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Early post-operative complications after metabolic and bariatric surgery in Misurata, Libya: Retrospective cross-sectional study

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ABSTRACT

Background: Bariatric procedures are generally safe and effective, but can be associated with complications. Early complications may include bleeding, leakage, venous thromboembolic events (VTE), wound infection, abdominal wall hematoma, and dehydration requiring admission.

Aim: This study aimed to assess the incidence, clinical presentation, risk factors, and management of early postoperative complications within 30 days.

Methods: In this cross-sectional retrospective study, data were collected for all patients who underwent one of the following bariatric surgical operations: sleeve gastrectomy, one-anastomosis gastric bypass, Roux-en-Y gastric bypass, or single anastomosis sleeve ileal (SASI) from some Misurata hospitals between January and December 2024.

Results: The total number of patients was 992; of them, 648 (65.3%) were females and 344 (34.7%) were males. The patient's body mass index (BMI) was 46.2 kg/m². The most common procedure done was sleeve gastrectomy, 606 (61%), followed by bypass surgery, 341 (34.3%), and 45 (4.6%) were revisional procedures. The most common early complication was abdominal wall hematoma, which occurred in 31 (3.1%) patients, followed by dehydration in 24 (2.4%) and postoperative bleeding, which occurred in 19 (1.9%) patients; of them, 14 (1.4%) patients experienced extra-luminal bleeding and 5 (0.5%) patients intraluminal bleeding, wound infection in 11 (1.3%) patients, VTE, as well as leakage, occurred in 6 (0.6%) patients, and prolonged ileus in 2 (0.25%) patients. Two cases died, with a mortality rate of 0.25%. Noticeably, the leakage was strongly related to higher BMI ($p < 0.01$), while bleeding was significantly associated with hypertensive patients ($p < 0.05$).

Conclusion: The incidence of early complications after bariatric surgery remains within the acceptable range in comparison with the other published studies. Most of the early complications could be managed conservatively, while surgical treatment might be required for some patients, especially with hemodynamic instability.

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Introduction

Bariatric surgery has become a widely accepted and effective intervention for the treatment of severe obesity and its associated comorbidities, including type 2 diabetes, hypertension, and obstructive sleep apnea [1]. The increasing global prevalence of obesity has led to a rising number of bariatric procedures, making it crucial to understand and manage potential postoperative complications. While bariatric surgery offers significant long-term benefits in weight reduction and metabolic improvements, it is not without risks, particularly in the early postoperative period [2]. These complications can range from minor issues to life-threatening events, significantly affecting patient outcomes and recovery [2].

Coblijn et al. [3] developed the bariatric surgery index for complications, a risk model predicting

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postoperative complications in bariatric surgery patients, using six preoperative variables to classify patients into low-, intermediate-, or high-risk groups. Predictors in multivariable analysis were the use of anticoagulants, chronic obstructive pulmonary disease, dyslipidemia, gender, psychiatric history, and revisional surgery [3].

Early postoperative complications, occurring within 30 days of surgery, can significantly impact patient outcomes, prolong hospital stays, and increase healthcare costs [4]. These complications range from minor issues, such as nausea and vomiting, to severe conditions, including anastomotic leaks, pulmonary embolism, and surgical site infections [5]. The incidence and severity of these complications vary depending on the type of bariatric procedure performed, patient-related factors, and the experience of the surgical team.

Among the commonly performed bariatric procedures, Roux-en-Y gastric bypass (RYGB) and sleeve gastrectomy (SG) have shown differing complication profiles. RYGB is associated with a higher risk of anastomotic leaks and internal hernias, while SG carries risks such as staple line leaks and gastroesophageal reflux disease [6]. Identifying risk factors, implementing preventive measures, and ensuring prompt management of complications are essential for improving patient safety and surgical outcomes.

While RYGB demonstrated a higher rate of bleeding complications compared to SG, it did not significantly impact overall postoperative morbidity. This finding suggests that RYGB may be a relatively safe bariatric procedure, although the influence of preoperative Body mass index (BMI) and comorbidities on postoperative outcomes remains an area of ongoing investigation. Furthermore, our results challenge the notion of SG as a universally "less invasive" procedure, as it failed to exhibit a lower complication rate compared to RYGB [7].

Given the growing demand for bariatric surgery and its associated risks, this study aims to evaluate the incidence, risk factors, and management strategies for different early post-operative complications following bariatric surgery. Understanding these complications can guide clinical decision-making, improve surgical protocols, and enhance patient care. This study aims to assess the incidence and risk factors for early postoperative complications within 30 days following bariatric surgery to analyze current management strategies and propose evidence-based interventions for mitigating complications. By identifying the most common complications and their predictors, the study seeks to enhance clinical decision-making and improve patient outcomes.

Materials and Methods

Study design and setting

This study is a cohort retrospective analysis conducted at Misurata Medical Center, Al-Safwa, Al-Banun, and Al-Sweihli hospitals in Misurata City, Libya.

Study population

The study includes all patients who underwent one of the following bariatric surgical procedures at the Misurata Medical Center, Al-Safwa, Al-Banun, or Al-Sweihli between January and December 2024:

- Sleeve gastrectomy (SG)
- One-anastomosis gastric bypass (OAGB)
- Roux-en-Y gastric bypass (RYGB)
- Single anastomosis sleeve ileal (SASI)

Patients with prior abdominal surgeries or specific comorbidities were excluded from the study.

Data collection

Patient data were retrospectively retrieved from hospital records, including electronic and paper-based medical files. The collected variables include demographic information, preoperative comorbidities, surgical details, and postoperative complications occurring within the first 30 days after surgery.

