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The Best Exposure of the Mitral Valve: The Pulmonary Veins Isolation Approach

Ovidio A Garcia-Villarreal*

Department of Cardiac Surgery, Hospital of Cardiology UMAE 34, IMSS, Monterrey, Nuevo Leon, Mexico

***Corresponding author:** Dr. Ovidio A, Sierra Nayarita 143, Col. Virginia Tafich, 66374, Santa Catarina, Nuevo León, México, Tel: +52 81 83 88 89 17; **E-mail:** ovidiogv@hotmail.com

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Abstract

Optimal exposure is one of the key factors for a successful MV surgery. Because the left atrium is located at the back of the heart, MV exposure may be very difficult. This article describes an approach which consists in sectioning the antrum of the pulmonary veins. By rotating and pulling out the heart, the mitral valve can be fully exposed. This technique is highly recommended for those cases with small left atrium.

Keywords: Cardiac surgical procedures; Heart atria; Mitral valve; Pulmonary veins

Introduction

Perfect exposure of the mitral valve (MV) is crucial to perform any type of MV surgery. Small left atrium (LA), posterior location of the LA in the heart, a very deep thoracic cavity and median sternotomy as preferred usual approach are factors affecting the MV visualization. Sometimes, the conventional LA incision through Sondergaard's groove does not give ideal exposure. Taking into account that the LA is located at the back of the heart, disconnection of the pulmonary veins (PV) antrum from the LA and twisting the heart by clockwise rotation offers an excellent solution for MV exposure.

Surgical Technique

Operation is performed through a full median sternotomy. Ascending aorta and bicaval cannulation is used. Cardiopulmonary bypass is established to moderate hypothermia. The aorta is cross-clamped and cold anterograde cardioplegic solution is administered. The LA is opened vertically from the right side in front of the right PV as usual. Two median Deaver retractors are placed under the MV. This manoeuvre makes it possible to identify the bulging between the PV antrum and the rest of the LA. The incision is extended inferiorly through the mitral itsmus until reaching the area between the base of the LA appendage and the left PV. Then, the incision is prolonged behind the superior vena cava and all around the LA roof encompassing the other end of this one. Two landmark sutures are placed in both sides of the LA before its division in order to facilitate the future anastomosis while preventing some malalignment. PV are now completely isolated. At this point, Deaver retractors are removed, and the heart is twisted by clockwise rotation. By a translation of the sectioned plane of the LA to another one more horizontal and anterior making a turn of almost 180 degrees, the surgeon can work on both the MV and LA at ground level. A very exceptional view of the MV is obtained (Figure 1). After MV surgery has been made, the heart is repositioned into place and the LA is sewn with a 3-0 prolene over-and-over running suture, begining at the most posterior point, according to the two marking sutures.

Discussion

Optimal visualization of the MV is required for any MV surgery. Several factors such as the space orientation of the MV pointing backwards, the

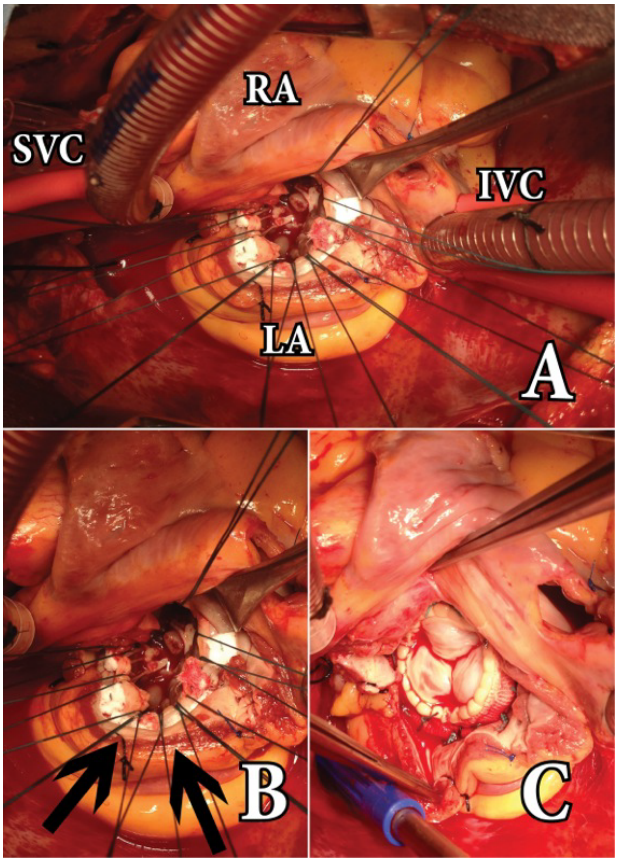

Figure 1: Different stages of operation. A: Panormic view of the mitral valve approach. B: Once the pulmonary veins have been isolated, the heart is twisted by clockwise rotation. With this maneuver, the posterior border of the left atrium becomes the most anterior structure in the operative field. The arrows indicate the sectioned posterior border of the left atrium. C: Mitral valve bioprosthesis has been inserted under vision of all the native mitral annulus.

IVC: Inferior Vena Cava, LA: Left Atrium, RA: Right Atrium, SVC: Superior Vena Cava.

