Sepsis Management in Post-bariatric Surgery Patients Using Extracorporeal Blood Purification Treatment, A Case Series

Minoo Heidari Almasi,[1] Maryam Barzin,[2] Antoine Schneider,[3] Kiana Entezarmahdi,[4] Nima Nassiri,[5] Amir Ahmad Nassiri[6]

[1]Department of Internal Medicine, Imam Hossein Hospital Clinical Research Development Unit, Shahid Beheshti University of Medical Sciences, Tehran, Iran
[2]Obesity Research Center, Research Institute for Endocrine Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran
[3]Adult Intensive Care Unit, Centre Hospitalier Universitaire Vaudois (CHUV), Lausanne, Switzerland
[4]Department of ICU, Jam General Hospital, Tehran, Iran
[5]Nikou International High School, Tehran,Iran
[6]Division of Nephrology, Department of Internal Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Keywords. sepsis, bariatric surgery, extracorporeal blood purification, continuous renal replacement therapy (CRRT)

Introduction. Bariatric surgery (BS) is among the most effective treatments for severe obesity. However, it is essential to acknowledge the risk of serious short-term complications following the procedure.

Case Presentation. We report four cases of Iranian patients admitted due to severe short-term complications following sleeve gastrectomy (SG), which included peritonitis, acute respiratory distress syndrome (ARDS), acute kidney injury (AKI), and sepsis. Based on their diagnoses and individual needs, two patients underwent exploratory laparotomy. All four cases were successfully treated with intravenous antibiotics, intensive supportive care, and continuous renal replacement therapy (CRRT) along with extracorporeal hemoperfusion.

Conclusions. SG is one of the most commonly performed metabolic procedures worldwide. However, it can lead to severe, life-threatening complications, such as sepsis resulting from peritonitis and pneumonia. These cases underscore the importance of early recognition and effective treatment strategies for this patient population. A strict postoperative follow-up is essential for the early detection and management of complications, ultimately reducing morbidity and mortality rates.

RJCCN 2025; 1: 57-61
www.rjccn.org
DOI: 10.61882/rjccn.1.1.13

INTRODUCTION

The global rise in obesity underscores the need for effective management strategies. Bariatric surgery (BS) is one of the most effective treatments for individuals with severe and morbid obesity. However, the inevitable risk of postoperative complications necessitates vigilant diagnosis and careful management. As the frequency of bariatric surgeries increases, so do concerns about postoperative complications and surgical effectiveness.[1,2]

The American Society of Metabolic and Bariatric Surgery (ASMBS) categorizes complications occurring within 30 days of surgery as short-term. Major complications include those requiring reoperation, prolonged hospitalization exceeding seven days, or anticoagulant therapy.[3]

Postoperative sepsis is one of the most life-threatening complications of BS.[4,5] Sepsis often leads to AKI and necessitates CRRT for critically ill patients in the intensive care unit (ICU). In septic shock, an uncontrolled host response to

Please cite this article as: Heidari Almasi M, Barzin M, Schneider A, Entezarmahdi K, Nassiri A. Sepsis Management in Post-bariatric Surgery Patients Using Extracorporeal Blood Purification Treatment, A Case Series. RJCCN 2025; 1(1): 57-61

infectious pathogens triggers a cytokine storm, resulting in cellular toxicity, organ failure, and increased mortality. CRRT can assist by removing inflammatory mediators using specialized adsorption membranes and sorbent cartridges.[6]

This study reports four cases of severe short-term complications following SG, including peritonitis, sepsis, ARDS, and AKI, all managed with CRRT.

CASE PRESENTATION

This retrospective case series includes four patients who presented with severe short-term complications following laparoscopic sleeve gastrectomy (SG) and were admitted to the ICU within 30 days post-surgery.

The surgical procedure was performed under general anesthesia with access through five trocars. Subsequently, cruroplasty was completed using 2/0 nonabsorbable sutures. A vertical gastrectomy was then created with an 8-stapler device, and the stapler line was imbricated with Prolene 2/0 sutures. Omentopexy and gastroplasty were carried out, followed by a leak test. Meticulous hemostasis was achieved, a drain was secured, and the remnant of the stomach was extracted.

Initial treatment for postoperative complications included hemodynamic management, broad-spectrum antibiotics (e.g., carbapenems and vancomycin), and ventilatory support according to standard protocols. Table 1 summarizes patient characteristics, symptoms, and laboratory results.

