

# In the operating room, do not leave important things unattended

Carlos Mestres<sup>1</sup>, Juri Sromicki<sup>2</sup>, and Paul Vogt<sup>2</sup>

<sup>1</sup>University Hospital Zurich

<sup>2</sup>UniversitätsSpital Zurich

January 5, 2021

## Commentary to JOCS-2020-OA-1345

**Concomitant tricuspid valve surgery is beneficial at the time of left-sided valve surgery**

**In the operating room, do not leave important things unattended**

Running Title: **The tricuspid not to be neglected**

**Carlos – A. Mestres MD PhD FETCS<sup>1, 2</sup>, Juri Sromicki MD<sup>1</sup>,**

**Paul R. Vogt MD<sup>1</sup>**

1 - Clinic of Cardiac Surgery, University Hospital Zürich, Zürich (Switzerland)

2 - Department of Cardiothoracic Surgery, The University of the Free State, Bloemfontein,  
(South Africa)

**Word count (All): 1631**

**Word count (Text): 1095**

**Key words :** Tricuspid regurgitation, tricuspid repair, left-sided valve surgery, aortic valve, mitral valve

Correspondence:

**Carlos A. Mestres, MD, PhD, FETCS**

Clinic for Cardiac Surgery

University Hospital Zürich,

Rämistrasse 100

CH 8091 Zürich (Switzerland)

Email: Carlos.Mestres@usz.ch

In this issue of the Journal of Cardiac Surgery, Huckaby et al (1) aimed at evaluating the impact of secondary functional tricuspid regurgitation (STR) and concomitant tricuspid valve repair (TVr) when operating left-sided valves. All patients undergoing left-sided valve surgery between 2010 and 2019 were retrospectively reviewed and grouped concerning the degree of TR and associated TVr. The authors collected 3,444 patients over a decade distributed in less-than-moderate TR without TVr (G1), more-than-moderate TR without TVr (G2) and more-than-moderate TR with TVr (G3) groups. The authors concluded that those patients with more-than-moderate TR without TVr when operating a left-sided valve had higher mortality and hospital readmissions. Our colleagues strongly recommend doing something on the tricuspid valve when we operate on the aortic or the mitral valves. Strong message, do not leave the tricuspid valve unattended!

It is clear that this interesting contribution has limitations. Some are acknowledged by the authors. Important is that their rate of completeness of follow-up is rather poor. First, they lost control of 10% of the cohort at 1 year postoperatively, with only 49.6% of the patients with some follow-up information at 5 years. By definition, this actually invalidates part of the analyses as the statistical power may eventually fall into a black hole. It is clear for quite long time that surgeons must have full control of the evolution of their patients over time; this has been addressed before (2). We probably have to accept this suboptimal follow-up and focus on this contribution including what we could call large study population, close to 3,500 patients. Is there some balance between the good and the bad parts?

It seems that insufficiency was the only criterion for TVr as per methods, unclear if authors took into account annular measurement or indexed values. Important and unknown is that if TVr was performed with the clamp on or the heart beating to justify some longer ischemic times. Furthermore, if during the follow-up the authors considered the effect of annulus measurements on late degrees of tricuspid regurgitation. It is likely that due to the retrospective design and the very low completeness of follow-up, these important questions cannot be fully addressed.

The tricuspid valve is still an obscure, even somewhat tantric complex. Is this because our knowledge is still limited? Is this because we are reluctant to add extra time under non-physiological conditions of cardiopulmonary bypass in patients with, e.g., mitral disease with pulmonary artery hypertension? Guess we still have no strong answers to many other questions. There is growing information that TVr plays a role in preventing mortality and improving outcomes in left-sided valvular surgery (3, 4), something which is supported in this current Huckaby et al contribution (1). This is most likely due to the control of regurgitation with positive impact on right ventricular function and pulmonary pressure. Although the gut feeling predominated decades ago and most of us decided to disorderly perform TVr of any kind, data were no solid to support action on a regular basis, especially due to the lack of robust follow-up data over time, beyond five years. Recent information from meta-analyses (5) and institutional series (4) tend to recommend TVr. The discussion about patients who might need tricuspid replacement should also be kept in mind, as it is likely that patients requiring repair or replacement are different populations.

As we have already pointed out earlier, it may happen that our understanding of the disease and its different forms is still suboptimal (6), considering that, as stated, accumulated information is based on retrospective studies covering long periods of time or observational studies with large differences in sample sizes and variability in inclusion criteria. Second, we have restricted room to expand our knowledge, because methodologically sound studies are not easy to design and execute when one considers logistics and finance among other issues (6).

Another topic of interest derived from this contribution (1) is the old problem of what to do in the tricuspid valve. Huckaby et al confirmed that they only performed partial annuloplasty ring repairs (1). Not confirmed if rigid, flexible or semi-rigid. As said, the suboptimal follow-up precludes deeper analyses on the influence of a given technique or a given ring. Classical implantations of flexible or rigid rings have been assessed by a number of authors with controversial outcomes. Algarni et al (7) confirm similar outcomes regardless of the ring but with more late TR when rigid rings are implanted. There is more controversy, as data from Shinn et al (8) showed no influence of the method of annuloplasty used on recurrence of TR over time in a 15-year experience, therefore challenging studies. Lack of standardization is still an issue and many answers will need studies known to be difficult to perform (6).

