

**CASE REPORT**

# Successful anaesthetic management in a patient scheduled for open-heart surgery for the third time: A case report



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## Abstract

**Background:** Anaesthetic management of patients undergoing third open-heart surgery presents significant challenges due to anatomical distortions, adhesions, and altered haemodynamics. Patients with complex comorbidities require meticulous planning to mitigate perioperative risks.

**Case description and management:** This report presents the case of a 48-year-old man with severe mitral valve dysfunction and multiple comorbidities who underwent redo mitral valve replacement. A comprehensive anaesthetic management plan was tailored to the patient, incorporating invasive haemodynamic monitoring with a coordinated multidisciplinary strategy. Cardiopulmonary bypass was established using femorofemoral cannulation, ensuring haemodynamic stability during the procedure. Postoperative care involved vigilant monitoring of haemodynamic and respiratory complications. The patient experienced transient desaturation, which was effectively managed with targeted therapy. The patient was extubated on postoperative day three and discharged in stable condition.

**Conclusion:** This case highlights the critical importance of multidisciplinary planning, individualised anaesthetic strategies, and proactive postoperative management in high-risk reoperative cardiac surgery to achieve favourable outcomes.

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Ethical approval was not sought because this is a case report. However, written informed consent was obtained from the patient for publication of this case report and any accompanying images.

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Not applicable

## Key messages

The third cardiac surgery on a patient carries an increased risk of adhesions, anatomical changes, and haemodynamic instability. To prevent complications, it is crucial to implement customised anaesthetic plans, advanced monitoring, and a coordinated multidisciplinary strategy. Additionally, precise adjustment of inotropes and respiratory support during the postoperative period is crucial for the patient's adequate recovery.

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## Introduction

Reoperative cardiac surgery is associated with heightened morbidity due to the presence of adhesions, altered mediastinal anatomy, and changes in cardiac physiology [1]. Hemodynamic responses to induction, ventilation, and cardiopulmonary bypass can be unpredictable in patients undergoing repeat sternotomy [2]. Effective multidisciplinary collaboration is crucial to ensure patient safety and optimise perioperative outcomes in complex redo cardiac surgeries. This case report describes an effective anaesthetic method for a patient undergoing a third open-heart surgery.

## Case description and management

A 48-year-old man presented with symptoms of exertional dyspnea, palpitations, and decreased exercise tolerance. His medical history is notable for an atrial septal defect closure performed 20 years ago, followed by a repeat atrial septal defect closure and mitral valve replacement with a porcine bioprosthetic valve 15 years ago.

Upon admission, the patient presented with a blood pressure of 110/68 mmHg, an irregular heart rate of 96 beats per minute, a respiratory rate of 20 breaths per minute, and an oxygen saturation (SpO<sub>2</sub>) of 94% on room air. The patient was classified as New York Heart Association class III. Cardiovascular examination indicated an irregular rhythm accompanied by a pansystolic murmur at the apex. Additionally, mild bilateral pedal oedema was noted.

valve dysfunction, a surgical intervention was deemed necessary. Informed written consent was obtained from the patient and relatives after discussing the pros and cons of the third cardiac surgery.

The patient was premedicated with 7.5 mg of oral midazolam and placed in the operating room with standard monitoring. General anaesthesia was induced with 5 mg midazolam, 100 µg fentanyl, 100 mg thiopental, and 8 mg vecuronium with lung-protective ventilation. Capnography, an invasive intra-arterial line, a right internal jugular central venous line, and two peripheral 18-gauge intravenous lines were secured. Re-entry into the chest cavity was anticipated to be difficult; therefore, cardiopulmonary bypass was established via femorofemoral cannulation (Figure 1b) at the surgical team's discretion. The old prosthetic valve was excised and replaced with a 25 mm On-X mechanical mitral valve (Figure 1c).

Upon weaning from cardiopulmonary bypass and decannulation (Figure 1d), significant haemodynamic support was required. Adrenaline (0.22 mcg/kg/min), noradrenaline (0.4 mcg/kg/min), and dopamine (8 mcg/kg/min) were initiated to maintain a heart rate of 128/min, arterial blood pressure of 116/70 mmHg, and SpO<sub>2</sub> of 95%; invasive arterial pressure and central venous pressure guided titration throughout the procedure. No significant arrhythmias were observed.

