques, such as therapeutic endoscopy and the use of indocyanine green fluorescence, have shown promise in reducing reinterventions and improving the safety of procedures. Final considerations: Early identification and proper management of bariatric emergencies are fundamental to reducing the morbidity and mortality associated with surgery. Despite technological advances, the need to standardize protocols, expand access to new technologies and conduct robust comparative studies are still essential to optimize the efficacy and safety of these procedures.
Keywords: bariatric, complications, surgical, emergencies, perioperative.

INTRODUCTION

Obesity is a chronic condition that affects approximately 38% of the world's population and is a primary risk factor for several comorbidities, such as type 2 diabetes, hypertension, cardiovascular diseases, hepatic steatosis associated with metabolic dysfunction (MASLD) and gastrointestinal neoplasms (Masood *et al.,* 2024). Considering the significant impact of obesity on morbidity and mortality and quality of life, bariatric surgery has become one of the most effective therapeutic strategies for sustained weight reduction and improvement of associated metabolic diseases (Arterburn *et al.*, 2020). Among the most commonly performed procedures are Roux-en-Y gastric bypass (RYGB) and laparoscopic vertical gastrectomy (LSG), both widely studied and recognized for their benefits in remission of comorbidities (Santos *et al.*, 2024).

Advances in surgical techniques and perioperative care have significantly reduced the rates of intraoperative and postoperative complications. However, bariatric emergencies continue to represent a clinical challenge and are responsible for emergency hospitalizations and reoperations. Complications such as gastrointestinal bleeding, staple line leakage, intestinal obstruction, stenosis, fistulas and internal hernias can occur in both the acute and late phases (Fink *et al.,* 2024). Studies indicate that certain preoperative risk factors-including advanced age, male gender, systemic arterial hypertension and the use of enoxaparin instead of heparin-are associated with an increased incidence of bleeding after RYGB, highlighting the need for careful preoperative assessment (Santos *et al.,* 2024).

With the growth of the obesity epidemic and the consequent increase in the number of bariatric surgeries, the incidence of complications has also become more significant. Recent data indicate that more than 252,000 bariatric surgeries are performed annually in the United States, highlighting the need for greater monitoring and strategies to mitigate surgical complications (Fink *et al.*, 2024). LSG, which surpassed RYGB in frequency of performance as of 2013, is widely recognized for its efficacy, but has potential complications, including staple line leakage, stenosis, gastroesophageal reflux and digestive bleeding, which often require specialized endoscopic interventions (Masood *et al.*, 2024). Therapeutic endoscopy has played a key role in managing these complications, reducing the need for reoperations and improving patients' clinical outcomes.

In addition, technological innovations, such as the use of indocyanine green for intraoperative detection of staple line leaks, have been incorporated to increase the safety of bariatric procedures (Meng *et al.*, 2024). However, the effectiveness of these strategies still requires validation in multicentre studies, and it is essential to develop standardized guidelines to optimize the management of complications. In addition, rare complications, although less documented, can have a significant impact on the outcome of patients undergoing bariatric surgery. Recently, Belluzzi *et al.* (2024) reported uncommon adverse events associated with laparoscopic vertical gastrectomy, highlighting the importance of prolonged postoperative surveillance and an early detection protocol for atypical complications.

Given this scenario, it is essential that the scientific community deepens its knowledge of the main emergencies related to bariatric surgery, identifying risk factors, early diagnosis strategies and the most effective therapeutic options. This study proposes a critical review of bariatric emergencies, analyzing technological advances, the applicability of endoscopy in the management of complications and the impact of these interventions on clinical outcomes. A better understanding of these aspects will help reduce morbidity and mortality, optimize surgical protocols and improve the quality of life of patients undergoing these procedures.

DOI https://doi.org/10.22533/at.ed.1595172511047

METHODOLOGY

A literature review developed according to the criteria of the PVO strategy, which stands for: population or research problem, variables and outcome. This strategy was used to develop the research question "What are the main emergencies, urgencies and complications associated with bariatric surgery, their triggering factors, management strategies and impact on clinical outcomes?". The searches were carried out using the PubMed - MEDLINE (Medical Literature Analysis and Retrieval System Online) databases. The search terms were used in combination with the Boolean terms "**AND" and "OR"**, using the following search strategy: ("bariatric surgery" OR "bariatric") AND (("urgency" OR "emergency") AND "intraoperative period") OR ((staple line leaks) OR (anastomotic disruption) OR (bleeding) OR "intraoperative emergencies")). From this search, 246 articles were found, which were then submitted to the selection criteria. The inclusion criteria were: articles in English; published between **2020** and **2025** and which addressed the themes proposed for this research, review-type studies, meta-analysis, observational studies, experimental studies. The exclusion criteria were: duplicate articles, articles available in abstract form, articles that did not directly address the proposal studied and articles that did not meet the other inclusion criteria. After applying the inclusion and exclusion criteria, **21** articles were selected from the PubMed database to make up the collection of this study.

