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COMPARISON BETWEEN MITRAL CLIP THERAPY AND SURGICAL REPAIR OF MITRAL REGURGITATION IN PATIENTS WITH LEFT VENTRICULAR DYSFUNCTION

By

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ABSTRACT

Background: Mitral-valve repair can be accomplished with a procedure that involves the percutaneous implantation of a clip that grasps and approximates the edges of the mitral leaflets at the origin of the regurgitate jet.

Objective: Our study was performed to compare surgical repair and mitral clip repair for severe secondary MR after failure of maximum medical treatment.

Patients and methods: We none randomly were sixty patients with moderately severe or severe (grade 3+ or 4+) mitral regurgitation, 30 patients underwent percutaneous repair by clip and 30 patients underwent conventional surgery for repair of the mitral valve. The primary composite end point for efficacy was freedom from death, required surgery for mitral valve dysfunction (stenosis or regurgitation), and absence of significant MR (grade 3+ or 4+) at 6 months follow up.

Results: At 6 months, the rates of the primary end point for efficacy were 79% in the percutaneous repair group and 60% in the surgery group (P = 0.020). The respective rates of the components of the primary end point were as follows: death, 6.9%versus 25%, required surgery for mitral-valve dysfunction, 6.9% versus 10.7%; and significant MR, 16% versus 33%. Major adverse events occurred in 20% of patients in the percutaneous-repair group and 50% of patients in the surgery group at 30 days (P<0.001).

Conclusions: Percutaneous treatment was associated with increased safety, improved left ventricular volumes, clinical improvements in NYHA classes and quality of life.

Keywords: MR, Mitraclip and surgical repair.

INTRODUCTION

The presence of sever mitral regurgitation increased risk of heart failure and impaired long term prognosis. The mitral valve is a highly intricate structure with several coordinated components. The functional anatomy of this structure includes the myocardium of left ventricle, the subvalvular apparatus (including papillary muscles and chorda tendineae), the mitral annulus, the mitral leaflets (anterior long leaflet and posterior short leaflet), and left atrium. Intrinsic abnormalities or disruption of these coordinated functions of these individual

parts can result in MR *(Sorajja et al., 2016).*

The natural history of patients with chronic MR depends on the degree of regurgitation, the cause of the underlying disorder, and the degree of left ventricular (LV) dysfunction. When severe MR is present, approximately 5% to 10% of patients per year develop significant symptoms (LV failure, pulmonary hypertension, atrial fibrillation, and stroke), clinical indications for surgery, death, or all of these *(Nishimura et al., 2017).*

Open heart surgery for valve repair by annular ring with or without resection or by chordal repair, whether performed by mini-thoracotomy or midline sternotomy is associated with a small but definite risk of morbidity and mortality. Ottavi Alfieri and his colleague describe anew surgical repair technique for complex anterior mitral valve prolapse, where the prolapsed segment is sutured to the opposing middle scallop of the posterior leaflet resulting in reducing mitral leakage and creation of double orifice mitral valve. There are four major categories of percutaneous mitral valve interventions aimed at reducing MR, edge-to edge clip, transcatheter mitral valve replacement, mitral annuloplasty and placement of artificial chordae, and catheter based plugging of paravalvular leaks. Among these, edge to edge repair is the only catheter based MV intervention approved by the United States Food and Drug Administration for commercial use *(Zoghbi et al. 2017).* In the four categories of percutaneous mitral valve interventions should assessing residual mitral regurgitation during procedure followed by an overall evaluation of MR outside the cath lab.

Our study was performed to compare surgical repair and mitral clip repair for severe secondary MR after failure of maximum medical treatment.

PATIENTS AND METHODS

This prospective and retrospective, controlled, non-randomized study enrolled 60 patients with grade 3 or grade 4 MR. The study was done at National Heart Institute, Nasr Institute, Cairo, Egypt and MCC, KSA from July 2016 to October 2019.

We aimed to explore efficacy and safety of percutaneous repair by clip as compared with surgical repair on secondary mitral regurgitation.