Outcome measures

The primary outcomes assessed in this study include

- Incidence of early postoperative complications such as anastomotic leaks, bleeding, venous thromboembolism, surgical site infections, dehydration, and other relevant adverse events.
- Risk factors associated with these complications, including patient demographics, comorbidities, and procedural variations.

Data analysis

Data were analyzed using appropriate statistical methods to determine the prevalence of complications and their associated risk factors. Categorical variables were presented as frequencies and percentages, while continuous variables were

summarized using means. Statistical comparisons were conducted using chi-square tests for categorical data. A p-value of < 0.05 was considered statistically significant.

Ethical approval

The study was conducted according to ethical guidelines, ensuring patient confidentiality and data protection. Institutional approval was obtained from Misurata Medical Center, and all patient data were anonymized to maintain privacy. Ethical approval was provided by the committee meeting no. CEC, MMC,2024,0122 on 20 December 2024.

Results

A total of 992 patients underwent bariatric surgery at Misurata Medical Center, Al-Safwa, Al-Banun, and Al-Sweihli during the study period. The cohort comprised 660 females (66.6%) and 332 males (33.4%) (Fig. 1). BMI for the patients ranged from 35 to 65 kg/m^2, with a mean of 46.2 kg/m^2.

Regarding the type of surgery performed, sleeve gastrectomy was the most common procedure, accounting for 606 cases (61.0%). Bypass surgeries, including one-anastomosis gastric bypass and Roux-en-Y gastric bypass, were performed in 341 patients (34.4%). Revisional procedures represented a minority, with 45 cases (4.6%). Figure 2.

A range of early postoperative complications was observed among the study population. Request admission for dehydration in 22 patients (2.2%). Post-operative bleeding occurred in 20 patients (2%), with further classification into extra-luminal bleeding in 12 patients (1.4%) and intraluminal bleeding in 6 patients (0.6%). Two patients (0.2%) needed surgical intervention for controlled bleeding, and 18 patients (1.8%) were under observation.

Wound infections were reported in 11 patients (1.3%), while venous thromboembolic events and anastomotic leakage were each observed in 5 patients (0.6%). Prolonged ileus was the least frequent complication, affecting 2 patients (0.25%). Two cases died, with a mortality rate of 0.25% (Figure 3).

Notably, the leakage was significantly associated with higher BMI (p < 0.01), while bleeding events were more frequently observed in hypertensive patients (p < 0.05).

Discussion

The findings of this study aligned with a previous study conducted by Buchwald and Oien [8] stated that the most common bariatric surgeries are LSG and RYGB in the world. According to the IFSO (International Federation for Surgery for Obesity and Metabolic Disorders) registry update in 2023, primary metabolic bariatric procedures represent the initial surgical intervention for obesity. The registry documented 449,583 such procedures. Sleeve gastrectomy is the predominant primary procedure performed across most participating countries. However, "other" procedures are increasingly common in some regions. It is difficult to change data that is recorded in national registries, but moving forward, it will be important to differentiate emerging procedures [9].

Our study demonstrated a relatively low overall complication rate in patients who underwent bariatric surgery at the Misurata Medical Center, which is similar to other reviews that concluded fewer complications in LSG and Roux-en-Y bypass procedures [10,11]. The most prevalent complications were abdominal wall hematoma, dehydration, and post-operative bleeding. Additionally, we identified significant associations between leakage and higher BMI, as well as bleeding and hypertension. These complications were similar to those reported by previous studies [12,13,14]. These studies underscore the importance of identifying risk factors associated with complications in bariatric surgery. A comprehensive understanding of these factors can lead to improved patient outcomes and more refined surgical techniques.

In a multicenter, retrospective cohort study, Iranmanesh et al. [15] identified male sex and ASA >2 as independent predictors of overall early postoperative complications after primary robotically assisted Roux-en-Y gastric bypass [15]. Santo et al. [5] reported an early complication rate of 9.6%, with bleeding occurring in 2.6% of patients, peritoneal infections in 3.2%, and abdominal wall infections in 2.2% [5]. Goel et al. [4] found an overall complication rate of 3.13%, with post-operative bleeding (0.75%) and nutritional deficiencies (0.75%) being the most common. Liang et al. [16] identified a severe complication rate of 0.52%, with leakage (0.28%) and bleeding (0.14%) as predominant events. Lim et al. [17] reported that postoperative bleeding that requires intervention occurs in up to 11% of cases in both the RYGB and SG and sleeve leaks range in incidence from 1% to 7%

[17]. Compared to these studies, our findings align closely with Goel et al. [4] in terms of overall complication rates, and the rates of complications in our study are less than those reported by Lim et al. [17]. However, our observed rates of bleeding (1.9%) and leakage (0.6%) were slightly higher than those reported by Liang et al. [16]. The significant associations between leakage and BMI, as well as bleeding and hypertension, reinforce the findings of previous research, emphasizing the need for vigilant perioperative monitoring and individualized risk assessment to mitigate early complications in bariatric patients.

Conclusion

The rate of early complications following bariatric surgery observed in this study is comparable to that reported in previous research. Most complications could be managed conservatively, while some patients, particularly those with hemodynamic instability, may require surgical intervention.

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Conflict of interest

The authors declare that there is no conflict of interest.

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Authors' contribution

The research was created by F.M.E. The blueprints were created by F.M.E. and M.A., who also oversaw the study. They wrote the manuscript and helped with data collection as well. The statistical analysis was done by F.M.E and A.B.M. The manuscript was reviewed by A.B.M. The data and the text were both critically evaluated by all authors.

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