DISCUSSION

Bariatric surgery has emerged as the most effective treatment for severe obesity and its comorbidities, providing significant benefits such as improved glycemic control, reduced hypertension and improved quality of life for patients undergoing the procedure. However, as the frequency of these surgeries increases globally, so does the incidence of associated complications, requiring effective diagnostic and therapeutic approaches to optimize clinical outcomes and minimize intra- and post-operative risks (Lavoie; Collins, 2021).

Bariatric emergencies can occur at different times during the patient's course, ranging from intraoperative complications to late events that require immediate intervention. The literature highlights that events such as bleeding, staple line leaks, ischemia and pseudoaneurysms are critical complications that require robust diagnostic and therapeutic strategies (De Simone *et al.,* 2022). Intraoperative bleeding, for example, can have a significant impact on morbidity and mortality and is often related to failure to control hemostasis, the quality of surgical staplers and the presence of pre-existing comorbidities such as hypertension and coagulation disorders (Farah *et al.,* 2024).

The rupture of pseudoaneurysms, although rare, represents a high risk of death and can manifest late after surgery. Babic and Ramachandran (2024) reported a case of splenic artery pseudoaneurysm rupture after laparoscopic vertical gastrectomy, highlighting the need for close monitoring and early recognition of symptoms such as progressive abdominal pain and hemodynamic instability. This event reinforces the importance of prolonged surveillance in patients undergoing bariatric procedures.

Staple line leakage is one of the most feared complications, especially in surgeries such as vertical gastrectomy. Verras *et al.* (2023) analyzed 402 patients undergoing the procedure and identified an incidence of leakage of 6.46%, generally associated with factors such as high intra-abdominal pressure, failure to seal the staples and compromised nutritional status. Computed tomography has proved to be the most sensitive test for the early diagnosis of this complication, allowing appropriate management through percutaneous drainage and the use of endoscopic stents.

Staple line leakage is one of the most feared complications of vertical gastrectomy and represents a significant therapeutic challenge. In addition to its considerable incidence, ranging from 0.7% to 5.3% of cases, these leaks can manifest in heterogeneous ways, from asymptomatic conditions to severe presentations with sepsis and hemodynamic instability (Gipe et al., 2025). The management of this complication depends on multiple factors, including the clinical severity of the patient and the experience of the surgical team. Recent studies highlight the importance of minimally invasive techniques, such as the use of endoscopic stents, pigtail catheters and vacuum therapy, which have been shown to be effective in promoting closure of the leak and preventing aggressive reoperations (Gipe et al., 2025). However, in the most severe and refractory cases, rescue surgical approaches, such as jejunostomy for nutritional support or even total gastrectomy, may be necessary to avoid adverse outcomes. The lack of a standardized protocol reinforces the need to individualize treatment and work with a multidisciplinary team to optimize long-term results.

The impact of staple line leakage (SLL) on the long-term evolution of patients undergoing vertical gastrectomy (VG) has also been the subject of recent studies. Abu-Abeid et al. (2024) evaluated a group of patients with SLL and found that, despite the need for reoperations in 27.8% of cases and a serious complication rate (Clavien-Dindo ≥ 3) in 50.8% of patients, long-term outcomes were favorable. The study showed a median total weight loss of 27%, with a significant improvement in the comorbidities associated with obesity, except for gastroesophageal reflux, which remained present in 50% of patients. These findings reinforce the importance of proper management of postoperative fistulas, ensuring not only patient survival, but also good metabolic and weight loss results over the years. In addition, early identification of this complication and the implementation of individualized therapeutic strategies can minimize the need for multiple interventions and reduce the associated morbidity.

Differences between surgical techniques also influence the incidence of complications. Hsu *et al.* (2024) compared vertical gastrectomy (VG) with Roux-en-Y gastric bypass (RYGB) and observed that, although VG has a lower rate of general complications, it is associated with a higher incidence of gastroesophageal reflux disease, gastritis and thrombosis portal vein. RYGB, on the other hand, showed advantages in preventing reflux, although it is associated with a higher risk of intestinal obstruction and nutritional deficiencies.

Robotic bariatric surgery has been explored as an alternative to minimize intraoperative complications, especially in RYGB. Spurzem *et al.* (2024) observed that this approach reduces overall morbidity and bleeding rates, although it still presents longer surgical times and high costs. Nasser *et al.* (2024) corroborated these findings, pointing out that despite the technical and ergonomic benefits of robotic surgery, the choice of technique must be individualized based on the patient's profile and the resources available.

