See Article page 1374.

Commentary: Mild tricuspid regurgitation in rheumatic mitral surgery: To do, or not do, that is the question

Gonçalo F. Coutinho, MD, PhD

Gonçalo F. Coutinho, MD, PhD

The tricuspid valve has long ceased to be called the forgotten valve and become mainstream in heart valve disease intervention in recent years, whether in the surgical or the percutaneous intervention field. Of note, in the last 20 years, more than 8500 papers have been published regarding tricuspid regurgitation (TR), which gives a glimpse of this trendy subject (Figure 1).

Despite the consensus of intervening in severe TR, particularly in patients undergoing left-sided valve surgery (class I), the indication for less-than-severe TR is not generally accepted except whenever there is tricuspid annulus dilatation (>40 mm or 21 mm/m²) or previous signs and symptoms of right-sided heart failure (class IIa).^{1,2} Opinions diverge at this point; the “liberal faction” claims for tricuspid annuloplasty (TAP) in the majority of cases of left-sided valve surgery (up to 65% of patients).³ The rationale is that TAP is a straightforward, reproducible procedure, carrying a very low mortality and morbidity, does not increase significantly the operative time, and it has been demonstrated to provide reverse remodeling of the right ventricle and improvement of functional status, even in the absence of relevant TR. Moreover, it is well-recognized that reoperation for severe, isolated TR after left-sided valve

CENTRAL MESSAGE

Tricuspid valve repair is seldom necessary when there is only mild TR, without significant tricuspid annular dilation, in patients undergoing rheumatic mitral valve surgery.

surgery is associated with a perioperative mortality rate of 10% to 25%.

The “conservative faction” believes that less than severe TR, without annulus dilatation, will resolve in most instances with correction of the left-sided valve disease. In other words, the reduction of left pre- or afterload after mitral (MV) or aortic valve surgery will translate in pulmonary pressure decline, which in turn will reduce right ventricle pressure and/or overload, lessen tricuspid leaflet tethering and, consequently, less TR. This assumption is supported by numerous reports that have demonstrated that most patients will experience a reversal in TR severity and few will develop significant TR.^{4,5} Therefore, performing a prophylactic procedure with doubtful consequences can be viewed as a futile treatment (*primum non nocere!* [“first, do no harm”]).

In this issue of the *Journal*, Kim and colleagues⁶ analyze the potential benefit of having tricuspid valve (TV) repair for mild TR in patients undergoing rheumatic MV surgery. The primary end point was the development of severe TR, and secondary end points were death and heart failure. Inverse probability of treatment weighting was performed to reduce selection bias. Among 1208 consecutive patients, 419 received concomitant TV repair (TAP) and 789 did not. The groups were well balanced even before matching, with the TAP group slightly older (54.5 years vs 51.6 years),

From the Cardiothoracic Surgery Department, University Hospital and Centre of Coimbra; Faculty of Medicine, University of Coimbra, Portugal.

Disclosures: The author reported no conflicts of interest.

The *Journal* policy requires editors and reviewers to disclose conflicts of interest and to decline handling or reviewing manuscripts for which they may have a conflict of interest. The editors and reviewers of this article have no conflicts of interest.

Received for publication May 28, 2021; revisions received May 28, 2021; accepted for publication June 1, 2021; available ahead of print June 9, 2021.

Address for reprints: Gonçalo F. Coutinho, MD, PhD, Cardiothoracic Surgery, Department of the University Hospital and Center of Coimbra, Praceta Professor Mota Pinto, 3000-075, Coimbra, Portugal (E-mail: goncalofc Coutinho@gmail.com).

J Thorac Cardiovasc Surg 2023;165:1385-6
0022-5223/\$36.00

Copyright © 2021 by The American Association for Thoracic Surgery
<https://doi.org/10.1016/j.jtcvs.2021.06.008>

FIGURE 1. Number of publications in PubMed regarding tricuspid regurgitation (2000-2020).

with more prevalent AF (85.4% vs 61.3%) and increased tricuspid annulus diameter (32.6 mm vs 31.5 mm). Interestingly, only 6.5% (3.1% vs 3.4%) of patients had tricuspid annulus diameter greater than 40 mm and the mean pulmonary systolic pressure was around 40 mm Hg (40.8 mm Hg vs 39.8 mm Hg), which means that this was not probably a severely ill population.

Thus, not surprisingly no differences were found between groups concerning both primary and secondary outcomes, and the authors conclude that TV repair for mild TR in rheumatic MV surgery has no overt clinical benefit. This finding has important clinical implications, particularly to avoiding unnecessary procedures: first, it should be recognized that the rheumatic involvement is systemic, it may affect all valves, and mild changes of the TV (leaflet thickening, annular stiffness) can pass unnoticed. Hence, performing an annuloplasty can promote some degree of functional tricuspid stenosis that can be more pronounced when there isn't marked annular dilatation, which was the case; second, only 2.9% (1.7% vs 3.5%) of patients developed severe TR during follow-up, which is consentaneous with the randomized study of Pettinari and colleagues⁷ and other studies in which patients who had baseline mild TR rarely progressed to severe TR, regardless of the addition of TV repair; and finally, the omission of atrial fibrillation (AF) ablation was the only predictor of severe TR development. There is now recognition that TR can develop in association with AF and annular dilation, so in presence of large right

atria and AF, ablation, and possibly tricuspid annuloplasty, it can make a difference in long-term outcomes. Answering the question—To do or not to do a tricuspid repair during MV surgery in mild TR, I would say no, if there isn't significant annular dilation, and probably yes, if there is AF and an enlarged right atrium.

References

1. Otto CM, Nishimura RA, Bonow RO, Carabello BA, Erwin JP III, Gentile F, et al. 2020 ACC/AHA guideline for the management of patients with valvular heart disease: a report of the American College of Cardiology/American Heart Association Joint Committee on clinical practice guidelines. *Circulation*. 2021;144:E72-227.
2. Baumgartner H, Falk V, Bax JJ, De Bonis M, Hamm C, Holm PJ, et al. 2017 ESC/EACTS guidelines for the management of valvular heart disease. *Eur Heart J*. 2017;38:2739-91.
3. Chikwe J, Itagaki S, Anyanwu A, Adams DH. Impact of concomitant tricuspid annuloplasty on tricuspid regurgitation, right ventricular function, and pulmonary artery hypertension after repair of mitral valve prolapse. *J Am Coll Cardiol*. 2015;65:1931-8.
4. David TE, David CM, Fan CPS, Manthot C. Tricuspid regurgitation is uncommon after mitral valve repair for degenerative diseases. *J Thorac Cardiovasc Surg*. 2017;154:110-22.e1.
5. Yilmaz O, Suri RM, Dearani JA, Sundt TM III, Daly RC, Burkhart HM, et al. Functional tricuspid regurgitation at the time of mitral valve repair for degenerative leaflet prolapse: the case for a selective approach. *J Thorac Cardiovasc Surg*. 2011;142:608-13.
6. Kim WK, Kim SE, Yoo JS, Jung JH, Kim D-H, Kim JB, et al. Impact of valve repair on mild tricuspid insufficiency in rheumatic mitral surgery. *J Thorac Cardiovasc Surg*. 2023;165:1374-83.e7.
7. Pettinari M, De Kerchove L, Lazam S, Pasquet A, Gerber B, Vanoverschelde JL, et al. Mid-term results of a randomized trial of tricuspid annuloplasty for less-than-severe functional tricuspid regurgitation at the time of mitral valve surgery. *Eur J Cardiothorac Surg*. 2019;55:851-8.