All patients signed informed consents and the study was approved by the local ethics committee. Key inclusion criteria were; patients who were presented with grade 3+ or more MR either ischaemic or non ischaemic. EF< 60%, left ventricular endsystolic diameter (LVESD) ≥ 40mm, pulmonary hypertension, left atrial diameter (LAD)≥ 55mm was an indication for severity and surgery. Primary regurgitant jet is no commissural. Age ≥ 18 years old. Symptomatic (NYHA class II, III or ambulatory IV) despite guidelines optimal medical treatment (ACEI, BB, Diuretics, revascularization and CRT if indicated). High likelihood of successful repair 95% and mortality 1% by highly experienced surgeon in specialized centers for surgical repair. candidate for percutaneous clipping; Pathology in A2–P2 zone, Coaptation length ≥2 mm, Coaptation depth ≥ 11 mm, Mitral valve orifice area ≥ 4 cm2.

Key exclusion criteria were: patients with rheumatic MR, calcific leaflets, infective endocarditis and flail leaflets (primary mitral regurgitation), MV orifice area <4 cm2, cerebrovascular stroke (CVS) in last 30 days, Untreated clinically significant coronary artery disease (CAD) requiring revascularization, leaflet anatomy that might preclude MitraClip implantation, Life expectancy <12 months owing to no cardiac conditions, need for emergent or urgent surgery for any reason or any planned cardiac surgery within next 12 months, prior mitral valve leaflet surgery or any currently implanted prosthetic mitral valve, or any prior trans catheter mitral valve procedure.

Every patient included in this study was subjected to medical history and previous admission to cardiology department including analysis of demographic data (age, sex), presence of risk factors, coronary atherosclerosis, associated comorbidities, general and cardiac examination, 12 leads ECG and routine laboratory investigations.

Using General Electric System Vivid-3 machine with (2.5-5) MHZ probe, two dimensional echo, M-Mode, Doppler and Simpson's methods were performed to obtain measurements of LV volumes, ejection fraction, segmental wall motion abnormality and mitral regurgitation according to recommendation of American society of echocardiography *(Zoghbi et al., 2017).* The following measurements were obtained; LV end diastolic volume (LVEDV): Normal value (95±18 mL), LV end systolic volume (LVESV): Normal value (39±11 mL), LV end diastolic volume index (LVEDVI): Normal Value (45±10ml/ m2), LV end systolic volume index (LVESVI): Normal value (21±9ml/ m2), severity of secondary MR by effective regurgitate orifice area (EROA) ≥0.2, regurgitate volume (RV)≥30 ml/beat, vena contracta (VC) ≥ 4mm and Regurgitate Fraction(RF)≥50 ml, and anatomical suitability of mitral leaflets for clipping. All data were analyzed by expert echo cardiographer *(Stone et al., 2018).*

Coronary angiography: was done according to recommendation of ESC guidelines. Percutaneous mitral repair and surgical mitral repair. The MitraClip device is a 4-5 mm wide cobalt chromium implant with two arms that are opened and closed with the use of the delivery system handle. Atrial transseptal puncture is performed. The mitral leaflets are grasped, and the device is closed to approximate the leaflets. Adequate reduction of mitral regurgitation to a grade of 2+ or less is assessed with the use of TEE. Patients with grade 3+ or 4+ mitral regurgitation despite device treatment were referred for elective surgical valve replacement. Patients were treated with heparin during the procedure, with aspirin at a dose of 325 mg daily for 6 months and with clopidogrel at a dose of 75 mg daily) for 30 days after the procedure *(Franzen et al., 2010).*

Six months transthoracic echocardiography follow up was performed with special emphasis on the left ventricular ejection fraction, left ventricular end diastolic and systolic diameters and volumes, and mitral regurgitation or stenosis.

