VER
Vascular & Endovascular Review

Early Postoperative Outcomes of De Vega Versus Ring Tricuspid Annuloplasty in Patients Undergoing Mitral Valve Replacement

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ABSTRACT

Background: Patients having mitral valve replacement (MVR) frequently have functional tricuspid regurgitation (TR), which is linked to poor postoperative results if treatment is not received. The relative effectiveness and safety of two popular surgical methods for tricuspid annuloplasty, De Vega semicircular suture annuloplasty and prosthetic ring annuloplasty, are still being compared.

Objectives: This study aimed to compare the early clinical and echocardiographic outcomes of De Vega suture annuloplasty versus prosthetic ring annuloplasty in patients with moderate-to-severe functional TR undergoing concomitant MVR.

Methods: A prospective comparative cohort study was conducted at Shebein Elkom Teaching Hospital and the National Heart Institute. Sixty adult patients with moderate-to-severe functional TR scheduled for MVR were enrolled and equally divided into two groups: Group A (De Vega group, n = 30) underwent De Vega semicircular suture annuloplasty, and Group B (Ring group, n = 30) underwent prosthetic rigid or semi-rigid ring annuloplasty.

Results: Intraoperative characteristics — including CPB time (p = 0.742), aortic cross-clamp time (71.8 ± 10.4 vs. 68.3 ± 9.7 min; p = 0.186), and total procedure time (p = 0.553) — were comparable between groups. Both groups demonstrated significant improvements in EF (p = 0.003) and significant reductions in PAP postoperatively, with no statistically significant difference between groups (p = 0.248 and p = 0.368, respectively). Postoperative TR severity distribution was similar between groups (mild TR: 56.7% vs. 60.0%; p = 0.807). ICU stay was comparable (4.8 ± 1.7 vs. 4.1 ± 1.2 days; p = 0.085). No statistically significant differences were observed in postoperative complications, including prolonged intubation, tracheostomy, IABP use, ECMO requirement, or need for dialysis. Thirty-day mortality was 6.7% in the De Vega group and 10.0% in the ring group (p = 1.0).

Conclusion: Both De Vega suture annuloplasty and prosthetic ring annuloplasty yielded comparable early postoperative outcomes in patients with functional TR undergoing MVR, including equivalent improvements in EF and PAP, similar TR severity grades, and comparable complication and mortality rates. While ring annuloplasty demonstrated a numerical trend toward greater hemodynamic improvement, the differences did not reach statistical significance in this early follow-up period. Long-term studies are warranted to determine whether differences in TR recurrence and durability emerge between the two techniques over time.

KEYWORDS: Tricuspid regurgitation; De Vega annuloplasty; ring annuloplasty; mitral valve replacement; functional tricuspid regurgitation; tricuspid valve repair; pulmonary artery pressure; ejection fraction..

How to Cite: Mohamed Abdallah, Islam Ebeid, Mazin Essam Eldin Ali, Eslam Elshafey, Sarah Mubarak Ibrahim, (2024) Early Postoperative Outcomes of De Vega Versus Ring Tricuspid Annuloplasty in Patients Undergoing Mitral Valve Replacement, Vascular and Endovascular Review, Vol.7, No.2, 384-390

INTRODUCTION

Mitral valve illness frequently coexists with tricuspid valve disease. Tricuspid valve (TV) annular dilatation and changed right ventricular geometry as a result of left-sided cardiac illness are the causes of functional tricuspid regurgitation (TR). Despite new findings demonstrating significantly worse functional results and survival if left untreated, concurrent treatment of functional secondary tricuspid regurgitation (TR) is still underutilized [1].

