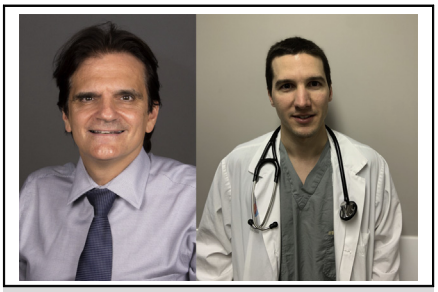
See Article page 1460.

Commentary: Transcatheter tricuspid valve interventions for treating isolated tricuspid regurgitation: Toward a new gold standard?

Guillem Muntané-Carol, MD, and
Josep Rodés-Cabau, MD



Josep Rodés-Cabau, MD (*left*), and Guillem Muntané-Carol, MD (*right*)

CENTRAL MESSAGE

This review adds a new piece of work on TTVI. Promising early and midterm data have been reported. The validation of these findings may establish TTVI as an alternative to surgery in TR patients.

Transcatheter tricuspid valve interventions (TTVIs) have arisen during the past decade as a treatment of isolated tricuspid regurgitation (TR).[1] Patients with isolated severe TR have been primarily managed medically, usually leading to progressive annular dilatation and end-stage right ventricular heart failure.[2] Consequently, late referral to surgery has been associated with the highest mortality rate among all surgical valve procedures (~10%).[3] TR is often functional[4] and occurs frequently in patients with already treated left-sided valvular disease, implying a higher surgical risk. Several transcatheter systems have been developed during the past years.[1] TTVIs can be classified according to their mode of action: annuloplasty devices, caval valve implantation, tricuspid valve replacement, and coaptation devices.

Bapat and Tang[5] contributed with a a concise and elegant review of the technical challenges and currently available devices for TTVI. The authors accurately described the preprocedural screening, including patient selection, anatomic challenges, and imaging features. Also, the authors described the available transcatheter tricuspid devices along with the current scientific evidence.

The management of isolated TR represents an unmet clinical need that has led to the expansion of TTVIs. The initial experience with the first-generation devices revealed that despite the high-risk profile of TTVIs recipients, most procedures were well tolerated with relatively low early mortality rates (much lower compared with most surgical series).[1] The results of the TriValve multicenter registry, including 312 TTVI recipients (Mitraclip [Abbott Vascular, Santa Clara, Calif]) 66%, caval valve implantation 9%, Forma [Edwards Lifesciences, Irvine, Calif] 8%, Trialign [Mitralign, Inc, Tewksbury, Mass] 6%, and other 11%) showed a 30-day mortality rate of 3.9%.[6] Taramasso and colleagues[7] evaluated, in patients with isolated severe TR, the clinical outcomes of patients undergoing TTVI versus medical treatment (propensity matched comparison), showing a significant reduction in mortality and heart failure hospitalization at midterm follow-up in TTVI patients. Although future randomized studies are needed, these preliminary results strongly support pursuing the development of transcatheter therapies for treating TR. Additionally, the initial experience with TTVIs showed that even modest reductions in TR severity may translate into significant improvements in early and midterm functional status and quality of life.[8,9] However, it should be pointed out that few data exist at long-term (>1 year) follow-up in this context. Of note, the only publication with long-term data (median, 32 months) showed good clinical outcomes but

From the Quebec Heart and Lung Institute, Laval University, Quebec City, Quebec, Canada.

Dr Muntané-Carol is supported by a research grant from the Fundación Alfonso Martín Escudero (Madrid, Spain). Dr Rodés-Cabau holds the Research Chair "Fondation Famille Jacques Larivière" for the Development of Structural Heart Disease Interventions.

Disclosures: Dr Rodés-Cabau has received institutional research grants from Medtronic and Edwards Lifesciences. The other author has nothing to disclose with regard to commercial support.

Received for publication Feb 24, 2020; revisions received Feb 24, 2020; accepted for publication Feb 25, 2020; available ahead of print March 19, 2020.

Address for reprints: Josep Rodés-Cabau, MD, Quebec Heart and Lung Institute, Laval University, 2725 Chemin Ste-Foy, G1V 4G5, Quebec City, Quebec, Canada (E-mail: josep.rodes@criucpq.ulaval.ca).

J Thorac Cardiovasc Surg 2020;160:1465-6
0022-5223/$36.00

https://doi.org/10.1016/j.jtcvs.2020.02.119

suggested that a relapse in right ventricular remodeling resulting in significant TR (moderate or greater) may occur over time.[10]

In conclusion, Bapat and Tang[5] added a new piece of work regarding the promising field of TTVIs. While some important issues remain (patient and device selection, optimization of the results regarding residual TR, long-term data), the early safety and preliminary efficacy data for most devices along with the surgical results (high early mortality in most series) may establish TTVIs as the new gold standard for the management of isolated TR in the coming years.

References

1. Asmarats L, Puri R, Latib A, Navia JL, Rodés-Cabau J. Transcatheter tricuspid valve interventions: landscape, challenges, and future directions. *J Am Coll Cardiol*. 2018;71:2935-56.
2. Kim Y-J, Kwon D-A, Kim H-K, Park JS, Hahn S, Kim KH, et al. Determinants of surgical outcome in patients with isolated tricuspid regurgitation. *Circulation*. 2009;120:1672-8.
3. Alqahtani F, Berzingi CO, Aljohani S, Hijazi M, Al-Hallak A, Alkhouli M. Contemporary trends in the use and outcomes of surgical treatment of tricuspid regurgitation. *J Am Heart Assoc*. 2017;6(12):e007597.
4. Mutlak D, Lessick J, Reisner SA, Aronson D, Dabbah S, Agmon Y. Echocardiography-based spectrum of severe tricuspid regurgitation: the frequency of apparently idiopathic tricuspid regurgitation. *J Am Soc Echocardiogr*. 2007;20:405-8.
5. Bapat V, Tang GHL. Emerging transcatheter options for tricuspid regurgitation: many shades of grey? *J Thorac Cardiovasc Surg*. 2020;160:1460-4.
6. Taramasso M, Alessandrini H, Latib A, Asami M, Attinger-Toller A, Biasco L, et al. Outcomes after current transcatheter tricuspid valve intervention: mid-term results from the international TriValve registry. *JACC Cardiovasc Interv*. 2019;12:155-65.
7. Taramasso M, Benfari G, van der Bijl P, Alessandrini H, Attinger-Toller A, Biasco L, et al. Transcatheter versus medical treatment of patients with symptomatic severe tricuspid regurgitation. *J Am Coll Cardiol*. 2019;74:2998-3008.
8. Hahn RT, Meduri CU, Davidson CJ, Lim S, Nazif TM, Ricciardi MJ, et al. Early feasibility study of a transcatheter tricuspid valve annuloplasty: scout trial 30-day results. *J Am Coll Cardiol*. 2017;69:1795-806.
9. Perlman G, Praz F, Puri R, Ofek H, Ye J, Philippon F, et al. Transcatheter tricuspid valve repair with a new transcatheter coaptation system for the treatment of severe tricuspid regurgitation: 1-year clinical and echocardiographic results. *JACC Cardiovasc Interv*. 2017;10:1994-2003.
10. Asmarats L, Perlman G, Praz F, Hensey M, Chrissoheris MP, Philippon F, et al. Long-term outcomes of the FORMA transcatheter tricuspid valve repair system for the treatment of severe tricuspid regurgitation: insights from the first-in-human experience. *JACC Cardiovasc Interv*. 2019;12:1438-47.