TRICKS AND TIPS TO FACILITATE ROBOTIC APPROACH FOR MITRAL VALVE REPAIR

Hugo M. N. Issa MD, Syed Rehman MD, Daniel Burns MD, Marc Gillinov MD, Kevin Hodges MD.

1- Cleveland Clinic, Department of Thoracic & Cardiovascular Surgery, Cardiac Surgery, Cleveland, OH

Disclosure Statement: The authors have no conflict of interests to disclose.

Funding: No funding was granted in this project.

Address correspondence to:
Hugo Monteiro Neder Issa
Department of Thoracic & Cardiovascular Surgery, Cleveland Clinic
9500 Euclid Avenue
Cleveland, OH 44195
E-mail: hugocardiaca@gmail.com

Central message – There are a number of key steps and helpful tricks that facilitate a robotic approach to complex mitral repairs

Central Picture Legend:
Transition from sternotomy to robotically mitral repair requires adaptation and training
The robotic approach for degenerative mitral repair is safe and effective\(^1,2\).

Nevertheless, transitioning from the sternotomy to the robotic approach requires training and adaptation involving clinical and technical aspects (Figure 1). Patient selection and surgical technical aspects of the robotic approach are essential to achieve excellent results\(^2\). This video aims to demonstrate a robotically-assisted mitral valve repair for Barlow's disease. The video (Video) will focus on critical steps and helpful tricks for a robotic approach to complex repairs.

**Case Video Summary**

A 29-year-old man presented with symptomatic severe mitral regurgitation. Patient’s informed consent was obtained for this publication: IRB approval was not required. Transesophageal echocardiogram demonstrated diffuse bileaflet prolapse. Based on these findings, a repair was planned to consist of anterior neochords, posterior leaflet resection, sliding valvuloplasty, and annuloplasty.

The patient was brought to the operating room. General anesthesia was performed with double-lumen endotracheal tube intubation to allow single left lung ventilation. The setup for the robot approach is shown in the video. The right femoral vessels are exposed first. After assessment of the femoral vessels, a small lateral minithoracotomy is made in the fourth ICS, starting from the anterior axillary line and extending anteriorly. The robotic atrial retractor is placed in the 4th ICS, in the mid-clavicular line. The left instrument port is placed in the 2nd ICS, approximately halfway between the midclavicular and the anterior axillary lines. The right instrument port is placed in the 6th ICS below the anterior axillary line. Two angiocatheters are placed in the
midaxillary line for posterior pericardial traction sutures. We routinely use a
detacheable clamp to cross clamp the ascending aorta and antegrade root cardioplegia to
arrest the heart.

The repair begins by placing two sets of artificial chordae to the anterior leaflet. In cases
where the likelihood of needing anterior neochords is high, it is best to insert there
before completing a posterior leaflet resection, because the reconstructed posterior
leaflet can obstruct the surgeon’s view of the papillary muscles. Next is performed
resection of P2 and detachment of the P1 and P3 scallops from the annulus for sliding
repair. A key step is identifying the location on the annulus where the two halves of the
leaflet will meet to achieve perfect symmetry. The posterior leaflet is reconstructed
using a modified interrupted suture technique. Next is performed an annuloplasty
using a flexible band, which allow us to use a running suture technique.

In most cases, the need for a commissuroplasty is assessed on static testing after the
annuloplasty is performed. This suture is easy to place, even after annuloplasty, and is
occasionally unnecessary after other repair techniques have been performed. In this
case, we decided to perform a medial commisuroplasty due to a residual P3 prolapse.

Post-operative TEE demonstrated no residual mitral regurgitation and a mean gradient
of 2 mmHg. Hospital course was uncomplicated.

In conclusion, successful repair of Barlow's disease often requires multiple techniques
and can be complex. Several key steps and helpful tricks are shown in this video that
facilitate a robotic approach to these complex repairs.
References


Video Legend: Demonstration of a robotically-assisted mitral valve repair for Barlow's disease.
Transitioning from sternotomy to robotically assisted mitral surgery requires adaptation and training that involves patient selection, clinical experience, surgical technique, and team synergy. Herein, we present a video that shows several key steps and helpful tricks to facilitate a robotic approach to complex mitral repairs.
MITRAL VALVE REPAIR VIA STERNOTOMY

ADAPTATION TRAINING

MITRAL VALVE REPAIR ROBOTICALLY ASSISTED