CytoSorb therapy was initiated at the onset of AKI, ARDS, or hyperinflammatory states, alongside hemodynamic instability requiring escalating vasopressor dosages over 12 to 24 hours. CytoSorb was used in addition to CRRT or independently when CRRT devices were unavailable. CRRT was performed using the Diapact system (B. Braun,

Table 1. Clinical Characteristic of Admitted Patients

	Case 1	Case 2	Case 3	Case 4
Age, y	61	36	39	27
Sex	Male	Female	Male	Male
Preoperative BMI, kg/m^2	47.5	45	41	45
Type of surgery	Sleeve Gastrectomy	Sleeve Gastrectomy	Sleeve Gastrectomy	Sleeve Gastrectomy
Number of hospital days (ICU)	4	6	10	12
Complications	Peritonitis, AKI, sepsis	AKI, sepsis	Peritonitis, Sepsis	ARDS, sepsis
CRRT mode	CVVH, CytoSorb	CVVH, CytoSorb	CVVH, CytoSorb	CVVH, CytoSorb
CRRT time, hours	60	48	12	42
Before CRRT, during, after				
WBC, ×10^3	16.09, 21.83, 33.59	39.94, 28.66, 23.03	18.23, 23.02, 21.04	17.03, 16, 8.3
Platelet, ×10^3	307, 243, 216	94, 73, 71	328, 464, 283	162, 158, 98
Urea	152, -, 101	86, -, 67	64, -, 47	37, -, 38
Creatine, mg/dL	4.9, -,2.5	4.4, -, 2.1	1, -,1	1.2, -, 1.04
PCT	112, 93, 30	13, 12, 4	6, 4, 1	3, 2, 0.7
PTT	34, 54, 50	59, 180, 38	31, 115, 87	33, 38, 36
INR	1.3, 1.4, 1.01	1.4, 1.3, 1.2	1.3, 1.2, 1.2	1.1, 1.2, 1.12
Bilirubin, mg/dL	3.2, -, 2.9	1.7, -, 0.9	0.4, -, 0.3	1.3, -, 0.4
Lactate	27, 23, 16	1.2, 0.8, 0.7	6.8, 6.2, 4.3	15, 44, 14.3
ESR	71, 51, 39	83, 67, 44	125, 99, 73	81, 35, 29
CRP	56.2, 43, 45	38, 29, 31	41, 37, 41	46, 46, 23
Albumin, g/dL	3.1, -,2.7	2.4, -, 2.2	2.9, -, 3.1	3.7, -, 4.1
GCS	11, -, 15	14, -, 15	14, -, 15	13, -, 15
Blood pressure, mmHg	100/78 with norepinephrine ≤ 0.1 µg/kg/ min, 100/70, 120/80	75/pulse, 100/70, 1112/75	117/75, 112/75/ 128/68	110/76, 115/75, 131/81
PaO_2/FiO_2 , mmHg	< 200 and mechanically ventilated including CPAP, - , ≥ 400	< 400 , - , ≥ 400	< 400 , - , ≥ 400	< 200 and mechanically ventilated including CPAP, -, ≥ 400

Melsungen, Germany) in continuous venovenous hemodialysis/hemofiltration (CVVHD/CVVH) mode with heparin-based anticoagulation. The CRRT circuit included a CytoSorb adsorber before the dialyzer, with blood flow rates between 200 to 250 mL/min and 25 to 30 mL/kg/ hr dialysis doses. Adsorbers were replaced after 12 hours for the initial session and every 24 hr thereafter.

Treatment was discontinued upon clear signs of clinical improvement, including PaO2/FiO2 ratios > 250 mmHg, reduced vasopressor needs, and decreased inflammatory markers (e.g., WBC, ESR, CRP, lactate, procalcitonin). Lung function (PaO2/FiO2) and Sequential Organ Failure Assessment (SOFA) scores were monitored before and after CytoSorb therapy.[7]

Case 1

A 61-year-old man with a history of diabetes and chronic obstructive pulmonary disease (COPD) (preoperative BMI: 47.5 kg/m²) presented with decreased consciousness, abdominal pain, fever, and peritonitis five days after undergoing laparoscopic sleeve gastrectomy (SG) for weight loss. Paraclinical tests revealed leukocytosis (WBC count: 16,000/µL), elevated inflammatory markers (C-reactive protein: 150 mg/L), and acute kidney injury (AKI) with a serum creatinine level of 2.3 mg/dL. Diagnostic laparotomy confirmed a surgical site infection (SSI) with purulent peritoneal fluid and widespread peritonitis. The patient was treated with broad-spectrum antibiotics, including meropenem and vancomycin, and hemodynamic support using vasopressors. Despite experiencing hypotension, tachycardia, and hyperpyrexia indicative of septic shock, continuous renal replacement therapy (CRRT) combined with CytoSorb therapy over 60 hr led to gradual clinical improvement. He was discharged in stable condition after completing 10 days of intravenous antibiotics.

