Masters of Cardiothoracic Surgery

The periareolar approach to robotic mitral valve repair

Francesco Musumeci, Federico Ranocchi, Antonio Lio

Department of Cardiac Surgery and Heart Transplantation, Azienda Ospedaliera San Camillo Forlanini, Rome, Italy

Correspondence to: Antonio Lio, MD. Department of Cardiac Surgery and Heart Transplantation, Azienda Ospedaliera San Camillo Forlanini, Circonvallazione Gianicolense, 87, 00152 Rome, Italy. Email: antoniolio@hotmail.it.

Submitted May 11, 2022. Accepted for publication Aug 09, 2022.
doi: 10.21037/acs-2022-rmvs-12
View this article at: https://dx.doi.org/10.21037/acs-2022-rmvs-12

Clinical vignette

We report the case of a 60-year-old female admitted to our institution due to severe mitral valve (MV) regurgitation. No significant comorbidities were reported. At admission, the patient reported mild exertion dyspnea (NYHA functional class III).

Preoperative echocardiography showed a well-functioning left ventricle (LV) (LV ejection fraction of 75%) with a severe mitral regurgitation due to flail of the P2 segment of the posterior leaflet. The patient was scheduled for a robotically-assisted, minimally invasive MV repair through a periareolar approach.

Surgical technique

Preparation

The patient is placed in a supine position with an air sac under the right scapula, thereby elevating the right chest to achieve optimal exposure of the working field. After draping, the lateral half-circumference of the areola is marked.

Exposition

A femoro-femoral platform is generally used to establish cardiopulmonary bypass (CPB). Femoral vessels are exposed through a two- to three-cm transverse incision in the groin: Two single 5-0 polypropylene purse-string sutures are inserted on the artery and vein, respectively. Femoral vein cannulation is done under transesophageal echocardiographic guidance using a bicaval view to ensure that the cannula is properly advanced into the superior vena cava. Arterial cannulation is performed with the Seldinger technique: echocardiography is generally used to visualize the wire advancing into the descending aorta.

Operation

A semi-periareolar skin incision is performed and the fourth intercostal space (ICS) is entered under the mammary gland, preserving it. A soft-tissue retractor is then inserted into the mini-thoracotomy. Four dedicated robotic ports are then inserted: the port for the video assistance is always positioned through the principal periareolar incision in the fourth ICS, medial to the working access point and external to the soft-tissue retractor. The second port, for the left robotic arm, is positioned in the third ICS and the third port, for the right robotic arm, just under the mammary gland in the sixth ICS. The last port access is positioned in the fourth ICS medial to the first, just next to the sternum, for the atrial retractor. After CPB establishment and pericardium opening, a 3-0 purse-string suture reinforced with a Teflon pledget is made on the ascending aorta for insertion of a combined Y-shaped vent/cardioplegia catheter. The aorta is clamped using the Chitwood aortic clamp, that is inserted through the second ICS; the cold crystalloid cardioplegia solution (Custodiol) is delivered as a single dose/shot (20 mL/kg) into the aortic root. The MV is approached through the Sondergaard's groove and exposed using the dedicated robotic left atrial retractor; after MV analysis, the repair is performed: the proposed repair technique consists of a triangular resection of P2 segment and annuloplasty with a flexible band. Annuloplasty sutures are always tied using the Cor-Knot system (LSI Solutions, Victor, NY, USA).

Completion

After left atrial closure and de-airing, the aortic vent purse-string suture is tied with the Cor-Knot system (LSI Solutions) to make this passage easy and fast. The patient is weaned from CPB, and the operation is completed in a standard fashion. Particularly, after thoracotomy closure, the parenchyma of the breast is repaired by glandular approximation with interrupted sutures to prevent any deformity. The semi-periareolar incision is sutured with a 4-0 nylon running suture.

Comments

Clinical results

From April 2015 to January 2022, twelve patients underwent robotic MV surgery through a periareolar access. MV repair by means of annuloplasty and leaflet resection was performed in all patients. Aortic cross-clamp and CPB times were 93±32 and 140±32 minutes, respectively. Postoperative results were excellent: no patients died, and no significant postoperative events occurred. Moreover, no conversion to standard sternotomy was recorded. Median Intensive Care Unit (ICU) stay was one day, and median in-hospital stay was six days. No bleeding events were recorded, and blood transfusion (one red blood unit) was necessary only in one patient.

Advantages

Robotic MV surgery has gained increasing consensus as it has proved to be an efficient minimally invasive option, with excellent short- and long-term results (1,2). Potential benefits are related to reduced blood loss, lower morbidity and faster recovery with shorter in-hospital lengths of stay (1-3). Particularly, in our opinion, the periareolar approach guarantees optimal exposure of the MV, enabling the surgeon to perform complex MV repairs (4,5), associated with a cosmetic skin incision.

Caveats

For surgeons just beginning their experience with robotic surgery who want to opt for a periareolar access, we suggest performing easy MV procedures in female patients with large breasts. When the breast is small, e.g., in male patients or in patients with a small areola, a simple modification of the proposed technique, that consists of an equatorial semiperiareolar incision with a small medial and lateral para-areolar extension, is suggested.

Acknowledgments

Funding: None.

Footnote

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. Cao C, Wolfenden H, Liou K, et al. A meta-analysis of robotic vs. conventional mitral valve surgery. Ann Cardiothorac Surg 2015;4:305-14.
2. Chitwood WR Jr. Robotic mitral valve surgery: overview, methodology, results, and perspective. Ann Cardiothorac Surg 2016;5:544-55.
3. Phan K, Xie A, Di Eusanio M, et al. A meta-analysis of minimally invasive versus conventional sternotomy for aortic valve replacement. Ann Thorac Surg 2014;98:1499-511.
4. Poffo R, Montanhesi PK, Toschi AP, et al. Periareolar Access for Minimally Invasive Cardiac Surgery: The Brazilian Technique. Innovations (Phila) 2018;13:65-9.
5. Musumeci F, Mariscalco G, Ranocchi F, et al. Transareolar Robotic-Assisted Access to the Mitral Valve. Innovations (Phila) 2015;10:438-40.

Cite this article as: Musumeci F, Ranocchi F, Lio A. The periareolar approach to robotic mitral valve repair. Ann Cardiothorac Surg 2022;11(5):548-549. doi: 10.21037/acs-2022-rmvs-12