Secondary (functional) The most common cause of tricuspid regurgitation is valve damage from annulus dilatation brought on by pressure or volume overload of the right heart, which is typically caused by left heart valvular disease. The pathophysiology

of tricuspid valve annulus dilatation is as follows: unlike the posterior and greatest anterior leaflets, the smallest septal leaflet is resistant to extension during dilatation of the right heart chambers due to its placement. The free portion of the right ventricular wall is where those two leaflets meet in the annulus. The surgical procedure involves remodelling the dilated annulus (annuloplastic ring implantation or suture repair); in rare instances, valvular replacement is performed when restoration is not practical [2].

The American College of Cardiology (ACC)/American Heart Association (AHA) 2014 Practice Guideline for the care of patients with valvular heart disease states that valve repair surgery is the preferred treatment for TR, especially when left-sided valve surgery is being performed. When a dilated annulus with normal leaflets and chordal structures is present, the primary TV repair procedure is annuloplasty, which reduces the annular size and improves the leaflet coaptation surface. The annuloplasty techniques that have been defined thus far include Teflon strip band annuloplasty, de Vega/Kay annuloplasty, and ring annuloplasty with a stiff or flexible band [3].

Of the many TAP rings, the most popular prostheses are the flexible and stiff rings. In addition to permitting the tricuspid annulus's normal physiological mobility, flexible rings (bands) can shrink the dilated annulus (reduction annuloplasty). But it doesn't preserve or restore the annulus' ideal saddle form [4].

Dr. Norberto De Vega's tricuspid valve suture annuloplasty procedure was first used in clinical practice in the 1970s [5]. A double continuous suture is made across the annulus's perimeter in the area between the anteroseptal and posteroseptal commissures. A pledget is inserted and attached at the beginning and end of the suture. The dilated annulus is minimized and the tissue is retracted once the suture is tightened. One recorded late result of this treatment is tissue tearing of the intercalated sutures with a bow-string effect. Suture annuloplasty became popular because of its ease of use and effectiveness, but it has undergone numerous revisions to reduce this risk, including those made by Antuenes, Revuelt, Brugger, and others [2].

The study's goal was to compare the early outcomes of De Vega suture annuloplasty versus ring annuloplasty for patients with functional tricuspid regurgitation (TR) undergoing mitral valve replacement (MVR).

PATIENTS AND METHODS

This was a prospective comparative study conducted at Shebein Elkom Teaching Hospital and National Heart Institute, GOTHI, Egypt. Written informed consent obtained from all patients. Adult patients (≥18 years) with tricuspid annular dilatation and moderate to severe functional tricuspid regurgitation scheduled for mitral valve replacement due to rheumatic or degenerative illness comprised the study population. (>40 mm or >21 mm/m²), regardless of whether they were in sinus rhythm or atrial fibrillation. Patients were excluded if they had organic tricuspid valve disease such as infective endocarditis or congenital anomalies, a history of previous tricuspid valve surgery, severe right ventricular dysfunction (TAPSE <10 mm), severe pulmonary hypertension (PASP >70 mmHg), or if they required concomitant major cardiac procedures other than standardized CABG or AVR, as well as patients undergoing redo cardiac surgery.

A total of 60 patients were included and divided into two groups: Group A (De Vega group): Patients underwent De Vega semicircular suture annuloplasty. Group B (Ring group): Patients underwent prosthetic ring annuloplasty (rigid/semi-rigid ring) All patients underwent comprehensive preoperative assessment including detailed clinical evaluation with full medical history focusing on symptoms such peripheral oedema and dyspnea, in addition to a comprehensive physical examination for indications of heart failure on the right side. Complete blood counts, liver and kidney function tests, and coagulation profiles were among the standard laboratory procedures that were carried out. To evaluate heart rhythm, namely the existence of atrial fibrillation or sinus rhythm, electrocardiography (ECG) was performed. Transthoracic echocardiography (TTE) was also performed on all patients in order to measure tricuspid annular diameter, assess right atrial and right ventricular dimensions, Assess the pulmonary artery systolic pressure (PASP), the left ventricular ejection fraction, the underlying mitral valve disease, and the right ventricular systolic function utilising tricuspid annular plane systolic excursion (TAPSE).

