EDITORIAL

An Updated View on the Approach to Tricuspid Regurgitation

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Editorial referring to the article: Early Outcomes of Modified De Vega Annuloplasty for Functional Tricuspid Regurgitation at a Brazilian Hospital

The incidence of tricuspid regurgitation (TR) associated with left valvular disease is significant ranging from 8% to 35% of cases.[1,2] This is most common in conjunction with mitral valve disease but association with aortic valve pathology is not uncommon and frequently related to rheumatic valve disease and much rarer in association with degenerative mitral valve disease. In most cases, the tricuspid regurgitation is so called "functional", in other words, secondary to dilatation of the annulus as a consequence of right ventricular (RV) dilatation and pulmonary hypertension. The functional tricuspid regurgitation is a progressive disease that does not always resolve with the correction of the left-side lesion. The recommendations that existed were generally conservative, late in timing, and reflective in large measure of the historically poor outcomes with Tricuspid Valve (TV) surgery in the context of delayed referral, advanced heart failure symptoms, and RV dysfunction

It has become evident that in a significant number of cases, secondary TR does not regressed after appropriate correction of the left-side disease leading to a more aggressive conduct.[3,4]

Current ESC guidelines 2017 suggest that surgery should be considered in patients with mild or moderate secondary TR with annulus > 40mm or 21 mm/m² undergoing left-side valve surgery (Class IIa indication, level of evidence C).[5]

The American Heart Association /American College of Cardiology (AHA/ACC) guidelines 2014 also recommended in patients with pulmonary hypertension (Class IIa indication, level of evidence C).[6]

Keywords

Tricuspid repair; Mitral and aortic disease; Pulmonary hypertension.

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In those with isolate severe TR, surgery is recommended in the presence of symptoms or progressive right ventricular dilatation or dysfunction.[7]

Tricuspid intervention at the time of the surgery to the left side valve usually helps to improve the functional capacity without significant increase in perioperative mortality and morbidity

Before left-side valve surgery, careful assessment of the severity of TR and careful measurement of the tricuspid annulus is mandatory.

The patients may remain asymptomatic even with TR of moderate or severe degree. When symptoms appear, patients may complain asthenia, fatigue or decreased exercise tolerance as a result of lower cardiac output. The signs of elevated right atrial pressure, such as peripheral oedema and abdominal fullness, congestive hepatomegaly and ascites will be present in the evolution of disease. Atrial fibrillation as a result of right atrial enlargement is common

Evaluation of patients with TR requires the integration of the information from different cardiac imaging techniques. The transthoracic echocardiography (TTE) and cardiovascular magnetic resonance(CMR) are the most used (Table 1).[8]

Transthoracic echocardiography is the technique of choice to evaluate the aetiology of the TR, quantify its severity and determine the annular diameters. The normal annulus diameter in adults is 28 ±5 mm and a significant dilation is defined by a diastolic diameter > 40mm or 21 mm/mm.[2,8]

The selection of a valve repair versus replacement is largely driven by anatomic factors, including the extent of leaflet damage and degree of anular dilatation.When feasible, valve repair may be preferred due to the risks of prosthetic valve thrombosis, bioprosthetic valve degeneration and long term anticoagulation, Repair is generally favoured in patients undergoing left-sided surgery as these techniques can be accomplished quickly to minimise bypass time.It is estimated that 73% of TV operations are repairs, with 88% performed

Table 1 – Echocardiographic (A) and cardiovascular magnetic resonance (B) reference values of RV and right atrial size and function in healthy adults

	Abnormal
(A) Echocardiography	
RV diameter (mm)	
Base*	>41
Midventricular Level*	>35
Length*	>83
RV wall thickness (subcostal view) (mm)	>5
RA end-systolic area (mm2)	>18
RA volume (mL/m2)	>30
Systolic function	
TAPSE (mm)	>17
Pulsed Doppler peak 5′ (m/s)	<9.5
RV fractional area change (%)	<35
RV 3D EF (%)	<45
Diastolic Function	
E/E′ ratio	>6
Tissue Doppler MPI	>0.54
(B) Cardiovascular magnetic resonance	
End-diastolic volume/BSA (mL/m2)	>108
End-systolic volume/BSA (mL/m2)	>48
EF (%)	<50
Mass (g/m2)	>46

BSA: body surface area; MPI: myocardial performance index; RA: right atrium; TAPSE: triscupid annular plane systolic exclusion.

at the time of left-sided valve surgery.[9] The most common surgical techniques are reviewed in figure 1

It is generally believed that the long-term results of tricuspid annuloplasty are more favorable than those obtained after valve replacement, whether by mechanical or bioprosthetic implants. The survival after replacement has been reported as low as 35% and up to 75% after 10 years These numbers are lower than those that we observed after tricuspid annuloplasty

The surgical technique described by Ferraz et al entitled Early Outcomes of Modified De Vega Annuloplasty for Functional Tricuspid Regurgitation at a Brazilian Hospital a modified De Vega technique[10] by interposition of Teflon felt pledgets for each annular bite of the suture, produced excellent results.

