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Research Article

IS DE VEGAS REPAIR DURABLE FOR SEVERE TRICUSPID REGURGITATION AN INSTITUTIONAL STUDY

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ABSTRACT

Background: Tricuspid valve disease frequently accompanies left side valve disease. Surgical correction of significant functional TR at the time of left side valve surgery is recommended. The current study was undertaken to assess the impact of ring annuloplasty and De Vega annuloplasty techniques in functional and primary significant TR in a predominantly rheumatic population.

Methods: Between May 2012 to November 2018, a total 92 patients underwent surgery for functional and primary tricuspid valve disease. Retrospective data analysis was done. The patient selection criteria were as per the institutional protocol (for all primary and functional severe TR and moderate TR with Tricuspid Index > 21mm/m²) based on preoperative TTE (Trans-thoracic Echocardiography) findings and the type of procedure was the surgeon's decision on table. Techniques routinely involved in the repair procedures included tricuspid prosthetic ring Annuloplasty (CARPENTIER EDWARD) and De Vega suture annuloplasty. Postoperatively all the patient had routine TTE before hospital discharge (considered as immediate post op period). Follow up was present post-operatively in the form of a TTE and clinical at the time of data collection for this study. Redosurgical tricuspid valve replacement requirement in failure of de Vegas repair.

Results: Significant difference was observed in residual significant TR when Ring Annuloplasty was compared to De Vega repair. There was improvement in NYHA class status after ring, but after De Vega annuloplasty patient were in NYHA class II to III, and 8 patient underwent redo tricuspid valve replacement.

Conclusions: Present study shows that the techniques of TV repair specially De Vegas repair should be rethought when applied to functionally and primary significant TR in a pre-dominantly rheumatic population.

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INTRODUCTION

Tricuspid valve disease is a frequent accompaniment of mitral valve disease. Functional tricuspid regurgitation (TR) is caused by tricuspid valve (TV) annular dilation and altered right ventricular geometry secondary to left sided heart disease.¹ The concomitant correction of functional secondary tricuspid regurgitation (TR) remains underused despite recent data showing substantially poorer functional outcomes and survival if untreated. The traditional view that functional tricuspid regurgitation generally resolves with surgical correction of the primary lesions is no longer held. Significant TR secondary to right ventricular dilation and dysfunction associated with mitral valve disease is a risk factor for poor functional outcome and mortality after mitral valve surgery.² Surgical correction of significant functional TR at the time of left side valve surgery is recommended.³⁻⁸ Without treatment, TR may worsen over time leading to worsening of symptoms,

heart failure and even death. TV repair in patients with secondary or primary TR does not prolong bypass time in most cardiac operations and is also not a very complex procedure. According to AHA/ACC guidelines 2017 update, intervention for TR is indicated in patients with severe TR, moderate TR with either tricuspid annular dilatation (greater than 4 cm) or Tricuspid index greater than 21 cm/m².

There are several annuloplasty techniques available for the repair of tricuspid valve. The current study was undertaken to assess the impact of ring annuloplasty and durability of De Vega annuloplasty techniques in functional or primary significant TR in a predominantly rheumatic population.

METHODS

Between May 2012 to November 2018, a total 92 patients underwent surgery for tricuspid valve disease. We did a retrospective data analysis and reviewed the records of all 92

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patients which included clinical histories, perioperative echocardiogram, operative notes and follow up data. The preoperative demography of these patients is listed in the Table1.

The patient selection criteria were as per the institutional protocol (for all functional severe TR and moderate TR with Tricuspid Index > 21mm/m²) based on preoperative TTE (Trans-thoracic Echocardiography) findings and the type of procedure was the surgeon's decision on table. Mortality at time of intialpost operative period was excluded from study .Techniques routinely involved in the repair procedures included tricuspid prosthetic ring Annuloplasty (CARPENTIER EDWARD) and De Vega suture annuloplasty. DeVEgas was performed in 60 patient and ring annuloplasty in 32. Intra operative Transesophageal Echocardiography (TEE) and saline infusion tests revealed no more than mild TR. Postoperatively all the patient had routine TTE before hospital discharge (considered as immediate post op period).

Table 1 Pre-operative characteristics

Variables	Total (n=92)	Ring annuloplasty (n=32)	De vegaannuloplasty (n=60)
Age in years	20-70		
Female	68	26	42
Male	24	6	18
LVEF>45%	60	12	20
LVEF<45%	32	20	40
		RV Dysfunction	
Severe	4	2	2
Moderate	50	8	42
Mild	26	10	16
		PAH	
Sev PAH	16	6	10
Mod PAH	46	6	40
Mild PAH	18	8	10

The recorded patient follows up was present over period of 5 year post-operatively (in the form of another TTE and clinical data sheet) at the time of data collection for this study. Seven patients werelost in follow-up. 8 patient of Devega's repair underwent redo tricuspid valve replacement, 1 patientdied during cardiac reoperations.

