

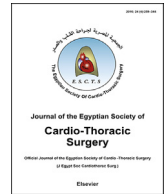
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## Long term results of mitral valve repair of posterior or bileaflet prolapse with two different concepts<sup>☆</sup>

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### ABSTRACT

**Background:** To evaluate the long term results of two simple techniques for correction of posterior or bileaflet prolapse with no incidence of postoperative systolic anterior motion of the anterior mitral leaflet (SAM).

**Methods:** From June 2010 to June 2016, 64 patients underwent mitral valve repair. Edge to edge (35 patients) (group A) Vs. ('U') technique, (29 patients) (group U). A mean follow-up of  $58 \pm 13$  months in (group A) and  $42 \pm 16$  months in (group U).

**Results:** There were no early or late deaths. Both surgical techniques showed excellent immediate postoperative results regarding reduction of the mitral regurgitation grade-accepted mean pressure gradients (MPG) through the mitral valve ( $2.3 \pm 0.6$ ). Left ventricular function was maintained, and tricuspid regurgitation grade was reduced overall. During the follow-up period, Significant increase in the MPG was observed in (group A) with no significant change in the degree of mitral regurge. The majority of them with significant increase are due to the rheumatic pathology (9/12). They became symptomatic and came out of the study after a follow up period of  $41 \pm 13$  months and their valves were replaced while those with non rheumatic pathology remained of reasonable gradient. Redo mitral valve replacement was done in only one patient in (group U) due to early endocarditis.

**Conclusions:** Despite the rationale is completely different in both techniques (double orifice, double leaflet(A) versus Uni-leaflet, Uni-orifice(U)), the long-term results are comparable in both. The U technique is mostly better in rheumatic patients but need more follow up on larger scales of this patient group.

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## 1. Introduction

The well known edge-to-edge technique introduced in 1991 by Alfieri [1] for treatment of mitral regurgitation (MR) is in common use by cardiac surgeons. It consists of anchoring the free diseased leaflet edge to the corresponding healthy opposing one. It can be used either as a planned operation or as a rescue or bailout for any residual prolapse after any conventional technique for mono/bileaflet prolapse with or without chordal rupture.

Few years ago, an alternative surgical approach for the same category of patients in need for mitral valve (MV) repair was developed by Calafiore [2]. He realized that correction of posterior leaflet (PL) prolapse whether associated with chordal rupture or not could be reached by suturing the scallops all together making it all in one and this step can only be done after reduction of the excess leaflet height in any of the scallops mostly in P2, and the novel (“U”) technique appeared. Annular over-reduction is coming as a final step of the procedure in both of the techniques.

Both techniques can offer the surgeon the advantage of simplicity, reproducibility and effectiveness with no incidence of postoperative systolic anterior motion of the anterior mitral leaflet (SAM). Exercise echocardiography is recommended nowadays in valvular evaluation specially in borderline cases when the resting images are not conclusive and the symptoms of the patients are atypical in both stenotic and regurgitant lesions. Significant increase in SPAP >60 mmHg or a rise in valve gradient to >15 mmHg during exercise is becoming now (class IIB, level of evidence C) indication for invasive intervention even in mild symptomatic patients according to the American College of Cardiology/American Heart Association (ACC/AHA) guidelines [3]. Also, percutaneous mitral balloon valvotomy is indicated in asymptomatic patients with moderate to severe mitral stenosis and favourable characteristics, who reach an SPAP >50 mmHg at rest or >60 mmHg during exercise (class I, level of evidence C). European Society of Cardiology (ESC) guidelines considered it also in borderline mitral stenotic lesions and in asymptomatic as well as patients with atypical symptoms [4]. Meticulous analysis of the exercise-induced changes in symptoms, SPAP and valve gradients can be the key for decision making. The 2014AHA/ACC valve guideline recommended exercise echocardiography in evaluating the severity of mitral stenosis when there is a discrepancy between the resting echocardiographic findings and clinical findings [5]. In patients who cannot exercise, dobutamine has been used to increase heart rate [6].

The current study objective was to compare our long term results of these two simple techniques, we are using for correction of posterior or bileaflet prolapse. We used the dobutamine stress echocardiography in our study to follow up the results of our repaired mitral valve starting from the immediate postoperative while still in the Operating Room (OR) and over the follow up period of this study.

## 2. Patients and methods

Retrospective data collection for 64 patients underwent MV repair From June 2010 to June 2016, for isolated posterior leaflet prolapse (n = 23) or bileaflet prolapse (n = 41) with or without chordal rupture. Edge to edge, our initially preferred technique, used in 35 patients (group A) was compared to the newly developed Uniscallop (“U”) technique, used in 29 patients (group U). In both groups, the annulus was reshaped using a 3D ring annuloplasty (30–32 mm). Preoperative echocardiography was done for all patients. Coronary Angiography was considered for all patients above the age of 40ys going for valve surgery whether male or female. Postoperative echocardiography was performed in all patients after a mean follow-up of  $58 \pm 13$  months in (group A) and  $42 \pm 16$  months in (group U).

### 2.1. Surgical technique

Peri-operative transesophageal echocardiography (TEE) was obtained in all patients. For the two groups, after median sternotomy, or right mini-thoracotomy, operative procedures were conducted on normo-thermia with bicaval cannulation and cold blood antegrade cardioplegia in full sternotomy cases or custadiol cardioplegia in cases of right mini-thoracotomy. Routine trans-septal approach to the mitral valve was used in all cases.

In group A, all the patients underwent an edge-to-edge repair. A particular attention was paid to the diameter of both neo-orifices, which should never be less than 19–20 mm of diameter as measured by Heggar dilators at the end of edge-to-edge apposition.

In group U, the strategy was annular over-reduction after scallop suturing making the whole posterior leaflet as one scallop. Longitudinal plication to the scallops before leaflet fixation in vertical position was done only if indicated after evaluation of the height of the scallops to make it all uniform [2]. Complete rings (Medtronic 3-D) were implanted in all of the cases (100%) in both groups. In patients with associated anterior leaflet (AL) prolapse, 2 or more artificial chordae were used. The length of neo-chordae was adjusted as previously described by Calafiore et al. [7]. Any deviant cusp, if present, was sutured with the main body of the leaflet. Chordal re-implantation was carried out for anterior leaflet.

Correction of moderate or greater tricuspid regurgitation was performed in all patients using the Sorin Band caliber 50 mm for ring annuloplasty, if present, whereas correction of mild tricuspid regurgitation was performed only in patients with annular enlargement in both groups.

Radiofrequency ablation was done for patients with atrial fibrillation (AF) in the usual manner using the radiofrequency system from Medtronic (Cardioblate® Gemini® Surgical Ablation Device).

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