Case 2

A 36-year-old woman (preoperative BMI: 45 kg/m²) presented with fever (39.2 °C), severe abdominal pain, hematuria, and a history of multiple episodes of nephrolithiasis 20 days post-SG. Her past medical history included hypothyroidism managed with levothyroxine and recurrent nephrolithiasis. Physical examination revealed low blood pressure (75 mmHg systolic) and tachycardia (heart rate: 120 bpm). An abdominopelvic CT scan demonstrated multiple stones in the distal and proximal portions of the left ureter, along with evidence of left hydronephrosis. Urgent lithotripsy was performed to clear the obstructing stones. Laboratory tests showed AKI with serum creatinine elevated to 3.1 mg/dL and markers consistent with urosepsis, including elevated procalcitonin levels. Broad-spectrum antibiotics, including piperacillin-tazobactam, were administered for 20 days, and CRRT was performed for 48 hours due to worsening kidney function. The patient made a full recovery and was discharged in stable condition.

Case 3

A 39-year-old man with a history of multi-drug addiction, type 2 diabetes, obstructive sleep apnea, and hypertension presented with fever (38.8 °C) and severe abdominal pain eight days after undergoing SG. He reported progressive abdominal distension and weakness. Diagnostic laparotomy revealed an infected abdominopelvic hematoma containing approximately 500 cc of old clot and purulent material, which was drained. Blood cultures were positive for methicillin-resistant Staphylococcus aureus (MRSA). Elevated inflammatory markers, including a C-reactive protein level of 180 mg/L, prompted the initiation of CRRT for 12 hr alongside intravenous antibiotics (linezolid and meropenem). The patient showed significant clinical improvement over the next week and completed a 20-day treatment course. He was discharged in stable condition.

Case 4

A 27-year-old man (preoperative BMI: 45 kg/m²) was admitted to the ICU a few hours post-SG with respiratory distress, hypoxemia, and reduced oxygen saturation (SpO2: 75% on room air). A chest CT revealed bilateral coalescent opacities consistent with acute respiratory distress syndrome (ARDS). The patient required immediate endotracheal intubation and mechanical ventilation with protective lung strategies. Laboratory findings indicated leukocytosis, elevated procalcitonin, and evidence of systemic inflammatory response

syndrome (SIRS). CRRT was initiated for 42 hours due to fluid overload and worsening renal function. Despite the critical presentation, he gradually improved with supportive care, including diuretics, intravenous antibiotics (meropenem and vancomycin), and lung-protective ventilation. He was extubated on day 10 and discharged from the hospital after completing 12 days of intravenous antibiotics and supportive care.

DISCUSSION

Bariatric surgery is one of the most effective treatments for severe obesity and its comorbidities. However, SG, like any major surgical procedure, can lead to complications. While many individuals achieve significant weight loss and remission of comorbidities, rare cases of serious complications requiring early diagnosis and extensive care have been documented. Our case series underscores the necessity of early identification and appropriate treatment for patients experiencing significant postoperative complications.

Peritonitis, sepsis, ARDS, and AKI are severe complications that can be life-threatening. These cases demonstrate that, despite SG being a minimally invasive metabolic surgery, serious postoperative complications can arise and necessitate rapid intervention. In line with our study, Valera-Montiel reported a 54-year-old male who was admitted due to abdominal pain, hemodynamic instability, and altered consciousness, ultimately undergoing exploratory laparoscopy for SSI and septic shock seven days after SG.

Treatment with CRRT and CytoSorb proved beneficial for our patients. CRRT improved renal function and helped remove inflammatory cytokines that exacerbate sepsis and multi-organ failure. The efficacy of this treatment strategy highlights the importance of extracorporeal therapy in managing hyperinflammatory states caused by severe infections.

It is important to note that our patients had various risk factors, including diabetes, multi-drug addiction, hypertension, and respiratory disorders, which may have contributed to their postoperative complications. Consistent with our findings, Blair *et al.* reported that a history of hypertension, diabetes, and smoking can increase the risk of postoperative sepsis. These cases illustrate the need for multidisciplinary coordination among surgeons, intensivists, and nephrologists in addressing such urgent situations.

These instances emphasize the importance of ongoing research and clinical experience exchange to understand better and manage the potential consequences of bariatric surgical procedures. While SG is a safe and effective treatment for obesity, heightened awareness of uncommon yet severe complications is crucial for ensuring optimal outcomes for individuals embarking on their weight loss journey.

CONCLUSIONS

Early recognition and effective management of short-term complications following SG, such as peritonitis, sepsis, ARDS, and AKI, are crucial for reducing morbidity and mortality. Postoperative follow-up and timely intervention are essential for improving outcomes in this patient population.