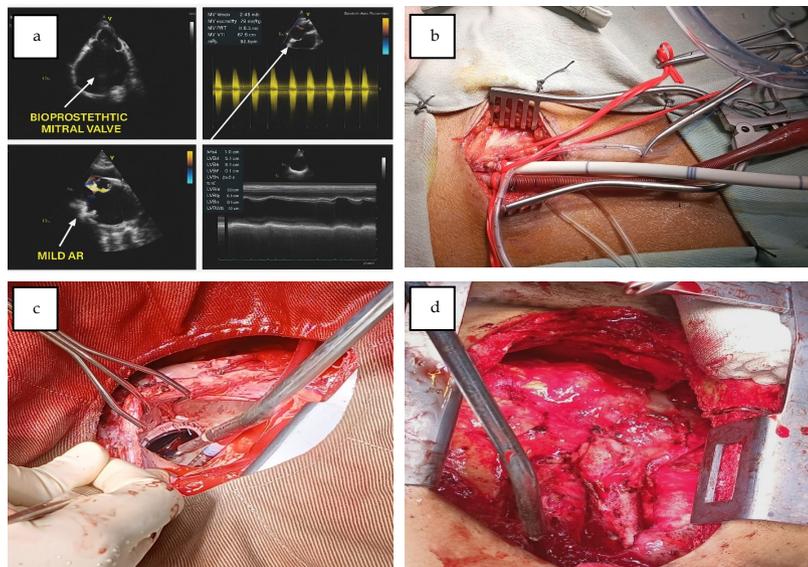
In the intensive care unit, the patient remained intubated and haemodynamically supported. Two hours later, the SpO<sub>2</sub> decreased to 87%. Arterial blood gas analysis showed pH 7.21, PaO<sub>2</sub> 62 mmHg, PaCO<sub>2</sub> 48 mmHg, and HCO<sub>3</sub> 19.6 mmol/L. A combination of aminophylline, dexamethasone, and furosemide was administered to treat suspected pulmonary congestion. Oxygenation improved to 97% within three hours.

Four units of packed red blood cells and fresh frozen plasma were transfused. Inotropes were gradually tapered as the ventricular function stabilised. The patient was extubated on post operative day three, transferred to the high-dependency unit on day seven, and discharged on day ten in stable condition.

## Discussion

Adhesions, distorted mediastinal anatomy, and increased bleeding risk are major concerns in repeat cardiac surgeries [3, 4]. A third sternotomy requires preoperative planning and coordination among the cardiology, anaesthesiology, surgery, and intensive care teams. Such collaboration enables safe management of patients with complex cardiac pathologies. The anaesthetic management of high-risk cardiac patients requires specific strategies [5, 6]. In our case, we used midazolam, fentanyl, and vecuronium to achieve stable haemodynamics during induction.

The haemodynamic goals focus on maintaining adequate ventricular perfusion and preventing acute



**Figure 1** a) Preoperative echocardiography demonstrating severe stenosis of the bioprosthetic mitral valve, b) Femorofemoral cannulation before establishing cardiopulmonary bypass, c) Explanted porcine tissue valve and implanted a 25 mm On-X mechanical prosthesis, d) Operative field after decannulation.

Echocardiographic assessment identified major stenosis and regurgitation of the bioprosthetic mitral valve, with peak and mean pressure gradients measured at 20.4 mmHg and 14.2 mmHg, respectively. The left ventricular ejection fraction was 40%, while the right ventricular ejection fraction ranged between 35% and 40% (Figure 1a). Additionally, pulmonary artery pressure was found to be elevated. In light of the progressive symptoms and

failure. Adrenaline and noradrenaline are essential inotropes that support the residual volume free wall and increase systemic vascular resistance [7]. Studies have shown that advanced haemodynamic monitoring supports the judicious use of inotropes [8, 9]. In our scenario, although advanced cardiac output monitoring was unavailable, careful titration guided by invasive arterial pressure and central venous pressure trends provided adequate haemodynamic assessment.

Transient postoperative desaturation underscores the need for vigilant pulmonary monitoring. Early detection and intervention prevented respiratory decline. Successful extubation demonstrates the effectiveness of proactive ventilatory strategies in reducing intensive care unit length of stay. We report here that a multidisciplinary team of cardiologist, anaesthesiologist and surgeon can safely manage anaesthetic procedure in a patient undergoing open heart surgery for the third time.

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#### Author contributions

*Manuscript drafting and revising it critically:* MN, SKS, OSK. *Approval of the final version of the manuscript:* MN, SKS, MMR, OSK, RH. *Guarantor accuracy and integrity of the work:* MN, SKS, MMR, OSK, RH.

#### Conflict of interest

We do not have any conflict of interest.

#### Data availability statement

We confirm that the data supporting the findings of the study will be shared upon reasonable request.

#### Supplementary file

None

#### AI disclosure

None

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