The primary end point for efficacy was freedom from death, from surgery for mitral-valve dysfunction, and from grade

3+ or 4+ mitral regurgitation at 6 months. The primary safety end point was a composite of major adverse events within 30 days. Six months secondary end points included the change in left ventricular dimensions and volumes, New York Heart Association (NYHA) class and quality-of-life.

Statistical analysis:

Data were presented as mean+ SD for continuous data and as number (%) for categorical data. Between groups comparison was done using Mann–Whitney U test for continuous data and by Chi-square test (or Fischer exact test) for qualitative data. Level of evidence was detected to be significant at P value < 0.05. Data were collected and analyzed by SPSS (version 17, USA, IL).

RESULTS

The total number of patients included in the study were 60 patients, they were 39 males (65%) and 21 females (35%), in group A (patients with mitral clip) there were 21 males (70%) and 9 females (30%), in group B (patients with surgical repair) there were 18 males (60%) and 12 female (40%) (P-value 0.417). The mean age was 64.9 ± 13.4 years in group A and 53.3 ± 10.3 years in group B (P-value <0.001). There were 33(55%) diabetic patients; in group A, 15 (50%) and 18 (60%) in group B. There were 30 (50%) hypertensive patients; in group A they were 16 (53.4%) and 14 (46.7%) in group B (P-value 0.418) **(Table 1)**.

Table (1): Demonstrated demographic data and risk factors

Baseline characteristics	MV clip	MV surgery	P-value
Count	30	30	
Age (years)			
Mean ± SD	64.9 ± 13.4	53.3 ± 10.3	<0.001
BMI (kg/m2)			
Mean ± SD	27.0 ± 3.3	28.3 ± 3.0	>0.05
Demographics and co-morbidities			
Male gender	21 (70%)	18 (60%)	>0.05
DM	15 (50%)	18 (60%)	>0.05
HTN	16 (53.4%)	14 (46.7%)	>0.05
Dyslipidemia	9 (30%)	15 (50%)	>0.05
CKD	9 (30%)	10 (33.3%)	>0.05
NYHA class			
Class 2	5 (16.7%)	10 (33.3%)	>0.05
Class 3	21 (70%)	17 (56.7%)	
Class 4	4 (13.3%)	3 (10%)	

Coronary angiography 10 (33.3%) with normal coronary angiography versus 20 (66.7%) with coronary artery disease (demonstrated that there was 7 of them post CABG and 13 patients post PCI) in group A patients. In group B 14 (46.7%)

with normal coronary angiography versus 16 (53.3%) diseased coronary arteries (11 patients were revascularized by CABG and 5 patients with non-significant lesions and others not suitable for PCI or CABG continue on medical treatment) (p-value was 0.292). As regard risk stratification scores, mean EURO score was 8.2 ± 0.9 in group A versus 4.5 ± 1.2 in group B with statistically highly significant as regard risk in mitral clipping patients (p-value ≤ 0.001 . mean STS score was 7.8 ± 0.9 in group A versus 3.1 ± 0.7 in group B with statistically significant as regard risk in mitral clip patients (p-value ≤ 0.001) **(Table 2)**.

Table (2): Coronary angiographic data and cardiothoracic risk scores.

CA data and cardiothoracic risk scores	**MV clip 30**	**MV surgery 30**	P-value
CA findings			
Normal	10 (33.3%)	14 (46.7%)	>0.05
CAD	20 (66.7%)	16 (53.3%)	
EURO score Mean ± SD	8.2 ± 0.9	4.5 ± 1.2	<0.001
STS score Mean ± SD	7.8 ± 0.9	3.1 ± 0.7	<0.001

Mean ICU stay in days was 1.9 ± 0.9 in group A versus 5.0 ± 2.0 in group B (p-value= significant). Hospital stay with relation to residual MR was 8 (26.7%) in group A versus 0(0%) in group B with no residual MR, 12 (40%) in group A versus 10 (33.3%) in group B with grade I MR, 10 (33.3%) in group A versus 14 (46.7%) in group B with grade II MR, 0 (0%) in group A versus 4 (13.3%) in group B with grade III MR and patients with grade IV MR was 0(0%) in group A versus 2 (6.7%) in group B (p-value was 0.001) **(Table 3)**.

