

A Clinician's View of Tricuspid Regurgitation: What do I Need to Know? When to Intervene?

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Tricuspid valve dysfunction was considered a benign clinical situation for a long time, but with the advancement of diagnostic imaging methods and better clinical stratification of patients with structural heart disease, adequate classification of tricuspid regurgitation has become fundamental to decision making in the context of a Heart Team.¹

The first assessment to be taken into account is the etiology of the dysfunction. With a low prevalence, the primary etiology, mainly due to rheumatic and congenital causes, has a well-established intervention flowchart, primarily based on the presence of symptoms or hemodynamic repercussions on the right side of the heart.²

The secondary etiology is the most prevalent, and it brings many challenges in its approach, as there are a number of conflicting publications regarding proposal of intervention.^{3,4}

During the natural history of heart failure with reduced left ventricular ejection fraction, tricuspid insufficiency of at least moderate intensity is common, and it has an unfavorable impact on morbidity and mortality. In this context, even mild regurgitation that is considered progressive, with evolution between serial echocardiograms of 0.2 cm² in the effective regurgitation orifice (ERO) and 15 mL/beat in the regurgitant volume, has an unfavorable prognosis.⁵

Some clinical aspects must be taken into account when evaluating tricuspid insufficiency of functional etiology in order to select patients who may have worse prognosis, and, in this context, the criterion with the greatest impact is permanent atrial fibrillation.⁵ This clinical condition leads to progressive dilation of the tricuspid annulus and is time-mediated; that is, the longer the patient spends in permanent fibrillation, the greater the dilation and, consequently, the greater the degree of reflux.⁶

Evaluation with multimodal diagnostic imaging methods is currently the recommended systematized approach, seeking anatomical and functional substrates of the tricuspid valve complex and the right ventricle.⁷

Transthoracic echocardiography is the first test to be indicated to assess the presence, etiology, and severity classification of tricuspid insufficiency. This valve dysfunction is very sensitive to pre- and post-load, and attention should be paid to the volume status and clinical stability of heart failure during image acquisition.⁷

Understanding the limitations of the method, qualitative data, such as anatomical alterations and coaptation failure, and quantitative data, such as ERO and regurgitant volume calculated by proximal isovelocity surface area (PISA), should be analyzed together by an echocardiographer who has experience with structural heart disease. Services that have complementary 3-dimensional echocardiography should use the method to improve the accuracy of the assessment, and complementary transesophageal echocardiography often adds little information, except in limited thoracic acoustic windows.

Compared to other diagnostic imaging methods, cardiac magnetic resonance has excellent spatial resolution, and it is especially valuable for assessing right ventricular function. Due to the merely moderate correlation of quantitative assessment with echocardiography and the few data available in the literature on clinical impact, the use of the method is still limited.⁸ Cardiac tomography is important in planning a possible structural intervention with assessment of the annular shape, perimeter, diameter, location, and trajectory of the right coronary artery.⁷

Efforts for adequate classification of tricuspid insufficiency are currently directed toward the following 2 main groups: those where it is possible to indicate the exact moment when the physiological limits were exhausted and the overload begins to negatively impact ventricular function, and those considered as having important tricuspid insufficiency, but well above the cutoff values. For the latter group, 2 new classifications have emerged, torrential and massive, which have negative prognostic and evolutionary impacts.^{7,9}

After obtaining multimodality images and extensive discussion in a Heart Team, the criteria for indicating intervention in tricuspid insufficiency are aligned with the main international guidelines. As previously mentioned, primary tricuspid insufficiency in the presence of symptoms or hemodynamic repercussions on the right ventricle is a clear indication for intervention, valve repair being the first option. In the event that this is technically impossible, the implantation of a biological prosthesis is a viable alternative, even with the high prevalence of thromboembolic phenomena, which discourages the implantation of mechanical devices in this topography.^{2,4}

Keywords

Tricuspid Valve; Tricuspid Valve Insufficiency; Heart Valve Diseases

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Manuscript received January 9, 2023; revised January 16, 2023; accepted January 26, 2023.

Editor responsible for the review: Daniela do Carmo Rassi Frota

DOI: <https://doi.org/10.36660/abcimg.202300051>

Regarding functional etiology, if a patient has significant tricuspid regurgitation and a clear indication for intervention due to another reason, such as left-sided valve disease or even myocardial revascularization, the tricuspid lesion should be corrected during the same surgical time.^{2,4,10}

The presence of a tricuspid annulus greater than or equal to 40 mm assessed by echocardiography through the apical 4-chamber window also indicates a concomitant approach at the same surgical time.^{2,4,10}

The most challenging situation in the presence of functional tricuspid insufficiency is the isolated lesion, with no other indication for intervention. In this context, the data in the literature are controversial as to whether there is clear indication for the approach. Conventional surgery with repair and implantation of a semi-rigid ring does not apparently benefit survival when compared to optimized clinical treatment, but, in very symptomatic cases, valve correction improves functional class.^{3,4}

The isolated approach may have a slightly clearer benefit in patients with very symptomatic functional tricuspid insufficiency in the presence of permanent atrial fibrillation or even in the presence of pacemaker electrodes altering the tricuspid valve dynamics. This fact has also led to a new etiological classification, creating a separate group within the secondary etiology for cases caused by the presence of this device.^{4,7}

In an era of catheter-based technologies, the selection of a device based on the analysis of anatomical characteristics is essential to obtain the best results. Assessment of the regurgitation mechanism should include the annular, leaflet, and subannular components.⁷

In low-risk patients, surgery remains the gold-standard treatment for functional tricuspid insufficiency, but, in cases of high surgical risk, especially during the past decade when a large number of transcatheter devices were developed based on established surgical procedures, the clinical decision may be different.⁷

The greatest experience is related to valve repair with edge-to-edge clipping, in which the most robust data show a reduction in the degree of regurgitation, good echocardiographic evolution, and improved functional

class, with little evidence of improvement in mortality, including cases considered to have torrential tricuspid insufficiency.^{2,7}

Some annuloplasty devices can be used in patients whose leaflet tethering is less pronounced. The combination of procedures and devices may also be an interesting strategy, depending on the pre-procedure anatomical and functional evaluation.⁷

With the advancement of diagnostic methods and new devices for correcting tricuspid dysfunction, we will, in the coming years, be able to accompany a series of interesting data on clinical impact in the management of these patients, including changes in the level of recommendation for intervention depending on the clinical, anatomical, and functional characteristics, which will always be at the center of the discussion about tricuspid insufficiency.

Author Contributions

Conception and design of the research, writing of the manuscript and critical revision of the manuscript for intellectual content: Bignoto T.

Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Sources of Funding

There were no external funding sources for this study.

Study Association

This study is not associated with any thesis or dissertation work.

Ethics Approval and Consent to Participate

This article does not contain any studies with human participants or animals performed by any of the authors.

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