Yan Topilsky and cols investigated the impact of TR in 271 patients with left ventricular systolic dysfunction (ejection fraction 31± 10%), functional tricuspid regurgitation and an effective regurgitation orifice area of o,26 ±0,3 cm² on clinical outcome. Presentation with right heart failure was strongly related to the degree of TR. An effective regurgitant orifice area ≥ 0,4 cm² was associated with increased mortality and increased cardiac events including mortality, new atrial fibrillation or heart failure (figure 2)[11]

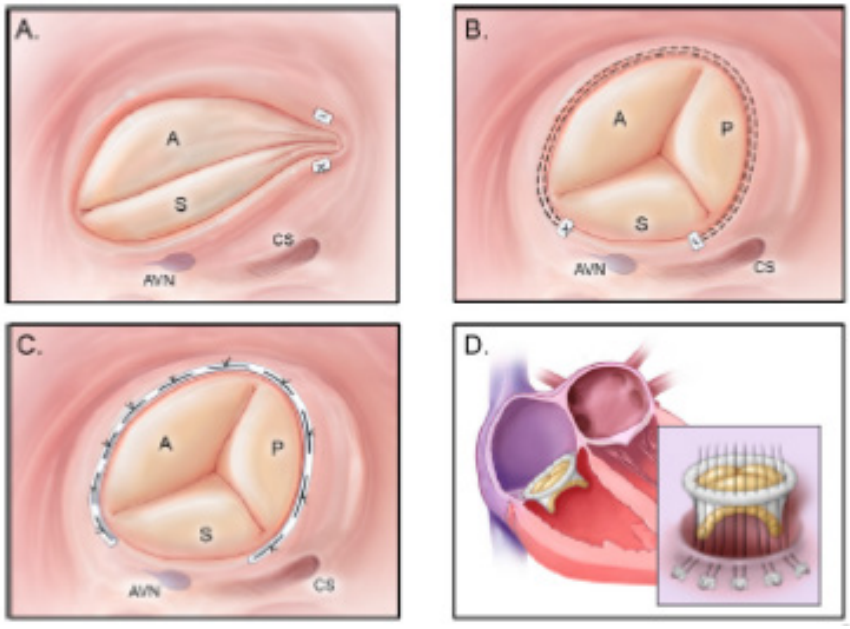
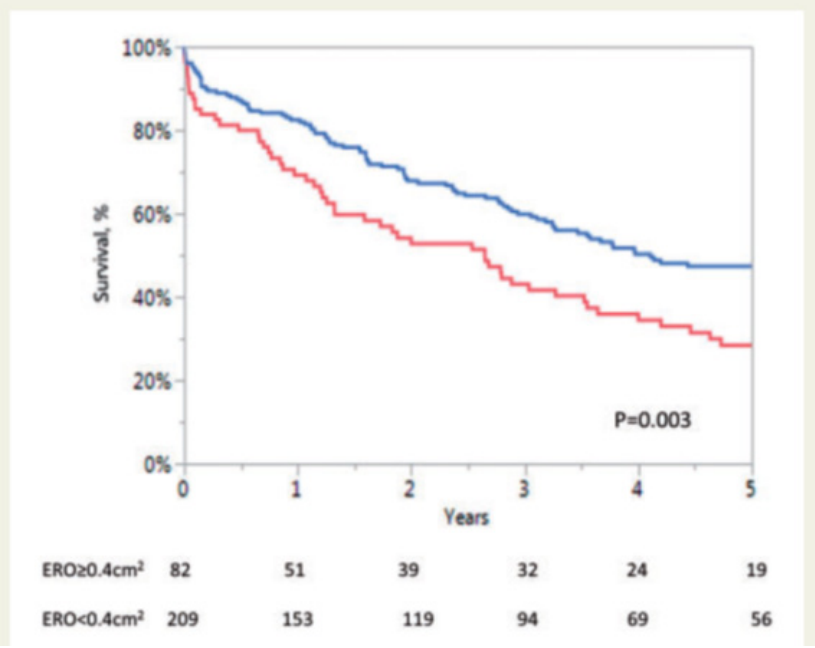


Figure 1 – The most common tricuspid valve operations include the Kay bicuspidisation (A), DeVega suture annuloplasty (B), prosthetic annuloplasty band (C) and tricuspid valve replacement (D).AVN, atrioventricular node; CS, coronary sinus; A, anterior leaflet; P, posterior leaflet; S, septal leaflet



(EROA <0.4 cm², blue line; blue line; ≥0.4 cm², red line)

Figure 2 – Overall survival under medical management in patients with tricuspid regurgitation associated with systolic dysfunction comparing patients with severe tricuspid regurgitation (effective regurgitant orifice ≥ 0.4 cm²) to lesser degree of tricuspid regurgitation (effective regurgitant orifice <0.4 cm² blue line, ≥ 0.4 cm² red line). Note that there is decrease in survival with effective regurgitant orifice ≥0.4 cm²