Table (3): Comparison between the studied groups regarding the in-hospital date

In-hospital data	**MV clip**	**MV surgery**	P-value
Count	30	30	
ICU stay (days)	1.9 ± 0.9	5.0 ± 2.0	<0.001
post residual MR			
No MR	8 (26.7%)	0 (0%)	<0.001
Grade I	12 (40%)	10 (33.3%)	
Grade II	10 (33.3%)	14 (46.7%)	
Grade III	0 (0%)	4 (13.3%)	
Grade IV	0 (0%)	2 (6.7%)	
In-hospital complications			
Transient neurology	3 (10%)	5 (16.7%)	>0.05
IABCP	1 (3.3%)	11 (36.7%)	0.001
Inotropes	4 (13.3%)	24 (80%)	<0.001
Arrhythmia	3 (10%)	15 (50%)	<0.001
In-hospital mortality	1 (3.3%)	2 (6.7%)	>0.05

The mean LVEDV at baseline was 186.1 ± 37.3 ml (180.4 ± 34.7 ml in group A versus 191.8 ± 39.5 ml in group B, P = 0.243). After 6 months, LVEDV was 168.4 ± 32.1 ml (163.0 ± 32.6 ml for group A versus 175.4 ± 30.7 ml for group B, p= 0.186). The mean LVESV at baseline was 130.2 ± 37.6 ml (128.7 ± 41.1 ml in group A versus131.7 ± 34.4 ml in group B, P = 0.758). After 6 months,

LVESV was 110.8 ± 28.9 ml/m2 (104.6 ± 32.3 ml in group A versus 118.6 ± 22.0 ml for group B, p= 0.097). In group A, LVESV decreased by -20.5 ± 15.4 ml (15.6± 9.2%), p= 0.002), LVESV decreased by -7.3 ± 12.0 ml (5.3 ± 8.9%) in group B, p=0.002). The mean LVEF at baseline was 31.1 ± 8.4% (30.5 ± 10.6 % in group A versus 31.8 ± 6.1 % in group B, P = 0.553). After 6 months, LVEF was 35.0 ± 7.3 % (37.0 ± 8.7% for group A versus 32.4 ± 3.7% for group B, p= 0.029) table .The mean LAV at baseline was 139.7 ± 16.6 ml (138.2 ± 16.5 ml in group A versus141.2 ± 16.8 ml in group B, P = 0.492). After 6 months, LAV was 134.2 ± 15.3 ml (131.9 ± 16.6 ml in group A versus 137.0 ± 13.2 ml for group B, p= 0.261). As regard severity of MR in follow up echocardiography, in grade I was 11 (40.7%) in group A versus 3 (14.3%) in group B, grade II MR was 11 (40.7%) in group A versus 9 (42.9%) in group B, grade III MR 4 (14.8%) in group A versus 8 (38.1%) in group B and in grade IV MR 1 (3.7%) in group A versus 1 (4.8%) in group B with statistical significance (p-value 0.036) **(Table 4)**.