ABBREVIATIONS

BS: Bariatric surgery

SG: sleeve gastrectomy

ARDS: acute respiratory distress syndrome

AKI: acute kidney injury

CRRT: continuous renal replacement therapy

ASMBS: American Society of Metabolic and Bariatric Surgery

ICU: intensive care unit

CVVHD/CVVH: continuous venovenous hemodialysis/hemofiltration

SOFA: Sequential Organ Failure Assessment

COPD: chronic obstructive pulmonary disease

SSI: surgical site infection

MRSA: methicillin-resistant Staphylococcus aureus

ARDS: acute respiratory distress syndrome

SIRS: systemic inflammatory response syndrome

DECLARATIONS

Ethical Approval and Consent to Participate

All the procedures performed in the study were approved by the Research Ethics Committee of the Shahid Beheshti University of Medical Sciences and were in accordance with the ethical standards of the institutional Human Research Review Committee

and the 1964 Helsinki Declaration and its later amendments.

Patient Consent

The authors of this article hereby declare that informed consent was obtained from the patients described in this manuscript. The patient was fully informed about the nature of the study and its purpose. They were allowed to ask questions and were assured of their right to withdraw consent at any time without any impact on their future care. The patients have consented to the use of their data and any relevant medical information for this publication. Additionally, they understand that their identity will remain confidential and that any identifying details will be omitted or anonymized to protect their privacy. This declaration confirms our commitment to ethical standards in research and publication practices.

CONFLICT OF INTEREST

Kiana Entezarmahdi is a member of the editorial team of RJCCN. The author had no involvement in the peer-review or editorial decision-making process for this manuscript.

Availability of Data and Materials

The data supporting the findings of this study are available from the corresponding authors upon reasonable request. Due to privacy and ethical considerations, patient-related data have been anonymized, and individual records are not publicly accessible.

Competing Interest

The authors declare that they have no financial or non-financial competing interests.

Funding

No funding was received for this manuscript.

Author Contributions

Minoo Heidari Almasi and Amirahmad Nassiri conceptualized and designed the study, as well as oversaw data collection and manuscript preparation. Kiana Entezarmahdi and Antoine Schneider contributed to data collection and the evaluation of clinical cases. Maryam Barzin assisted with manuscript preparation. All authors participated in drafting, critically revising, and approving the final version of the manuscript.

Consent for Publication

Not applicable.

REFERENCES

1. Abiri B, Heidari Almasi M, Hosseinpanah F, et al. Legacy of the Tehran Obesity Treatment Study: Findings from 10 Years Bariatric Surgery Survey. Int J Endocrinol Metab. 2024;22(4).
2. Valera-Montiel AE, López-Sánchez J, Diaz-Maag CR. Septic Shock After Endoscopic Sleeve Gastroplasty: A Post-procedural Complication? Obes Surg. 2024;34(5):1990–2.
3. Brethauer SA, Kim J, el Chaar M, et al. Standardized Outcomes Reporting in Metabolic and Bariatric Surgery. Obes Surg. 2015;25(4):587–606.
4. Hui BY, Khorgami Z, Puthoff JS, Kuwada TS, Lim RB, Chow GS. Postoperative sepsis after primary bariatric surgery: an analysis of MBSAQIP. Surgery for Obesity and Related Diseases. 2021;17(4):667–72.
5. Blair LJ, Huntington CR, Cox TC, et al. Risk factors for postoperative sepsis in laparoscopic gastric bypass. Surg Endosc. 2016;30(4):1287–93.
6. Mehta Y, Paul R, Ansari AS, et al. Extracorporeal blood purification strategies in sepsis and septic shock: An insight into recent advancements. World J Crit Care Med. 2023;12(2):71–88.
7. Tomescu D, Popescu M, Akil A, et al. The potential role of extracorporeal cytokine removal with CytoSorb® as an adjuvant therapy in Acute Respiratory Distress Syndrome. Int J Artif Organs. 2023;46(12):605–17.
8. Xu J. A review: continuous renal replacement therapy for sepsis-associated acute kidney injury. All Life. 2023;16(1).
9. Yu G, Cheng K, Liu Q, Wu W, Hong H, Lin X. Clinical outcomes of severe sepsis and septic shock patients with left ventricular dysfunction undergoing continuous renal replacement therapy. Sci Rep. 2022;12(1):9360.
10. Hellman T, Uusalo P, Järvisalo MJ. Renal Replacement Techniques in Septic Shock. Int J Mol Sci. 2021;22(19):10238.

Correspondence to:
Amirahmad Nassiri, MD
Division of Nephrology, Department of Internal Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran
E-mail: nassirimorad@yahoo.com

Antoine Schneider, MD
Adult Intensive Care Unit, Centre Hospitalier Universitaire Vaudois (CHUV), Lausanne, Switzerland
E-mail: Antonie.Schneider@chuv.ch

Received September 2025
Revised October 2025
Accepted October 2025