CASE REPORT

ANAESTHETIC MANAGEMENT FOR TOTAL GASTRECTOMY IN A PATIENT WITH PREVIOUS ASCENDING AORTIC DISSECTION REPAIR: A CASE REPORT

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Abstract

Introduction: Total gastrectomy remains the gold standard for gastric adenocarcinoma treatment. The procedure poses significant anesthetic challenges due to its complexity and the physiological stress associated with major abdominal surgery. These challenges are further amplified in patients with a history of other diseases, especially those affecting the cardiovascular system, who require careful hemodynamic management and tailored perioperative strategies in the operating room. **Case Presentation:** This case report presents the perioperative management of a 62-year-old male diagnosed with gastric adenocarcinoma who underwent total gastrectomy. The patient had undergone surgical repair of an ascending aortic dissection three years earlier. Preoperative transthoracic echocardiography was obtained to assess cardiac function and graft integrity. Anesthetic induction was performed with carefully titrated agents to maintain hemodynamic stability. Invasive arterial blood pressure monitoring was employed throughout the procedure to allow real-time hemodynamic management. Analgesia was provided via a thoracic epidural catheter, with a continuous infusion of low-concentration bupivacaine (0.125%) administered to minimize sympathetic blockade and maintain stable blood pressure. The patient reported minimal discomfort and did not require additional analgesics during the recovery period. He was discharged in good general condition on postoperative day eight.
Conclusion: Patients with prior ascending aortic dissection repair undergoing major abdominal surgery pose significant anesthetic challenges. With appropriate monitoring and individualized management, good outcomes can be achieved.

Key words*: anesthesia challenging, ascending aortic dissection repair, high risk surgery, total gastrectomy.*

Introduction

Gastric cancer represents a significant global health challenge, ranking as the fifth most common cancer worldwide and the third leading cause of cancer-related mortality. (1) Despite advances in the field of medical and radiation oncology, surgical resection is a crucial intervention and remains the mainstay of the gold standard treatment (2). Total gastrectomy is a major abdominal surgery often associated with significant hemodynamic fluctuations, blood loss, and postoperative pain management challenges.

Patients with prior ascending aortic dissection repair may represent a higher-risk subgroup in noncardiac surgery, due to altered vascular compliance, graft hemodynamics leading to altered autonomic/sympathetic regulation, and potential for hemodynamic lability when exposed to surgical stress, although direct evidence is limited.

The perioperative literature offers limited guidance for anesthetic management in this particular intersection of aortic disease and extensive abdominal surgery. In accordance with the evidence-based perioperative management for total gastrectomy and contemporary guidelines for the perioperative management of cardiac patients undergoing noncardiac surgery, we adopted a multimodal, evidence-based anesthetic approach tailored to this patient's unique cardiovascular and surgical risk profile. The perioperative strategy—including hemodynamic optimization, analgesic planning, and anesthetic management—was designed to minimize physiologic stress and maintain cardiovascular stability. The details of this individualized approach are presented in this case report.

Case Presentation

A 62-year-old male patient, 172 cm in height and weighing 84 kg (BMI: 28.5 kg/m²), smoker, classified as ASA class 3, with a diagnosis of gastric adenocarcinoma confirmed by gastroscopic biopsy, was admitted to the University Clinic for Abdominal Surgery in Skopje for surgical management. He had significant medical history related to ascending aortic dissection, for which he underwent sternotomy and surgical repair three years earlier, including replacement of the ascending aorta and aortic arch with a prosthetic graft.

Regular medications included bisoprolol and aspirin, with aspirin being withheld two days before surgery. Airway evaluation demonstrated adequate mouth opening, Mallampati class II, and normal neck mobility. Routine laboratory investigations, coagulation profile, and chest radiography were all within normal limits. The ECG showed normal sinus rhythm with heart rate of 75 bpm, and inverted T wave in precordial leads.

Considering the patient's cardiovascular history, a preoperative transthoracic echocardiographic evaluation was conducted to assess cardiac function and the integrity of the aortic graft. The examination demonstrated a left ventricular ejection fraction of 55% with preserved systolic and diastolic function. Mild left atrial enlargement was observed, measuring 55 mm (normal reference value for males: <40 mm). The valvular assessment confirmed normal function of both the mitral and tricuspid valves, while the prosthetic graft and aortic dimensions appeared intact and within normal limits.