There were four categories for TR: no-trace, mild, moderate, and severe. Moderate to severe TR after surgery was characterised by the American Heart Association/American College of Cardiology Guidelines as inadequate repair or recurrence. The central jet area and vena contracta width were used to rate TR.

Mild TR: central jet area <5.0 cm² Vena contracta width not defined Moderate TR: central jet area 5–10 cm² Vena contracta width not defined but <0.70 cm Severe TR: Vena contracta width >0.7 cm and central jet area was considered as >10.0 cm².

Operative Technique

Cardiopulmonary bypass (CPB) via median sternotomy was used for all surgeries under general anesthesia. The surgical technique was selected according to the surgeon’s judgment. The finger method was used in the TDVA procedure to measure the annulus. The annulus was reduced in size to a thickness of two to three fingers wide. The ring gauge number, which provides leaflet coaptation, was utilized in the ring approach. For every TRA, a contour 3D annuloplasty ring (Medtronic, Minneapolis, MN) was utilized.

Diabetes was defined as a fasting blood glucose level of 126 mg/dL or higher. Hyperlipidemia was defined as a fasting blood low-density lipoprotein level of 160 mg/dL or higher. A creatinine level of 1.2 mg/dL or higher for female patients and 1.4 mg/dL or higher for male patients was considered indicative of renal impairment.

A median sternotomy was performed on the patients. Both bicaval venous and aortic arterial cannulation were carried out. The right superior pulmonary vein was used for venting. The ascending aorta was subjected to the cross-clamp. Cardiac arrest was achieved using antegrade isothermal blood cardioplegia. Every 20 minutes, antegrade cardioplegia was administered intermittently. The patients had their mitral valves replaced after the vertical left atriotomy incision. The left atrium was shut. The right atriotomy was then performed to expose and repair the tricuspid valve. After that, the cross-clamp was taken off, the right atriotomy was sealed, and the air was eliminated. Drain tubes and epicardial pacemaker wires were inserted upon separation from cardiopulmonary bypass. The sternum was wired when the bleeding was stopped. In compliance with the protocol, the skin and subcutaneous tissue were closed. The intensive care unit received the patients. The patients were monitored in the service following the stable intensive care procedure. Patients were discharged after clinical stabilization and satisfactory postoperative evaluation.

Each patient's cardiopulmonary bypass time, aortic cross-clamp time, total operating time, and any intraoperative issues were all carefully recorded. Following surgery, all patients were treated in the intensive care unit (ICU) with continuous hemodynamic monitoring. This included applying a standardized anticoagulation protocol, especially for patients receiving mechanical valves, and documenting the length of mechanical ventilation, the need for and duration of inotropic support, and postoperative complications. Patients were then monitored at predetermined intervals, such as at discharge, one month, six months, and twelve months after surgery. Clinical and echocardiographic evaluations were carried out at each visit to assess results and identify any recurrence of tricuspid regurgitation.

Outcome Measures

The primary outcome of this study were the degree of residual or recurrent tricuspid regurgitation as assessed by follow-up echocardiography and the lack of moderate or severe tricuspid regurgitation during the early postoperative follow-up periods.

Early postoperative mortality within 30 days, the frequency of postoperative complications like bleeding, arrhythmias, and heart block necessitating permanent pacemaker implantation, the length of ICU and overall hospital stays were all considered secondary outcome measures. In order to evaluate the efficacy and longevity of each annuloplasty procedure, echocardiographic measures such as tricuspid regurgitation grade, tricuspid annular diameter, right ventricular size and function, and pulmonary artery systolic pressure were also assessed during follow-up.

