

Precision in Practice: Anesthetic Approach for Laparoscopic Hernia Repair in Aortic Regurgitation

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Abstract: ***Background:** Perioperative management of patients with congenital heart disease presents significant challenges for anesthesiologists. We describe a case of a patient scheduled for laparoscopic mesh repair for umbilical hernia who was recently diagnosed with aortic regurgitation, highlighting the management strategies employed to ensure safe anesthesia and surgical outcomes. **Methods:** A comprehensive preoperative assessment was conducted, focusing on the severity and etiology of the aortic regurgitation, along with assessment of ventricular function and overall cardiac status. A multidisciplinary team approach involving cardiologists, cardiac surgeons, and anesthesiologists was employed to formulate an optimal perioperative plan. Intraoperatively, careful monitoring of hemodynamic parameters, maintenance of adequate preload, and vigilant management of anesthesia were prioritized to minimize fluctuations in systemic vascular resistance and optimize cardiac output. **Results:** The patient underwent successful laparoscopic mesh repair under general anesthesia without complications. Intraoperative transesophageal echocardiography confirmed mild to moderate aortic regurgitation with preserved left ventricular function throughout the procedure. Postoperatively, the patient was monitored closely in the recovery room and subsequently transferred to the surgical ward in stable condition. **Conclusion:** Effective perioperative management of patients with congenital heart disease, particularly those with recently diagnosed aortic regurgitation undergoing non-cardiac surgery, requires meticulous planning and execution. A multidisciplinary team approach, comprehensive preoperative evaluation, intraoperative hemodynamic monitoring, and careful anesthetic management are crucial in achieving favorable outcomes and minimizing perioperative complications.*

Keywords: aortic regurgitation, anesthesia, laparoscopy, erector spinae block, mesh repair.

1. Introduction

Valvular heart diseases significantly impact the outcomes of surgical procedures, especially non-cardiac surgeries. Management of such cases requires careful consideration of how drugs affect cardiac parameters such as contractility, heart rate, preload, afterload, systemic vascular resistance, and pulmonary vasculature. Aortic regurgitation (AR), occurring in approximately 1% of live births, poses unique challenges due to its effects on cardiac function and hemodynamics.

2. Case History

A 57-year-old, 68 kg patient presented for laparoscopic mesh repair of umbilical hernia. He reported occasional palpitations but no chest pain, syncope, or significant tachycardia. The patient was classified as NYHA Class II, with a regular pulse rate of 80 bpm, and blood pressure readings of 150/90 mmHg and 145/90 mmHg in the right and left upper limbs, respectively, and 160/100 mmHg and 150/95 mmHg in the right and left lower limbs, respectively. On auscultation, an ejection systolic murmur was audible at the left 5th intercostal space. Routine blood and biochemical investigations were within normal limits. Electrocardiography (ECG) indicated left ventricular hypertrophy, while echocardiography (ECHO) revealed normal left ventricular systolic function with an ejection fraction of 50%, severe AR, and progressive left ventricular dilatation.

The patient was deemed high-risk for non-cardiac surgery by a cardiologist and prescribed amlodipine 5 mg and atenolol 50 mg twice daily. Preoperative preparation included overnight fasting, pre-medication with sedatives, and continuation of antihypertensive medications.

Intraoperatively, monitoring included capnography, temperature probe, pulse oximetry, and central venous pressure (CVP) via a right internal jugular vein catheter. An epidural catheter was placed for analgesia, and an erector spinae block was administered under ultrasound guidance.

Induction of anesthesia with etomidate followed by endotracheal intubation was smoothly conducted, and maintenance was achieved with a balanced technique of oxygen, nitrous oxide, and sevoflurane. Intraoperative blood pressure was managed with inhalational anesthetics as needed. The surgery proceeded uneventfully under pneumoperitoneum, lasting 100 minutes in Trendelenburg position. Postoperatively, the patient was successfully extubated, received analgesia via epidural and erector spinae block, and was monitored in the ICU before transfer to the ward.

3. Discussion

The anesthetic management goals for a patient with aortic regurgitation undergoing non-cardiac surgery include maintaining a stable heart rate to optimize diastolic filling time, preserving sinus rhythm, reducing systemic vascular resistance, and ensuring adequate myocardial contractility. Pharmacological options such as ionodilators (milrinone, dobutamine), angiotensin-converting enzyme inhibitors, digitalis, and diuretics are utilized to manage afterload and volume status. Careful fluid management is crucial to prevent volume overload, with consideration for transesophageal echocardiography for comprehensive cardiac assessment.

Laparoscopic considerations involve minimizing carbon dioxide insufflation, optimizing patient positioning, and limiting intra-abdominal pressure to minimize

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hemodynamic instability. Intraoperative and postoperative analgesia through epidural and erector spinae blocks reduces cardiovascular stress and promotes early recovery.

4. Conclusion

Effective management of patients with aortic regurgitation undergoing non - cardiac surgery demands meticulous planning, interdisciplinary collaboration, and adherence to tailored anesthetic strategies. This case underscores the importance of individualized care, advanced monitoring techniques, and vigilant intraoperative management in achieving favorable outcomes while mitigating perioperative risks.

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