The planned anesthetic technique involved general endotracheal anesthesia (GETA) in combination with epidural analgesia for perioperative pain management. The associated risks and procedures were thoroughly discussed, and a written informed consent was obtained.

On the day of surgery, the patient continued his prescribed morning dose of bisoprolol and was premedicated with 500 mL of intravenous crystalloid solution, intravenous famotidine, metoclopramide, and appropriate antibiotic prophylaxis in accordance with institutional protocol. Standard ASA recommended monitoring was established, which included ECG, non-invasive blood pressure (NIBP), and oxygen saturation (SpO_2). The baseline parameters recorded were: blood pressure of 180/90 mmHg, heart rate of 80 beats per minute, and SpO_2 at 98%. After explaining the procedure once again, and achieving anxiolysis by slow iv administration of 2 mg of midazolam, a thoracic epidural catheter was placed at T8–T9 for analgesia.

After preoxygenation with 100% oxygen via facial mask with a fresh gas flow of 7 L/min for 2 minutes, anesthesia induction was then achieved with the following medications: fentanyl (1 mcg/kg/BW), lidocaine (0.6 mg/kg/BW), propofol (2 mg/kg/BW). Rapid sequence intubation was performed using succinylcholine (1mg/kg) to ensure prompt airway control while minimizing the risk of aspiration. After successful first attempt intubation, muscle paralysis was achieved with rocuronium (0.6 mg/kg). Anesthesia maintenance was achieved with Sevoflurane at 0.6 MAC. Mechanical ventilation was initiated in pressure-controlled volume-guaranteed mode, with a tidal volume set at 6 mL/kg of predicted body weight and a positive end-expiratory pressure (PEEP) of 5 cm H_2O, and respiratory rate set to achieve end tidal CO_2 between 35-45 mmHg.

After induction, the patient remained hemodynamically stable. Invasive blood pressure monitoring was managed by catheterizing the left radial artery. Analgesia was provided via a continuous epidural infusion of Bupivacaine 0.125% delivered at a rate of 8ml/h.

Intraoperative fluid therapy was carefully titrated to maintain euvolemia, guided by continuous monitoring of hemodynamic parameters, urine output, and serial arterial blood gas analyses. Additional analgesia included intravenous administration of 1 g of paracetamol and 1.5 g of magnesium sulfate. The patient remained hemodynamically stable throughout the procedure, with minimal estimated blood loss. The total surgical duration was three and a half hours. At the conclusion of the procedure, residual neuromuscular blockade was reversed, and the patient was uneventfully extubated in the operating room. Afterwards, the patient was transferred to the PACU where his stay was uneventful.

Postoperatively, the patient received antibiotic prophylaxis, antiemetic therapy, and anticoagulation with enoxaparin (1 mg/kg). Analgesia was maintained with epidural administration of morphine three times a day, supplemented with intravenous paracetamol and metamizole. Vital signs and urine output were closely monitored, with supported diuresis as clinically indicated. The patient remained hemodynamically stable throughout the postoperative period and was discharged on the eighth postoperative day. At three-month follow-up, he remained clinically stable with no deterioration in cardiac function and was undergoing adjuvant chemotherapy.

Discussion

Aortic dissection, though uncommon, is a catastrophic vascular disorder characterized by a tear in the intimal layer of the aorta, leading to the separation of the aortic wall layers. Blood enters between the intima and media, propagating the dissection either proximally or retrograde, resulting in compromised blood flow to vital organs. Acute aortic dissection carries extremely high mortality rates, with many patients dying before reaching emergency care. (3) The International Registry of Acute Aortic Dissection is a consortium a 21 large referral centers around the world. This registry's data have shown that the in-hospital mortality of patients with ascending aortic disease is approximately 27% in those who undergo timely and successful surgery. (4)

In vivo studies have revealed that the introduction of an aortic graft augments systolic and pulse pressure (PP), alters waveforms and increases ventricular afterload (5,6,7). It was also found that aortic arch repair can cause shorter inflection time, leading to an increased systolic pressure in comparison to an age-matched control. In combination, these hemodynamic alterations may contribute to subsequent cardiovascular complications such as hypertension, myocardial infarction and coronary heart disease. The proximal graft increased aortic systole and pulse pressure to a greater degree than a distal aortic graft. The proximal graft pulse pressure percent change was twice as high as the distal graft pulse pressure percent change. (5)

Given these considerations, it is understandable that the literature on perioperative management of patients following this type of surgical repair is limited, and that managing potential complications during surgery can be particularly challenging, especially for complex procedures such as total gastrectomy. Accordingly, the anesthetic plan and perioperative management were developed in accordance with evidence-based perioperative management for total gastrectomy, as well as contemporary guidelines for the perioperative care of cardiac patients undergoing noncardiac surgery.