Enthusiasm for the application of transcatheter tricuspid valve therapies to the treatment of severe TR has logically followed in the wake of the successes achieved with aortic and mitral valve interventions. The principles learned regarding clinical evaluation, multimodality imaging algorithms, risk assessment, multidisciplinary team consensus treatment recommendations, and shared decision-making are directly transferable. Although it is attractive to consider the use of less invasive, nonsurgical interventions earlier in the natural history of TR to prevent its long-term deleterious consequences, the effectiveness, safety, and durability of catheter-based treatments must first be established and then compared against current medical and surgical standards [9] (figure 3)

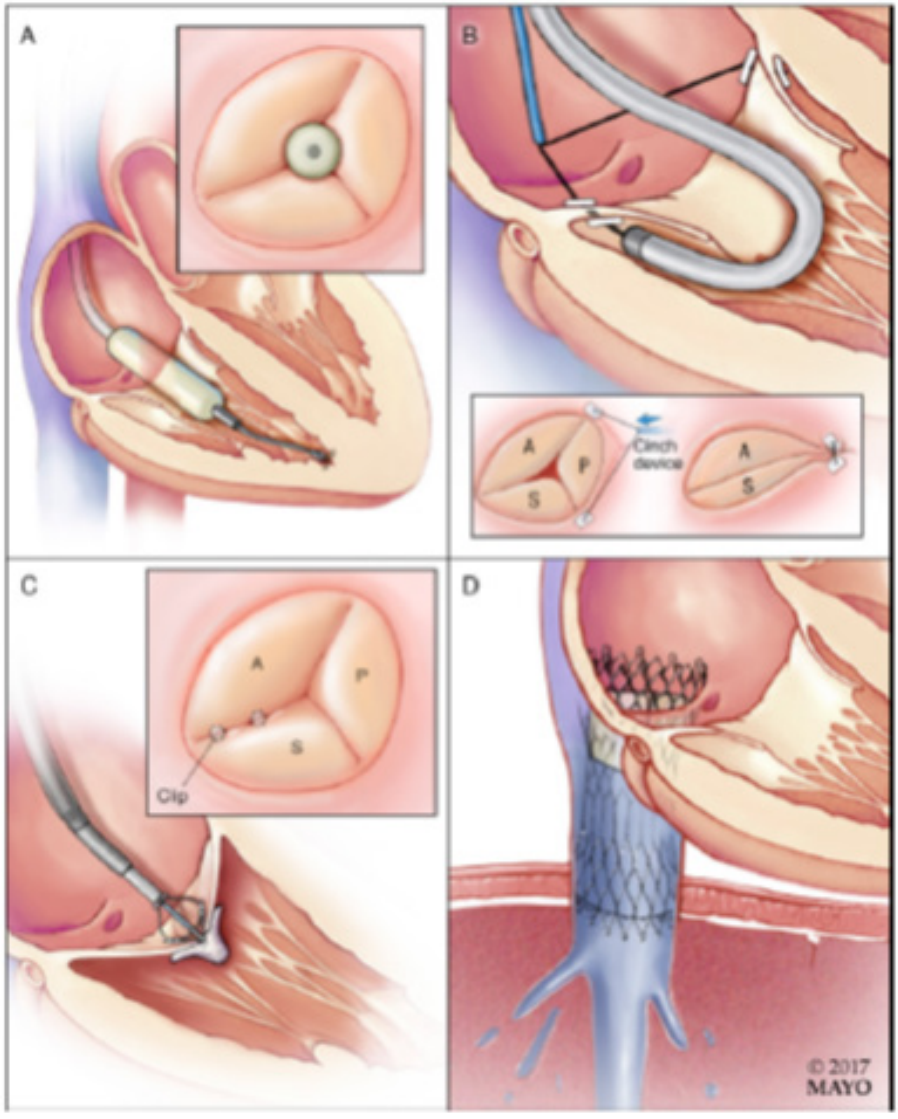


Figure 3 – Percutaneous devices in development for the treatment of tricuspid regurgitation. Panel (A) is the FORMA device, a tricuspid spacer which occupies the regurgitant orifice and provide a surface against which coaptation can occur. Panel (B) demonstrates the TriAlign, which percutaneously reproduces a surgical Kay bicuspidisation. Panel (C) shows the MitraClip being used in the tricuspid position. Panel (D) demonstrates a stented caval valve implanted in the inferior vena cava.

Erratum

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In Editorial "An Updated View on the Approach to Tricuspid Regurgitation", with DOI number: https://doi.org/10.36660/ijcs.20200325, published in the journal International Journal of Cardiovascular Sciences, 35(3):297-301, in page 297, correct the title "An Uptated View on the Approach to Tricuspid Regurgitation" to "An Updated View on the Approach to Tricuspid Regurgitation".

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