Statistical Analysis

SPSS software (Statistical Package for Social Science) version 27.0 was used to computerise and statistically analyse the gathered data (IBM, 2020). Qualitative variables were compared using the Chi-square test. When one or more of the examined cells had fewer than five, the qualitative variables in various groups were compared using Fisher's exact test. To determine the difference between quantitative variables in two sets of normally distributed data, the independent T test was employed. In data that was not normally distributed, quantitative variables between two groups were compared using the Mann Whitney (MW) test. Preoperative and postoperative continuous variables within each group were compared using the paired t-test.

RESULTS

Table (1): Baseline demographic and anthropometric characteristics of the studied groups

Variable		De Vega (n=30)	Ring (n=30)	p-value
Age (Years)	**Mean ± SD (Range)**	49.3 ± 10.3 (27–67)	49.1 ± 9.6 (22–66)	0.917
BMI (kg/m²)	**Mean ± SD (Range)**	28.5 ± 4.0 (19.8–37.5)	28.0 ± 5.1 (18.0–43.7)	0.688
Gender	**Female**	22 (73.3%)	20 (66.7%)	0.778
	Male	8 (26.7%)	10 (33.3%)	
Weight (kg)	**Mean ± SD (Range)**	77.3 ± 8.9 (54.8–96.9)	74.7 ± 10.9 (52.0–108.2)	0.307
Height (cm)	**Mean ± SD (Range)**	165.0 ± 5.1 (155.4–173.6)	164.0 ± 7.0 (150.0–176.9)	0.528

BMI: Body Mass Index, SD: Standard Deviation

There was no statistically significant difference between the De Vega and Ring groups regarding baseline demographic and anthropometric characteristics (Table 1).

Table (2): Preoperative echocardiographic characteristics of the studied groups

Variable		De Vega (n=30)	Ring (n=30)	p-value
Preoperative LAD	**Mean ± SD (Range)**	45.7 ± 4.8 (35.7–54.8)	44.1 ± 5.1 (34.3–51.1)	0.208
Preoperative LVEDD	**Mean ± SD (Range)**	55.7 ± 6.4 (40.4–70.0)	55.9 ± 5.2 (46.2–69.3)	0.926
Preoperative LVESD	**Mean ± SD (Range)**	41.5 ± 5.7 (29.4–51.7)	42.1 ± 5.2 (31.2–54.6)	0.697

Preoperative EF	**Mean ± SD (Range)**	50.7 ± 7.6 (38.4–65.0)	50.9 ± 5.8 (38.0–61.9)	0.930
Preoperative PAP	**Mean ± SD (Range)**	49.0 ± 10.7 (30–69)	49.9 ± 9.9 (30–69)	0.755

LAD: Left Atrial Diameter, LVEDD: Left Ventricular End-Diastolic Diameter, LVESD: Left Ventricular End-Systolic Diameter, EF: Ejection Fraction, PAP: Pulmonary Artery Pressure, SD: Standard Deviation

There was no statistically significant difference between the De Vega and Ring groups regarding preoperative echocardiographic parameters (Table 2).

Table (3): Intraoperative characteristics of the studied groups

Variable		De Vega (n = 30)	Ring (n = 30)	p-value
CPB time	**Mean ± SD (Range)**	95.8 ± 11.2 (73–118)	96.8 ± 13.6 (72–122)	0.742
Ischemic time	**Mean ± SD (Range)**	71.8 ± 10.4 (55–100)	68.3 ± 9.7 (43–85)	0.186
ACC	**Mean ± SD (Range)**	63.4 ± 10.7 (40–80)	63.3 ± 8.4 (41–78)	0.982
TPT	**Mean ± SD (Range)**	99.5 ± 15.6 (60–132)	102.0 ± 16.8 (71–138)	0.553

CPB: Cardiopulmonary Bypass, ACC: Aortic Cross-Clamp, TPT: Total Procedure Time, SD: Standard Deviation

There was no statistically significant difference between the De Vega and Ring groups regarding intraoperative parameters (Table 3).