Following the patient's history and physical examination, a preoperative cardiovascular risk assessment was performed using the 2019 AUB-HAS2 Cardiovascular Risk Index, which indicated an intermediate risk (11%) of adverse events within the 30-day postoperative period. In accordance with current recommendations, a transthoracic echocardiographic evaluation was subsequently conducted, confirming normal cardiac function as well as intact graft integrity. (8,9) The risk of perioperative complications is influenced by factors such as the presence of comorbidities, the patient's pre-surgery health status, and the urgency, scale, type, and length of the surgical procedure. (10)

In accordance with the latest 2024 AHA/ACC/ACS/ASNC/HRS/SCA/SCCT/SCMR/SVM Guideline for Perioperative Cardiovascular Management of Patients Undergoing Noncardiac Surgery, which states that abrupt discontinuation of beta-blockers prescribed for long-term indications is harmful and should be avoided (11,12*)*, perioperative beta-blocker therapy should be carefully titrated based on clinical judgment and continued throughout hospitalization and at

discharge unless contraindicated. Therefore, the patient's beta-blocker therapy was maintained perioperatively.

Hemodynamic monitoring and management are cornerstones of perioperative care. The goal of hemodynamic management is to maintain organ function by ensuring adequate perfusion pressure, blood flow, and oxygen delivery to prevent perioperative complications – that remain as high as almost 20% in patients having elective non-cardiac surgery. (13, 14). Continuous arterial pressure monitoring allows detecting arterial pressure changes in real-time and can thus help reduce arterial pressure fluctuations and hypotension. (15, 16,17)

In this patient, analgesia was administered via a thoracic epidural catheter—an evidence-based approach, demonstrating the benefits of regional techniques in major abdominal surgery in patients with significant cardiovascular comorbidities. Continuous thoracic epidural analgesia provides effective pain control, reduces perioperative stress responses, and minimizes the need for systemic opioids, thereby promoting earlier mobilization and improved pulmonary function. Moreover, in patients with cardiovascular disease, epidural analgesia has been shown to contribute to greater hemodynamic stability and reduced myocardial oxygen demand. (18). Meanwhile, perioperative cardiovascular guidelines underscore the importance of tailored regional techniques that minimize hemodynamic stress and optimize pain control in patients with vascular or cardiac disease. (19, 20).

Another major challenge encountered was the intraoperative and postoperative fluid management. The combined effects of surgical blood and fluid loss, thoracic epidural analgesia, and general anesthesia often contribute to signs of relative hypovolemia in the immediate postoperative period. Conversely, excessive water and sodium administration increases the risk of respiratory complications and delays the return of bowel function. Current perioperative evidence supports a goal-directed approach to fluid therapy aimed at achieving near-zero fluid balance, even if the temporary use of low-dose vasopressors is required to manage epidural-related hypotension (21). Therefore, intraoperative and postoperative fluid therapy was carefully titrated, guided by continuous hemodynamic monitoring, urine output, and serial arterial blood gas analyses.

Close postoperative surveillance was essential to detect early signs of hemodynamic instability, graft complications, or cardiac ischemia. Analgesic titration continued under vigilance to maintain hemodynamic balance while allowing early mobilization, pulmonary hygiene, and gut recovery. The patient's favorable recovery in this case underscores the value of meticulous planning, multimodal monitoring, and guideline-informed decision making.

Conclusion

This case highlights the complex perioperative challenges in managing a patient with a history of ascending aortic dissection repair undergoing major abdominal surgery. Applying evidence-based perioperative strategies and cardiovascular risk optimization enabled individualized hemodynamic management, balanced fluid therapy, and effective pain control through thoracic epidural analgesia. Careful coordination among surgical, anesthetic, and critical

care teams ensured hemodynamic stability and facilitated an uncomplicated recovery. Our experience underscores the importance of a multidisciplinary, guideline-informed approach for patients with significant cardiovascular history undergoing noncardiac surgery.

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