

Fourth-time Mitral Valve Replacement (Third-Redo) Using a Minimally Invasive Right Mini-Thoracotomy (MICS): A Case Report

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Background

Redo mitral valve surgery remains one of the most technically demanding procedures in cardiac surgery. Repeated median sternotomy is associated with increased risks of cardiac injury, major hemorrhage, prolonged operative time, and postoperative complications due to dense mediastinal adhesions. Patients undergoing multiple redo valve operations have significantly higher perioperative morbidity and mortality. Minimally invasive cardiac surgery (MICS) through a right mini-thoracotomy provides an alternative approach that avoids repeat sternotomy while offering excellent exposure of the mitral valve.

Case Presentation

A 42 year-old female presented with progressively worsening dyspnea (NYHA Class III/IV) and reduced exercise tolerance. The patient had undergone three previous mitral valve operations:

Primary BMV in (2005,2008) Mitral Valve Replacement (MVR): 2011 [First Redo MVR: 2022 Second Redo MVR: 2024

Preoperative transthoracic echocardiography demonstrated significant prosthetic mitral valve dysfunction with and a left ventricular ejection fraction of 35 %.

Computed tomography of the chest revealed extensive mediastinal adhesions with close proximity of cardiac structures to the posterior table of the sternum, indicating a high risk for repeat sternotomy. Following multidisciplinary evaluation, a minimally invasive right mini-thoracotomy approach was selected for a fourth-time mitral valve replacement (third redo).

Surgical Technique

The procedure was performed under general anesthesia with transesophageal echocardiographic guidance.,Right anterolateral mini-thoracotomy through the fourth intercostal space Femoral arterial and venous cannulation for cardiopulmonary bypass

Limited intrathoracic adhesiolysis to avoid extensive dissection Left atriotomy for mitral valve exposure Careful explantation of the dysfunctional prosthetic mitral valve Implantation of a new prosthetic mitral valve 23mm using standard surgical techniques

Intraoperative transesophageal echocardiography confirmed satisfactory valve function with no paravalvular leak. The procedure was completed successfully without conversion to median sternotomy. X time- 77min, Delnido plegia

Postoperative Outcome

Postoperative echocardiography demonstrated a well-seated prosthetic mitral valve with no paravalvular leak and a non significant mean gradient. The patient had an uneventful recovery with significant improvement in symptoms and functional status.

Discussion

Fourth-time mitral valve replacement is exceptionally rare and technically challenging. Repeat sternotomy carries increased risks of cardiac injury, major bleeding, and prolonged operative time due to dense mediastinal adhesions. A minimally invasive right mini-thoracotomy avoids sternal re-entry, minimizes dissection, provides excellent mitral valve exposure, and may facilitate faster recovery. In this case, the approach enabled successful completion of a third-redo MVR with favorable early outcomes.

Conclusion

Third-redo mitral valve replacement through a right mini-thoracotomy is a feasible and safe option in carefully selected patients. With meticulous preoperative planning and surgical expertise, MICS can serve as an effective alternative to repeat sternotomy in complex redo mitral valve surgery.

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