Finally, the problem of permanent pacemaker implantation (PPM) cannot be neglected when concomitant TVr is performed, especially in the setting of mitral valve surgery. This has been infrequently addressed in the past (8, 9). Jouan et al (10) confirmed an increased risk of postoperative PPM in the cases of concomitant TVr at the time of mitral surgery. The eventual role of shape and rigidity when using a prosthetic ring for TVr has still to be elucidated. It is known that TVR annuloplasty is a risk factor for postoperative conduction abnormalities. Huckaby et al. described postoperative arrhythmias in relation to less-than-moderate TR without TVr (G1), more-than-moderate TR without TVr (G2) and more-than-moderate TR with TVr (G3) of 11.29%, 20.43% and 24.91%. Unfortunately, we are not informed if these arrhythmias were transient

or permanent or when was PPM indicated. In any case, as also stated earlier, the fine balance between performing a procedure to benefit patients and withholding an additional maneuver to avoid harm in the absence of compelling indication is one that appears particularly relevant to this discussion (11).

In the end, STR has been identified as a growing problem in recent years due to misconceptions (12). To summarize, Huckaby et al (1) have brought again the attention of the readership to a still active and unsolved problem. They highlight the impact of TR on outcomes among patients undergoing left-sided valve operations, aortic and mitral as they pooled all together, which might be a matter of discussion. Moderate-or-greater TR led to more deaths and readmissions and the important part of their conclusion remarks is that patients who underwent concomitant TVr did not die more than patients with lesser degrees of TR. Therefore and in line with other studies suggesting the more and more frequently we must address TR at the time of left-sided valve surgery (13).

### Conflict of interest

The authors declare no conflicts of interest with regards this contribution

### ORCID

Carlos – A. Mestres <http://orcid.org/0000-0001-8148-9044>

Juri Sromicki <http://orcid.org/0000-0001-9964-7733>

### Data Availability Statement

Data have been retrieved from publicly available sources (PubMed) and from the original article JOCS-2020-OA-1345

### References

1. Huckaby L, Seese L, Hong YW et al. Concomitant Tricuspid Valve Surgery Is Beneficial at the Time of Left-Sided Valve Surgery. *J Card Surg* 2021 (In press).
2. Mestres CA, Weber A. How do we follow up our patients? Reporting outcomes without complete follow-up data renders us on the weak side. *J Thorac Cardiovasc Surg* 2018; 155:586-587.
3. Yilmaz O, Suri RM, Dearani JA, Sundt IIT, 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; 142:608–613.
4. Pahwa S, Saran N, Pochettino A et al. Outcomes of tricuspid valve surgery in patients with functional tricuspid regurgitation. *Eur J Cardiothorac Surg* 2020 Nov 7:ezaa350. doi: 10.1093/ejcts/ezaa350.
5. Veen KM, Etnel JRG, Quanjel TJM, et al. Outcomes after surgery for functional tricuspid regurgitation: a systematic review and meta-analysis. *Eur Heart J Qual Care Clin Outcomes* 2020; 6:10-18.
6. Mestres CA, Suri R. Preventive tricuspid annuloplasty: When benefit justifies the risk. What else? *J Thorac Cardiovasc Surg* 2016; 152:1641-1642.
7. Algarni KD, Alfonso J, Pragliola C et al. Long-term outcomes of tricuspid valve repair; the influence of the annuloplasty prosthesis. *Ann Thorac Surg* 2020 Nov 23:S0003-4975(20)31934-2. doi: 10.1016/j.athoracsur.2020.09.038.
8. Koplan BA, Stevenson WG, Epstein LM, Aranki SF, Maisel WH. Development and validation of a simple risk score to predict the need for permanent pacing after cardiac valve surgery. *J Am Coll Cardiol* 2003; 41: 795-801.
9. Mestres CA. Discussion of Berdajs D, Schurr UP, Wagner A, Seifert B, Turina MI, Genoni M. Incidence and pathophysiology of atrioventricular block following mitral valve replacement and ring annuloplasty. *Eur J Cardiothorac Surg* 2008; 34:61.
10. Jouan J, Mele A, Florens E et al. Conduction disorders after tricuspid annuloplasty with mitral valve surgery: implications for earlier tricuspid intervention. *J Thorac Cardiovasc Surg* 2016; 151:99-103.
11. Mestres CA, Suri RM. Pacemaker risk associated with prophylactic tricuspid annuloplasty: Balancing beneficence and nonmaleficence. *J Thorac Cardiovasc Surg* 2016; 151:104-105.

12. Taramasso M, Vanermen H, Maisano F et al. The growing clinical importance of secondary tricuspid regurgitation. *J Am Coll Cardiol* 2012; 59:703-710.
13. Dreyfus GD. Functional tricuspid pathology: To treat or not to treat? That is the question. *J Thorac Cardiovasc Surg* 2017; 154:123-124.