Table (4): Echocardiographic from baseline to 6 months

Echocardiographic data	**MV clip n=30**	**MV surgery n=30**	P-value
LVEDV at baseline (mL)			
Mean ± SD	180.4 ± 34.7	191.8 ± 39.5	0.243
LVEDV at 6 months (mL)			
Mean ± SD	163.0 ± 32.6	175.4 ± 30.7	0.186
LVESV at baseline (mL)			
Mean ± SD	128.7 ± 41.1	131.7 ± 34.4	0.758
LVESV at 6 months (mL)			
Mean ± SD	104.6 ± 32.3	118.6 ± 22.0	0.097
Change in LVESV (mL)			
Mean ± SD	-20.5 ± 15.4	-7.3 ± 12.0	0.002
Change in LVESV (%)			
Mean ± SD	15.6 ± 9.2	5.3 ± 8.9	<0.001
EF at baseline (%)			
Mean ± SD	30.5 ± 10.6	31.8 ± 6.1	0.553
EF at 6 months (%)			
Mean ± SD	37.0 ± 8.7	32.4 ± 3.7	0.029
LAV at baseline (mL)			
Mean ± SD	138.2 ± 16.5	141.2 ± 16.8	0.492
LAV at 6 months (mL)			
Mean ± SD	131.9 ± 16.6	137.0 ± 13.2	0.261
MR severity at 6 months	**by VC, EROA, RF & RV**		
Grade I	11 (40.7%)	3 (14.3%)	> 0.05
Grade II	11 (40.7%)	9 (42.9%)	
Grade III	4 (14.8%)	8 (38.1%)	
Grade IV	1 (3.7%)	1 (4.8%)	

Improvement of symptoms among all population studied during follow-up **(Table 5)**.

Table (5): 6-month evaluation after hospital discharge (N=48)

6-month clinical and echo data	MV clip	MV surgery	P-value
Count	27	21	
NYHA class at 6 months			
Class 1	4 (14.8%)	2 (9.5%)	> 0.05
Class 2	20 (74.1%)	16 (76.2%)	
Class 3	3 (11.1%)	3 (14.3%)	

Composite endpoint was recorded in 6 (20.7%) patients in group A versus 14 (50%) patient with statistically significant (P-value was 0.020).Stroke was recorded in 2 (6.9%) patients in group A versus 4 (14.3%) patients in group B (P-value was 0. 423) **(Table 6)**.

Table (6): 6 months clinical end points (N= 57)

6-month complications	MV clip	MV surgery	P-value
Count	29	28	
Composite endpoint	6 (20.7%)	14 (50%)	<0.03
Stroke	2 (6.9%)	4 (14.3%)	>0.05
Re-do	2 (6.9%)	3 (10.7%)	>0.05
Mortality at 6 months	2 (6.9%)	7 (25%)	>0.05

DISCUSSION

Percutaneous repair of mitral valve in severe secondary MR are beneficial in reducing left ventricular remodeling in patient with secondary mitral regurgitation which leads to reduction in MR and improvement of symptoms and avoiding risk of surgery especially in high surgical risk populations. Several randomized trials one of them showed benefit in reduction in LV remodeling, NYHA classes, valve dysfunctions and clinical end points in comparison to medical treatment alone *(Stone et al., 2018).*

This study evaluated the short term outcome of percutaneous repair of mitral valve in secondary chronic MR in comparison with surgical repair by ring. Percutaneous repair had a significant efficacy and safety in comparison to surgical repair at 6 months.

Athappan et al. (2016) reported that, owing to the invasive nature of surgery and the frequent presence of comorbidities especially for older patients and those with impaired LV function, percutaneous technologies that offer the potential benefit of decreased morbidity, improved recovery time, and shorter hospital stays compared with surgery are poised to significantly alter the treatment paradigm for chronic severe MR in this group. The MitraClip is currently the only available percutaneous option that is approved by the US Food and Drug Administration (FDA) for commercial use in patients with primary MR.

In the EVEREST II trails by *Feldman et al. (2009)* reported that; the implantation of the Mitral Clip was limited to patients with predominantly central (A2/P2) MR, mitral orifice area of greater than 4 cm2, flail gap of less than 10 mm, and flail width of less than 15 mm. Calcification of the valve leaflets in the grasping area and annular

calcifications was considered a contraindication to clipping owing to the potential risk of clip embolization. In our study, mitral clip was highly effective and safe in comparison to surgical repair with composite end point 20% in mitral clip in relation to 50% in surgical repair.

Likely to our results, COAPT trial by *Stone et al. (2018)* reported that among patients with heart failure and moderate to severe or severe secondary mitral regurgitation that remained symptomatic despite maximal guidelines medical therapy, Trans catheter mitral repair resulted in a lower rate of hospitalization for heart failure, lower mortality, and better quality of life and functional capacity.