Table 2 Immediate Post-Operative Outcomes

Devega's tv Repair	no. of Patients	Patients with RV Dysfunction
ASD with TV Repair	8	nil
MVR with TV Repair	38	15
AVR with TV Repair	2	nil
DVR with TV Repair	12	5

Ring annuloplasty for tv	No. Of patients	Patients with rv dysfunction
ASD with TV Repair	3	Nil
MVR with TV repair	18	8
DVR with TV repair	9	3

RESULTS

Freedom from residual significant TR (moderate or severe): Severe and moderate TR regressed in both groups. In immediate post-operative period of patients in De Vega group and in ring annuloplasty group had less than significant residual TR, but in early follow up period of patients in the ring annuloplasty group and of patients in the De Vega group showed freedom from significant residual TR. But after 2 year

residual tricuspid regurgitation was moderate to severe in around 50% of patient and NYHA class was II to III. andcomparatively there was significant improvement in NYHA class in ring group. In Devegasout of 50 % over a period 26% underwent redo Tricuspid valve replacement and out of which 12.5% mortality was there.

DISCUSSION

Tricuspid valve repair for TR can be challenging with respect to indications and choice of optimum surgical technique. According to AHA/ACC guidelines 2017 update, intervention for TR is indicated in patients with severe TR, moderate TR with either tricuspid annular dilatation (greater than 4 cm) or Tricuspid index greater than 21 mm/m².9 Management options include conservative treatment, repair or replacement. Adequate physiologic and anatomic correction influences long term results of the repair.10 From surgical point of view,several techniques are available to correct TR. De Vega annuloplasty is considered to be simple, easy, effective and least expensive of them, but recurrence and reoperation rate has been reported in 34% and 10% of survivors, at mid-term follow up.11 De Vega annuloplasty has been criticized for being unpredictable and unreliable, perhaps due to the long suture line, which breaks or slides through the tissue as the annulus dilates.12 Several studies have indeed found the simple suture annuloplasty to be a risk factor for tricuspid failure.13,14 This has been proven in our study also . A prospective randomized studyof 159 patients conducted by Riveraetal comparing the DeVega technique to Carpentier ring annuloplasty demonstrated a higher recurrence of moderate and severe TR in De Vega group at 45 months follow up (Carpentier 4 of 40, De Vega 14 of 41; p<0.01).14 A similar small group study in 45 patients by Matsuyama *et al* showed a45% recurrence of 2+ to 3+ TR in De Vega compared with only 6% in the Carpentier repair group (p=0.027). Freedom from moderate and severe TR at a mean follow up of 39±23 month was 45% in the De Vega group and 94% in the Carpentier group.16

Bernal *et al* showed lesser re-operation rate after ring annuloplasty compared to De Vega repair.17 Tang *et al* showed lower TR recurrence rates in patients receiving prosthetic ring annuloplasty with better long term and event free survival.2 Carrier *et al* showed similar results between ring annuloplasty and De Vega.18

In the present study, Patients with higher right ventricular systolic pressure in preoperative period showed residual TR in both the groups, but the larger annular index diameter showed association with residual significant TR in postoperative period on follow up over period in De Vegas repair. Present results revealed significant difference in the 2 techniques, Ring annuloplasty and De Vega Repair, with respect to residual significant TR, in immediate follow-up nor at 6-month follow-up (p=0.44), similar to the results of Carrier etal.18 In survivors, NYHA class improved in both the groups (Table 3) (Table 4).But over a period of year in De Vegas group 50% has significant residual tricuspid regurgitation and NYHA class showed significant deterioration ,and out of which 26% patient require re do tricuspid valve replacement and 12.5 % mortality was there of redo surgery.

Table 3 Impact of Tricuspid index diameter, LV function and RVSP on Residual significant TR NYHA CLASS.

		No. of patients N=32	Tricuspid index diameter[mm/m2]	Lv function	Rsvp (mm of hg)	Nyha class
Ring annuloplasty	Significant tr	8	23	Mild-mod dysfunction	>60	Ii
	Non significant tr	24	<21	No dysfunction	<50	I

By these result we should be considerate enough for primary type of repair to be done as redosurgery carries its own morbidity and mortality.

CONCLUSION

The choice regarding which technique to address TV regurgitation can be a difficult one with literature available on various techniques. Present study shows results of both the techniques of TV repair, prosthetic ring annuloplasty and DeVega’s repair, when applied to significant TR in a predominantly rheumatic population. However, further studies with much larger sample size are required before an apt conclusion can be reached, that keeping in view the durability of DeVegarepair, a first hand consideration should be given for ring annuloplasty or tricuspid valve replacement.

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