



Original article

Video-assisted minimally invasive mitral valve surgery: Early experience

Ahmed M. El Ashkar ^{a,*}, Ahmed N. Khallaf ^b^a Cardio-thoracic Surgery Department, Benisuef University, Benisuef, Egypt^b Cardio-thoracic Surgery Department, Fayoum University, Fayoum, Egypt

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Abstract

Background: The post-operative complications of median sternotomy, especially the post-operative pain and wound complications, has led many surgeons to adopt less invasive techniques to perform open heart surgery. Video-assisted mitral valve surgery via mini thoracotomy is now widely used and is becoming the standard of care in many centers all-over the world.

Aim of the study: Comparing the early post-operative outcome of video-assisted minimally invasive mitral valve replacement versus the conventional approach via median sternotomy.

Patients and methods: 34 patients undergoing mitral valve replacement (MVR) were randomly selected for this study and were divided in 2 equal groups. Group (A) included 17 patients who had MVR via median sternotomy while group (B) included 17 patients who had MVR via video-assisted anterior minithoracotomy.

Results: The cross-clamp time was 63.7 ± 2.34 min in group (A) versus 83.4 ± 7.21 min in group (B), which was statistically significant. The operative time was 3.27 ± 1.22 h in group (A) versus 5.62 ± 1.67 h in group (B), which was statistically significant. The duration of mechanical ventilation and the mean units of blood needed were significantly higher in group (A) compared to group (B). There was no statistically significant difference between the 2 groups regarding the postoperative complications including mortality, bleeding or mediastinitis.

Conclusion: Minimally invasive mitral valve replacement is a safe procedure, with comparable post-operative outcome to conventional median sternotomy.

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Keywords: Mitral valve replacement (MVR); Video-assisted thoracoscopic surgery (VATS); Minithoracotomy

1. Introduction

Minimally invasive techniques are cautiously growing in cardiac surgery. Many surgeons are now using fewer and smaller incisions to avoid wound infection, to decrease post-operative pain and for better cosmetic outcome.

* Corresponding author. 51 Giza Street, Giza, Egypt.

E-mail addresses: aelashkar@gmail.com (A.M. El Ashkar), ankhallaf@gmail.com (A.N. Khallaf).

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Full median sternotomy has been well established as a standard approach for open heart surgeries for many years. It still has always been criticized for its length, post-operative pain and possible complications like wound infection and instability [1].

The goal of minimally invasive mitral valve surgery (MIMVS) is to reduce surgical trauma to the patient (pain, scarring, and inflammatory response) while maintaining the proven surgical efficacy of the conventional open approach [2].

Thoroscopically assisted MIMVS relates to mitral valve surgery procedures which use thoroscopic visualization of the operative field for at least part of the operation [3].

Moreover, new robotic methods offer endoscopic possibilities for mitral valve surgeons that before were impossible via both video-assisted and direct visions. Minimally invasive mitral valve surgery now is within the reach of most cardiac surgeons. Yet the steep learning curve still can be an impediment to its non wide spread adoption [4].

This study aims at the evaluation of the early post-operative outcome of thoroscopically assisted mitral valve surgery, in comparison to the standard median sternotomy technique.

2. Patients and methods

34 patients with isolated rheumatic mitral valve disease requiring MVR were randomly selected for this study and were divided into two groups:

- Group A included patients who underwent MVR via median sternotomy (17 patients)
- Group B included patients who underwent the same procedure via small anterolateral, video-assisted, minithoracotomy.

The study was performed in 4 centers: Cairo University, Benisuef University, New Kasr El Aini Teaching Hospital as well as Dar Al Fouad Hospital between March 2014 and September 2015.

2.1. Exclusion criteria

Patients with left atrial thrombus, other valve pathologies, ischemic heart disease (IHD), redo cases and significant comorbidities were excluded from this study. Patients with morbid obesity were also excluded.

2.2. Surgical technique of MIMVS

- Patients were positioned supine, with the right shoulder elevated 30–50° with the right arm abducted. A double lumen endotracheal tube was used for ventilation.
- Exposure of the femoral vessels was done at the beginning of the operation, heparin administration and cannulation of both the femoral artery and vein was done using Seldinger's technique. A 22Fr femoral vein, double stage cannula was used with its tip just inserted in the superior vena cava (SVC). For the femoral artery, a 21 Fr femoral cannula was used. Cannulation was always done guided by TEE to make sure that the cannulae were in the proper position, and to assess proper deairing and valve function at the end of the operation.
- The right thoracotomy was carried out just lateral to the nipple in males and in the mammary crease in females, and over the right 4th intercostal space for 7–8 cm. The chest was entered and a soft tissue retractor was used to deflect the soft tissues, followed by insertion of the rib spreading retractor.
- Cardiopulmonary bypass (CPB) was initiated, the lung deflated to expose the pericardium which was opened just ventral to the phrenic nerve, up to expose the ascending aorta and down to the diaphragm.

Assisted venous return should generally be used either via vacuum assist or by use of a biomedicus centrifugal pump in the venous line.

- A purse string suture was placed in the proximal part of the ascending aorta and the aortic root cannula was inserted for delivery of the cold crystalloid cardioplegic solution. The aortic clamp was placed through an

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