Table (4): Early postoperative echocardiographic outcomes of the studied groups

Variable		De Vega (n = 30)	Ring (n = 30)	p-value
Postoperative EF	**Mean ± SD (Range)**	53.6 ± 8.1 (40.8–68.2)	55.7 ± 6.0 (42.5–63.9)	0.248
Postoperative PAP	**Mean ± SD (Range)**	40.1 ± 11.4 (20–61)	37.5 ± 10.8 (20–58)	0.368

EF: Ejection Fraction, PAP: Pulmonary Artery Pressure, SD: Standard Deviation

The differences between the two groups were not statistically significant, despite the Ring group's marginally improved postoperative results in terms of pulmonary arterial pressure (PAP) and ejection fraction (EF) (Table 4).

Table (5): Distribution of postoperative tricuspid regurgitation severity in the studied groups

Variable	Category	De Vega (n = 30)	Ring (n = 30)	p-value
TR Severity	**Mild**	17 (56.7%)	18 (60.0%)	0.807
	Moderate	11 (36.7%)	9 (30.0%)	
	Severe	2 (6.7%)	3 (10.0%)	

TR: Tricuspid Regurgitation

There was no statistically significant difference between the De Vega and Ring groups regarding postoperative tricuspid regurgitation (TR) severity (Table 5).

Table (6): Early Postoperative intensive care unit (ICU) outcomes of the studied groups

Variable		De Vega (n = 30)	Ring (n = 30)	p-value
ICU stay (days)	**Mean ± SD (Range)**	4.8 ± 1.7 (2–8)	4.1 ± 1.2 (2–7)	0.085

ICU: Intensive Care Unit, SD: Standard Deviation

Although the Ring group showed a shorter ICU stay compared to the De Vega group, the difference did not reach statistical significance (Table 6).

Table (7): Early Postoperative Complications of the Studied Groups

Variable		De Vega (n = 30)	Ring (n = 30)	p-value
Prolonged intubation	**No**	27 (90.0%)	24 (80.0%)	0.470
	Yes	3 (10.0%)	6 (20.0%)	
Tracheostomy	**No**	29 (96.7%)	30 (100.0%)	1
	Yes	1 (3.3%)	0 (0.0%)	
IABP	**No**	28 (93.3%)	26 (86.7%)	0.667
	Yes	2 (6.7%)	4 (13.3%)	
ECMO	**No**	28 (93.3%)	28 (93.3%)	1

	Yes	2 (6.7%)	2 (6.7%)	
Dialysis	**No**	30 (100.0%)	30 (100.0%)	1
	Yes	0 (0.0%)	0 (0.0%)	
Mortality 30d	**No**	28 (93.3%)	27 (90.0%)	1
	Yes	2 (6.7%)	3 (10.0%)	

IABP: Intra-Aortic Balloon Pump, ECMO: Extracorporeal Membrane Oxygenation

There was no statistically significant difference between the De Vega and Ring groups regarding postoperative complications. The incidence of prolonged intubation, tracheostomy, intra-aortic balloon pump (IABP) use, extracorporeal membrane oxygenation (ECMO), need for dialysis, and 30-day mortality was comparable between the two groups (Table 7).

Table (8): Pre- and Postoperative Echocardiographic Changes within Each Study Group

Variable	Group	Preoperative	Postoperative	p-value
EF (%)	De Vega	50.7 ± 7.6 (38.4–65.0)	53.6 ± 8.1 (40.8–68.2)	**0.041**
	Ring	50.9 ± 5.8 (38.0–61.9)	55.7 ± 6.0 (42.5–63.9)	**0.003**
PAP (mmHg)	De Vega	49.0 ± 10.7 (30–69)	40.1 ± 11.4 (20–61)	**<0.001**
	Ring	49.9 ± 9.9 (30–69)	37.5 ± 10.8 (20–58)	**<0.001**

EF: Ejection Fraction, PAP: Pulmonary Artery Pressure, SD: Standard Deviation

Significant improvement was observed in both groups, with increased EF and decreased PAP postoperatively. The magnitude of improvement was slightly greater in the Ring group (Table 8).