Acute hiatal hernia, although rare, can occur after vertical gastrectomy, representing a complication that is rarely reported but has a major clinical impact. Ortiz *et al.* (2024) described a case of symptomatic hiatal hernia after VG, emphasizing that symptoms such as dysphagia, persistent vomiting and epigastric pain may indicate this condition, requiring immediate surgical correction to avoid serious outcomes.

In addition to intraoperative and structural complications, the body's inflammatory response can influence postoperative outcomes. AziziKia *et al.* (2024) analyzed serum bio-

markers such as albumin and the neutrophil--lymphocyte ratio (NLR) and identified that reduced preoperative albumin levels are associated with a higher incidence of complications, including infections, obstructions and thromboembolism. Increased NLR in the immediate postoperative period was correlated with an exacerbated inflammatory response, which may indicate early complications and the need for early intervention.

Technological advances have been an important ally in the management of bariatric complications. Braghetto *et al.* (2024) compared mechanical and motorized staplers, showing that the second option reduces the risk of intraoperative complications, such as leaks and bleeding. Similarly, the use of perfusion assessment devices, such as indocyanine green (ICG) fluorescence, has shown promise for preventing ischemic complications and improving the safety of procedures (Ardila--Gatas; English, 2022).

Complications can also be addressed by minimally invasive endoscopic techniques. Fichtl *et al.* (2024) reported the use of guided endoscopic ultrasound to access duodenal bleeding in patients with altered anatomy by RYGB, demonstrating that this approach can be effective in containing bleeding without the need for invasive surgical reinterventions.

Given the growing number of bariatric surgeries performed globally, early identification and proper management of complications are essential to optimize clinical outcomes and reduce the morbidity and mortality associated with these procedures. The evolution of surgical techniques, the introduction of new technologies and the adoption of individualized management strategies are essential to improve the safety and efficacy of interventions, guaranteeing better results for patients undergoing these surgeries.

FINAL CONSIDERATIONS

The findings of this review indicate that robotic surgery, by reducing complications such as leaks, intestinal obstruction and internal hernias, represents a significant advance in the management of patients undergoing bariatric procedures. However, the individuality of each patient must be considered, since specific risk factors can influence both the feasibility of the procedure and clinical outcomes. Although this technology has advantages, such as greater surgical precision and lower operative morbidity, its limitations, including high costs and the need for specialized training, still pose challenges to its widespread implementation. In addition, further research is needed to assess its long-term benefits and compare them comprehensively with conventional methods. This highlights the importance of developing standardized protocols that integrate a careful preoperative assessment, the appropriate selection of the surgical technique and systematic follow-up of patients, in order to optimize the safety and effectiveness of interventions. The adoption of robotic surgery shows significant potential for improving clinical results, but its consolidation as a standard of care still depends on expanding access, reducing costs and obtaining more robust evidence of its impact in different populations and clinical contexts. Therefore, future research should prioritize these aspects, allowing for a more comprehensive and sustainable application of this approach in the treatment of severe obesity.

DOI https://doi.org/10.22533/at.ed.1595172511047

REFERENCES

1. Abu-Abeid A, Litmanovich A, Abu-Abeid S, Eldar SM, Lahat G, Yuval JB. **Long-Term Outcomes of Patients with Staple Line Leaks Following Sleeve Gastrectomy.** Obes Surg. 2024 Jul;34(7):2523-2529.

2. Ardila-Gatas J, English W. **Endoscopic management of early complications following bariatric surgery.** Mini-invasive Surg. 2022;6:21.

3. Arterburn DE, Telem DA, Kushner RF, Courcoulas AP. **Benefits and Risks of Bariatric Surgery in Adults: A Review.** JAMA. 2020 Sep 1;324(9):879-887

4. AziziKia H, Shojaei S, Mousavi A, Salabat D, Shaker F, Dolama RH, Radkhah H, Alilou S. **Periprocedural Changes of Serum Biomarkers in Predicting Complications Following Bariatric Surgery for Obesity: Systematic Review and Meta-analysis.** Obes Surg. 2024 Jun;34(6):2198-2215.

5. Babic SM, Ramachandran RN. **Splenic artery pseudoaneurysm rupture post-laparoscopic sleeve gastrectomy.** J Surg Case Rep. 2024 Nov 25;2024(11):rjae752.

6. Belluzzi A, Sample JW, Marrero K, Tomey D, Puvvadi S, Sharma I, Ghanem OM. **Rare Complications Following Laparoscopic Sleeve Gastrectomy.** J Clin Med. 2024 Jul 30;13(15):4456.

7. Braghetto I, Czwiklitzer G, Korn O, Brante P, Burgos A. **RESULTS OF MECHANIC VERSUS MOTORIZED STAPLER USED IN GASTRIC SURGERY: PROSPECTIVE STUDY.** Arq Bras Cir Dig. 2024 Aug 30;37:e1818.