The point of discrepancy between our study and COAPT study is that in COAPT, mitral clip was preferred for patients that failed maximum medical treatment and not compare head to head mitral clip versus medical while our study compare treatment by mitral clip and surgical repair after failure of optimal medical treatment of heart failure complicated by secondary MR. Unlikely to our results, *Obadia et al. (2018)* reported that no benefit of mitral clip in treatment of secondary mitral regurgitation as compared to medical treatment as regard to re hospitalization and major adverse events.

Unlikely to our result, *Sorajja et al. (2016)*, reported that trans catheter mitral valve repair was approved for treatment of degenerative MR while not approved for functional MR as regard safety and efficacy for severely symptomatic patients with MR and prohibited surgical risk in the united states. Unlikely to our results; EVEREST II; reported that surgery is more effective at reducing MR severity than percutaneous repair with the Mitral Clip device is safer at one year follow up, both therapies had similar effectiveness in improving quality of life, symptoms and effective in improving LV chamber dimensions and volumes through favorable remodeling at four years follow up.

This discrepancy explained by study population in EVEREST II was 73% primary MR and 27% secondary MR, EF more than 25%, LVESD less than 55mm and 2:1 for mitral clip versus surgical repair which can cause statistical bias while our study only on secondary MR and no limitation for EF and LVESD. Near likely to our result, *Feldman et al. (2011)*, reported that percutaneous repair was less effective at reducing mitral regurgitation than surgery before hospital discharge, at 12 and 24 months the rates of reduction in mitral regurgitation were similar, and percutaneous treatment was associated with increased safety, improved left ventricular dimensions, and clinical improvements in NYHA class and quality of life.

Likely to our results; EVEREST II high risk trial9 reported that; the MitraClip device significantly reduced MR, improved clinical symptoms, and decreased LV dimensions at 12 months in high surgical risk patients. The population that was subjected to regular follow-up and recruited in the statistical analysis included 60 patients, divided into two groups A and B, group A included 30 patients had done mitraclip and group B had done surgical repair. Population characteristics, clinical data, and risk

factors were comparable between the two groups. Advanced age was a predictor of success of mitraclip in treatment secondary MR as compared to young age in success of surgical repair.

Feldman et al. (2011), unlike our result found that, in subgroup analysis of advanced age was equal predictor in outcome in mitraclip and surgical repair in comparison to young age was a good predictor of outcomes in surgical repair only. This discrepancy could be explained by differences in study population as main target was in primary MR and small sample secondary MR in *Feldman et al. (2011)* and *Stone et al. (2018)* (COAPT TRIAL), unlike our result found that, age was not a predictor of success in mitral clip. This discrepancy could be explained by COAPT trial compare mitral clip in medically failed patients by optimal medical treatment only while in our study we compare surgical repair by percutaneous repair. As regard to sex, in our study there was no difference in both group, unlike *Feldman et al. (2011)*, founded that there was statistical difference for surgical preference than mitraclip.

In our current study, we found that The mean LVEDV, LVESV, LAV at baseline and six months in both group was non statistically significant while, change in LVEDV % decreased by (10%) in mitral clip and (18%) in surgical repair, with statistical significance, change in LVESV% decreased by (15.6± 9.2%) in mitral clip and (5.3 ± 8.9%) in surgical repair with high statistical significance, After 6 months, LVEF was improved to 37.0 ± 8.7% for mitral clip and 32.4 ± 3.7% for surgical repair. Our results are in concordance with *Feldman et al. (2011)*, who found that the difference between baseline, discharge and follow up echo was statistically significant in both groups and more significant in comparison mitraclip to surgical repair. Also there was concordance with the COAPT trial, *Mack et al. (2018)*, who founded statistical significance as regard mitraclip.

Our result was concordant with EVEREST II high risk trial11 who founded that mitral clip decrease LV dimensions. In our study, there is statistically significance in risk scoring as EURO and STS score with high risk score patients included in mitraclip and low risk patients in mitral repair. This result disconcordant with *Feldman et al. (2011)*, that was founded no rule of risk scoring as predictor of choosing procedure preference.