DISCUSSION

This study compared the early results of ring annuloplasty combined with De Vega suture annuloplasty in individuals with functional tricuspid regurgitation (TR) undergoing mitral valve replacement (MVR).

This prospective comparative cohort study was carried out at the National Heart Institute and Shebein Elkom Teaching Hospital. Adult patients scheduled for mitral valve replacement who had moderate to severe functional tricuspid regurgitation made up the study population. There were sixty patients in all, split into two groups: Patients in Group A (De Vega group) had De Vega semicircular suture annuloplasty. Patients in Group B (Ring group) had rigid or semi-rigid prosthetic ring annuloplasty.

Age, sex, BMI, and preoperative echocardiographic measures such as EF, Pulmonary artery pressure, left ventricular end-diastolic and end-systolic diameters, and left atrial diameter did not differ statistically significantly between the two research groups.

This is in line with the findings of Omran and Zahra's [6] study that examined De Vega and ring annuloplasty in patients having concurrent mitral valve surgery and discovered no appreciable changes in the preoperative clinical or echocardiographic characteristics of the two groups.

Similarly, Huang et al. [7] verified similar preoperative characteristics in their De Vega and ring annuloplasty cohorts in a research involving 448 patients.

Cardiopulmonary bypass (CPB) time, Ischemia (aortic cross-clamp) time and overall procedure time did not differ statistically significantly between the two groups in this investigation.

This result is in line with that of Ren et al. [8], who discovered that CPB time (125.7 ± 31.2 minutes in the ring group vs. 125.3 ± 31.0 minutes in the De Vega group; $p = 0.701$) in a retrospective follow-up analysis of 74 patients with rheumatic heart disease. Lafçı et al. [3] sought to examine three methods of tricuspid annuloplasty: band, ring, and suture. They found that the de Vega annuloplasty group had statistically significant lower cardiopulmonary bypass periods ($p<0.001$).

Significant improvements in EF and a decrease in PAP were shown by both groups in the current study after surgery ($p = 0.041$ and $p < 0.001$ for the De Vega group; $p = 0.003$ and $p < 0.001$ for the ring group). Although the ring annuloplasty group experienced a somewhat larger improvement (EF: 55.7 ± 6.0% vs. 53.6 ± 8.1%; PAP: 37.5 ± 10.8 vs. 40.1 ± 11.4 mmHg), There was no statistically significant difference between the groups ($p = 0.248$ and $p = 0.368$, respectively).

The results are also consistent with those of Chikwe et al. [9], who showed in a large series that concurrent tricuspid annuloplasty was an independent predictor of right ventricular functional recovery, noting improvements in both EF and PAP regardless of the particular repair technique without a significant increase in operative mortality.

The De Vega and ring annuloplasty groups in the current investigation had similar postoperative TR severity distributions, with mild TR predominating in both (56.7% vs. 60.0%) and the groups did not differ statistically significantly ($p = 0.807$). After surgery, only a tiny percentage of patients in each group still had moderate or severe TR.

These are in line with the findings of Csanády et al. [10], who studied 570 patients in the past between 2000 and 2016. They

found that after TV surgery with either the De Vega suture technique or ring annuloplasty, 5.8% of patients in both trial groups had a recurrence of severe tricuspid regurgitation ≥ 3 10 years later. TR recurrence (grade II or III) was significantly more common following De Vega annuloplasty (p = 0.027), according to Matsuyama et al. [11].

Ren et al. [8] discovered that high pulmonary artery systolic pressure and non-ring annuloplasty were separate risk factors for TR recurrence. Additionally, they demonstrated that the ring annuloplasty group had a significantly higher Kaplan-Meier independence from recurrent TR at all time points from one week to two years after surgery (log rank p = 0.0377).