8. De Simone B, Chouillard E, Ramos AC, Donatelli G, Pintar T, Gupta R, Renzi F, Mahawar K, Madhok B, Maccatrozzo S, Abu-Zidan FM, E Moore E, Weber DG, Coccolini F, Di Saverio S, Kirkpatrick A, Shelat VG, Amico F, Pikoulis E, Ceresoli M, Galante JM, Wani I, De' Angelis N, Hecker A, Sganga G, Tan E, Balogh ZJ, Bala M, Coimbra R, Damaskos D, Ansaloni L, Sartelli M, Pararas N, Kluger Y, Chahine E, Agnoletti V, Fraga G, Biffl WL, Catena F. **Operative management of acute abdomen after bariatric surgery in the emergency setting: the OBA guidelines.** World J Emerg Surg. 2022 Sep 27;17(1):51.

9. Farah A, Tatakis A, Malshy K, Mahajna A, Sayida S. **Real-Time Perfusion and Leak Assessment in Bariatric Surgery: Bridging Traditional and Advanced Techniques.** Cureus. 2024 Oct 20;16(10):e71919.

10. Fichtl A, Elad L, Kornmann M, Seufferlein T, Müller M, Wagner M, Walter BM. **Endoscopic ultrasound-guided access using a lumen-apposing metal stent for the management of duodenal bleeding in a Roux-en-Y anatomy after gastric bypass.** Endoscopy. 2024 Dec;56(S 01):E110.

11. Fink M, Stock S, Fink JM, Seifert G, Broghammer V, Herrmann S, Fichtner-Feigl S, Marjanovic G, Laessle C. **Effect of Intraoperative Blood Pressure Regulation on Postoperative Hemorrhage After Bariatric Surgery.** Obes Surg. 2024 Jul;34(7):2446-2453.

12. Gipe J, Agathis AZ, Nguyen SQ. **Managing Leaks and Fistulas After Laparoscopic Sleeve Gastrectomy: Challenges and Solutions.** Clin Exp Gastroenterol. 2025 Jan 7;18:1-9.

13. Hsu JL, Ismail S, Hodges MM, Agala CB, Farrell TM. **Bariatric surgery: trends in utilization, complications, conversions and revisions.** Surg Endosc. 2024 Aug;38(8):4613-4623.

14. Lavoie M, Collins J **Management of the Bariatric Surgery Patient in the Emergency Department.** Wiley online Library 06 April 2021

15. Masood M, Low DE, Deal SB, Kozarek RA. **Endoscopic Management of Post-Sleeve Gastrectomy Complications.** J Clin Med. 2024 Mar 29;13(7):2011.

16. Meng M, Saini J, Fan D, Singh A, Farkas DT. **Use of Indocyanine Green to Detect Intraoperative Staple-Line Leaks in Robotic Bariatric Surgery: An Observational Cohort Study.** Cureus. 2024 Mar 26;16(3):e56991.

17. Nasser K, Jatana S, Switzer NJ, Karmali S, Birch DW, Mocanu V. **Predictors and Outcomes Associated with Bariatric Robotic Delivery: An MBSAQIP Analysis of 318,151 Patients.** J Clin Med. 2024 Jul 18;13(14):4196.

18. Ortiz AA, Cárdenas-Salas VD, Martinez Gamboa A, Moreno DE, Muñoz Leija MA. **Acute Hiatal Hernia After Sleeve Gastrectomy: A Case Report.** Cureus. 2024 Sep 12;16(9):e69260.

19. Santos-Sousa H, Amorim-Cruz F, Nogueiro J, Silva A, Amorim-Cruz I, Ferreira-Santos R, Bouça-Machado R, Pereira A, Resende F, Costa-Pinho A, Preto J, Lima-da-Costa E, Barbosa E, Carneiro S, Sousa-Pinto B. **Preoperative risk factors for early postoperative bleeding after Roux-en-Y gastric bypass surgery: a systematic review and meta-analysis.** Langenbecks Arch Surg. 2024 May 22;409(1):163.

20. Spurzem GJ, Broderick RC, Kunkel EK, Hollandsworth HM, Sandler BJ, Jacobsen GR, Horgan S. **Robotic sleeve gastrectomy has higher complication rates compared to laparoscopic: 8-year analysis of robotic versus laparoscopic primary bariatric surgery.** Surg Obes Relat Dis. 2024 Dec 5:S1550-7289(24)00947-X.

21. Verras GI, Mulita F, Lampropoulos C, Kehagias D, Curwen O, Antzoulas A, Panagiotopoulos I, Leivaditis V, Kehagias I. **Risk Factors and Management Approaches for Staple Line Leaks Following Sleeve Gastrectomy: A Single-Center Retrospective Study of 402 Patients.** J Pers Med. 2023 Sep 21;13(9):1422.