This discrepancy could be explained by differences in study population and difference in sample size. Also there was concordance with *Stone et al. (2018)* that was use mitraclip in high risk patients as per STS and EURO score. In our study, comparing ischaemic MR and non ischaemic MR was comparable between the two groups, this in concordance with *Feldman et al. (2011)*, in subgroup analysis with no difference between ischaemic and non ischaemic. *Stone et al. (2018)*, reported that no difference between ischaemic and non ischaemic MR in mitraclipping.

In our study, comparing the two subgroups as regarding the clinical outcomes, it was noticed that there was a relatively comparable in-hospital complications in both groups regarding neurological complication and in hospital

mortality however, the mitraclip group (group A) had significantly fewer patients with IABCP insertion, arrhythmia and decompensated heart failure with inotropic support use with highly statistical significance in comparing with surgical repair group (group B).

In our study by using Cox regression analysis resulted in significantly different composite endpoint hazard rate at 6-month follow up (MV surgery versus MV clip, HR: 3.03, 95% CI: 1.16 – 7.89, p-value = 0.023). Our result is concordant with *Feldman et al. (2011)* that reported percutaneous repair by clip is more safe and effective as compared to surgical repair. Our result was concordant with *Franzen et al. (2010)*; reported that MitraClip could be used in patients with severely depressed LV function as it was performed in 51 consecutive patients with a mean age of 73 years with symptomatic functional (69%) or organic MR (31%).

The LV ejection fraction was 36 17%, MitraClip implantation was successful in 96%, reduction in MR severity was grade 1 in 31%, grades 2 in 47%, and grades 3 in 18%, At discharge, 90% showed clinical improvement in NYHA class, no major adverse events and no in-hospital mortality *(Feldman et al., 2016).*

CONCLUSION

Patients presenting with chronic symptomatic severe mitral regurgitation should maximize guidelines optimal medical treatment, mitraclip can be preferred safely particularly in patients declined by surgeon for high risk. At 6 months, both groups had improved left ventricular size, New York Heart Association functional class, and quality-of-life measures, as compared with baseline and with comparing to each other there was statistical significance as regard percutaneous mitral clip.

Limitations of the study: Small sample size. Short follow up period. Lack of randomization, single interventionist and multiple surgeons.

REFERENCES

1. **Athappan G, Raza M and Kapadia S. (2016):** Mitraclip therapy for mitral regurgitation, primary MR. Intervention Cardiol Clin., 5: 71-82.
2. **Feldman T, Foster E, Glower DD, Kar S and Rinaldi MJ. (2011):** Percutaneous repair or surgery for mitral regurgitation. NEJM., 364: 1395-1406.
3. **Feldman T, Kar S, Rinaldi M, Fail P and Hermiller J. (2009):** Percutaneous mitral repair with the mitraclip system. ACC., 54: 686-694.
4. **Feldman T, Mehta A, Guerrero M, Levisay JP and Salinger MH. (2016):** mitral clip therapy for secondary mitral regurgitation. Intervent Cardiol Clin., 5: 83 – 91.
5. **Franzen O, Baldus S, Rudolph V and Meyer S. (2010):** Acute outcomes of MitraClip therapy for mitral regurgitation in high-surgical-risk patients: Emphasis on adverse valve morphology and severe left ventricular dysfunction. European Heart Journal, 31(11):1373-81.
6. **Mack MJ, Abraham WT, Lindenfeld J, Bolling SF and Feldman TE. (2018):** Cardiovascular Outcomes Assessment of the MitraClip in Patients with Heart Failure and Secondary Mitral Regurgitation: Design and rationale of the COAPT trial. Am Heart J., 205:1-11.
7. **Nishimura R, Otto C, Bonow R, Carabello BA and Erwin JP. (2017):** 2017 AHA/ACC focused update of the

2014 aha/acc guideline for the management of patients with valvular heart disease. Circulation, 135: 1159-1195.