These results were supported by a large propensity score-matched analysis by Sohn et al. [12], which included 435 patients with a median follow-up of 102 months and demonstrated that while overall survival and cardiac mortality were similar between De Vega and rigid ring annuloplasty, multivariate analysis identified preoperative TR grade and the annuloplasty technique (De Vega) as risk factors for late TR recurrence.

This is in line with the meta-analysis conducted by Parolari et al. [13], which examined data from several comparative trials and discovered that whereas ring annuloplasty was linked to a decreased rate of TR recurrence over longer follow-up periods, early postoperative results were essentially the same.

The systematic review by Khorsandi et al. [14], on the other hand, found that the balance of evidence favored ring annuloplasty for long-term TR reduction and found five studies that reported no significant difference in outcomes between ring and suture annuloplasty. The review examined 14 comparative studies involving 306 papers.

Additionally, OMRAN and ZAHRA [6] who assessed the results of ring annuloplasty and DeVega tricuspid valve repair for the management of severe functional TR during mitral valve surgery, found that hospital stays did not differ significantly between both groups (7.96±1.07 vs. 8.25±0.86; P=0.328).

In terms of postoperative complications, the rates of prolonged intubation, tracheostomy, IABP use, ECMO necessity, or the requirement for dialysis did not change statistically substantially between the two study groups. The rates of prolonged intubation (20.0% vs. 10.0%) and IABP usage (13.3% vs. 6.7%) were marginally higher in the ring group, but they were not statistically significant.

Comparable rates of in-hospital complications, such as prolonged ICU stay, prolonged ventilation, re-intubation, and reopening for bleeding, were reported between groups undergoing MVR with or without tricuspid annuloplasty (p > 0.05 for all) in a study by Farooq et al. [15] investigating the impact of concurrent tricuspid annuloplasty on early outcomes of MVR in rheumatic heart disease patients.

In the current investigation, the 30-day death rate was 10.0% in the ring group (3 patients) and 6.7% in the De Vega group (2 patients), with no statistically significant difference (p = 1.0).

These are in line with the findings of Csanády et al. [10], They discovered that the overall 30-day mortality rate was 10.9%, with the ring annuloplasty group reporting 11.8% and the De Vega group reporting 4.3%.

In a similar vein, Guenther et al. [16] observed no significant impact of repair technique on early mortality in a large retrospective dataset of 717 consecutive patients, with an overall 30-day mortality of 13.8% with comparable rates between the ring (12.7%) and the De Vega group (15.7%). In a propensity-matched cohort of 415 patients receiving tricuspid repair during mitral valve surgery, Shinn et al. [17] showed no significant difference in long-term mortality between ring annuloplasty and De Vega suture (hazard ratio 0.93; 95% CI 0.67–1.30).

According to Lafçı et al. [3], There was no discernible difference in in-hospital mortality across the groups. When evaluating the findings, it is important to take into account the many limitations of this study. First, the statistical power to identify clinically significant differences between the two methods may be limited by the small sample size of 60 patients (30 each group). Second, only early postoperative results are reported in the study; long-term follow-up data are required to evaluate TR recurrence rates and repair durability—parameters for which the two methods are known to differ in the literature. Third, the results may not be as applicable to other patient demographics and surgical settings due to the only two-centers design with limited sample size. Lastly, one possible source of assessment bias is the lack of blinded echocardiographic evaluation.

CONCLUSION

De Vega suture annuloplasty and prosthetic ring annuloplasty showed comparable early postoperative outcomes in patients with functional tricuspid regurgitation undergoing mitral valve replacement. No statistically significant differences were observed regarding postoperative EF, PAP, TR severity, ICU stay, complications, or 30-day mortality. However, a considerable proportion of patients in both groups had residual moderate-to-severe TR, highlighting the need for longer follow-up to assess repair durability and recurrence. Ring annuloplasty showed a non-significant trend toward better postoperative EF and PAP improvement.

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