Variable	
Cases	179
Age	62 ± 17 years
Gender, Female	127(70.9%)
Mitral valve pathology	
Pure Stenosis	8 (4.5%)
Pure Regurgitation	70(39.1%)
Combined stenosis and regurgitation	101(56.4%)
NYHA	2.7 ± 1.3
LVEF	0.51± 0.07
Left atrial diameters	
Supero-inferior	6.1 ± 2.3 cm
Antero-posterior	7.6 ± 2.1 cm
Transversal	5.8 ± 2.0 cm
PASP	61 ± 13 mm Hg
LVESD	39 ± 1.1 mm
LVEDD	49 ± 0.7 mm
Sinus rhythm	87(48.6%)
Atrial fibrillation	86 (48%)
Other rhythm	06(3.4%)
Intraoperative results	
Operative mortality	09 (5.02%)
In-hospital mortality	08 (4.5%)
CBP time	140 ± 15 min
Aortic cross-clamp time	115 ± 18 min
Mitral valve procedures	
Biological prosthesis	116 (64.8%)
Mechanical prosthesis	43 (24%)
Mitral valve repair	20 (11.2%)
Associated procedures	
Tricuspid valve repair	35 (19.6%)
Tricuspid valve replacement	02 (1.11%)
Aortic valve replacement	12 (6.7%)
Coronary artery bypass grafting	05(2.8%)
Left atrial reduction	27 (15%)
Left atrial appendage removal	136 (75.9%)
Postoperative results	
Bleeding in 24 hrs	480 ± 75 mL
Reoperation for bleeding	9 (5.02%)
Definitive pacemaker	6 (3.4%)
Use of vasoactive agents	130 (72.7%)
Acute renal failure	13 (7.3%)
Extubation in OR	125 (69.8%)
Prolonged intubation > 8 hours	42 (23.4%)
LOS in ICU	3.4 ± 2.2 days
LOS in-hospital (postoperative)	9 ± 5 days

Table 1: Preoperative, intraoperative and postoperative data of all patients undergoing mitral valve surgery by the pulmonary veins isolation approach.

location of the LA at the back of the heart and the median sternotomy as preferred approach may adversely affect the correct visualization of the MV. Moreover, a small LA and a very deep thoracic cavity can exacerbate the lack of MV exposure. All these factors may make the classic conventional LA incision inadequate to address the MV. Several alternative MV approaches have been described [1-6].

We must keep in mind that the LA can be divided into two main parts, viz, one section containing the MV and LA appendage, and another one containing the PV (also called PV antrum). In this technique described here, the surgeon totally cuts the LA into those two halves described above.

PV isolation approach for MV surgery proposed in this paper has the advantage of working at ground level. This is thanks to the twisting of the heart by clockwise rotation after the PV has been isolated. Making a turn of almost 180 degrees, the sectioned plane of the LA is translated to another more anterior and horizontal one. As a result, the surgeon can work on the MV at floor level. A spectacular view of the MV is obtained by this technique.

It is sometimes difficult to choose the most appropiate MV approach, and opening the LA is mandatory. Most of the time, the LA is initially opened in a conventional fashion parallel to the Sondergaard´s groove. If additional exposure is needed, the original incision is simply extended into the LA. This technique is also useful when a Cox-maze III procedure is performed in addition to the MV surgery. An excellent surgical view of both, the LA appendage as well as the MV itsmus is achieved with this technique.

This approach described here was initially performed as a part of atrial fibrillation surgery [7,8]. It has been successfully used by the author in more than 150 cases of MV disease since 1998 (Table 1).

In conclusion, the PV isolation approach for MV surgery is a good solution for cases with not optimal MV exposure. It addresses the issue of the posterior location of the LA and MV at the back of the heart. This approach is highly recommended in cases with small LA.

Conflict of Interest:

None declared

References

1. Bowman FO Jr, Malm JR (1965) The transseptal approach to mitral valve repair. Arch Surg 90:329-331.
2. Meyer VW, Verska JJ, Lindesmith GG, Jones JC (1965) Open repair of mitral valve lesions-the superior approach. Ann Thorac Surg 1:453-457.
3. Dubost C, Guilmet D, de Parades B, Pedeferri G (1966) New technique of opening of the left auricle in open-heart surgery: the transseptal bi-auricular approach. Presse Med 74:1607-1608.
4. Selle JG (1984) Temporary division of the superior vena cava for exceptional mitral valve exposure. J Thorac Cardiovasc Surg 88:302-304.
5. Garcia-Villarreal OA, Argüero RS, Diaz-Devis C (1996) Transversal trans-septal biatrial approach for mtral valve surgery. J Cardiovasc Surg 37:145-148.
6. Garcia-Villarreal OA, González-Oviedo R, Rodriguez-González H, Martínez-Chapa HD (2003) Superior septal approach for mitral valve surgery: a word of caution. Eur J Cardiothorac Surg 24:862-867.
7. Garcia-Villarreal OA, Rordiguez H, Treviño A, Gouveia AB, Argüero R (2001) Left atrial reduction and mitral valve surgery: the "funcional-anatomic unit" concept. Ann Thorac Surg 71:1044-1045.
8. Garcia-Villarreal OA, Gouveia AB, Gonzalez R, Arguero R (2002) Left atrial reduction. A new concept in surgery for chronic atrial fibrillation. Rev Esp Cardiol 55:499-504.