8. **Obadia JF, Messika-Zeitoun D, Leurent G, Iung B and Bonnet G. (2018):** Percutaneous repair or medical treatment for secondary MR. NEMJ., 379: 2297-2306.

9. **Sorajja P, Mack M, Vemulapalli S, Holmes DR and Stebbins A. (2016):** Initial experience with commercial transcatheter mitral valve repair in the United States. JACC., 67: 1129-1140.

10. **Stone G, Lindenfeld J, William T, Kar S and Lim S. (2018):** Transcatheter Mitral-Valve Repair in Patients with Heart Failure. NEJM., 379: 2307-2318.

11. **Zoghbi WA, Adams D, Bonow RO, Sarano M and Foster E. (2017):** Recommendations for noninvasive evaluation of native valvular regurgitation: A report from the American society of echocardiography developed in collaboration with the society for cardiovascular magnetic resonance. JACC., 30: 303-371.

مقارنه بين إصلاح الصمام الميترالي بإستخدام المشبك عن طريق القسطره والإصلاح الجراحي لمرضي الإرتجاع الميترالي المصاحب بخلل في الوظائف القلبية

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خلفيـــة البحـــث: الـنهج عـن طريـق الجلـد لإصـلاح الصـمام الميترالـي قـد شـهد محـاولات تقيميـه عديـده علـي مـدي السـنوات الماضـية ويمكـن أن يـوفر بـديلا أقـل ضـرراً للجسـم مـن العمليـه الجراحيـه لعـلاج إرتجـاع الصـمام الميترالي.

الهـدف مـن البحـث: إختبـار سـلامه وفعاليـه إصـلاح الصـمام الميترالـي بإسـتخدام المشـبك عـن طريـق القسـطره التداخليـه الوريديـه لعـلاج إرتجـاع الصـمام الميترالـي وتحسـين الخلـل الـوظيفي المتزايـد لعضـله القلـب اليسـري وتحسين الأعراض التنفسيه الناتج عنه وتحسين نوعية الحياة.

المرضـى وطـرق البحـث: تمـت دراسـة 30 مريضـاً تـم حجـزهم بمراكـز مختلفـه (معهـد القلـب و معهـد ناصـر ومركـز قلـب المدينـه المنـوره بالمملكـه السـعوديه) يعـانون مـن إرتجـاع فـي الصـمام الميترالـي الـوظيفي وذلـك مـن يوليـو 2016 حتـى أكتـوبر 2019، وتـم تقسـيم المرضـى إلـى مجمـوعتين: **المجموعـة الأولـى:** تشـمل المرضـى الـذين تـم علاجهـم عـن طريـق الإصـلاح بإسـتخدام المشـبك بواسـطه القسـطره .**المجموعـة الثانيـة:** وتشمل المرضى الذين تم علاجهم بالإصلاح الجراحي.

نتـــائج البحـــث: تبـــين أن نســـبه حـــدوث ارتجـــاع شـــديد بالصـــمام الميترالـــي كانـــت 18.5% فـــي المجموعـــه (أ) مقابـــل 42.9% فـــي المجموعـــه (ب) وكانـــت نســـبه التحســـن فـــي اتســـاع البطـــين الأيســـر أثنـــاء الإنبســـاط البطينـــي 62.9 مـــم فـــي المجموعـــه (أ) مقابـــل 66.1 مـــم فـــي المجموعـــه (ب) ونســـبه التحســـن فـــي إتســـاع البطـــين الأيســـر أثنـــاء الإنقبـــاض البطينـــي 53.3 مـــم فـــي المجموعه (أ) مقابل 53.8 مم في المجموعه (ب).

الإســـتنتاج: العـــلاج بواســـطة التـــداخل بالقســـطره بإســـتخدام المشـــبك قلـــل مـــن شدة إرتجاع الصمام الميترالى الناتج عن إتساع البطين الأيسر.