



# Transcatheter valvular interventions 2022: insights from the National Societies of Cardiology Journals of the European Society of Cardiology

Jean-Jacques Monsuez<sup>1</sup>, Plamen Gatzov<sup>2</sup>, Fernando Alfonso<sup>3</sup>

<sup>1</sup>Cardiology, APHP, Hôpital René Muret, Avenue du Dr Schaeffner

<sup>2</sup>Cardiology, Medical University of Pleven, Pleven, Bulgaria

<sup>3</sup>Cardiology, Hospital Universitario de La Princesa Universidad Autónoma de Madrid, Spain

Corresponding author: Email: [jeanjacquesmonsuez@gmail.com](mailto:jeanjacquesmonsuez@gmail.com)

Transcatheter valvular interventions (TVIs) have emerged in the wake of the successes achieved with the mitral percutaneous dilatation by Inoue, 40 years ago, and the transcatheter aortic valve implantation (TAVI) in patients with aortic stenosis by Cribier two decades ago. Transcatheter valvular interventions now apply with an increasing rate to several other diseases involving aortic, mitral, pulmonary and tricuspid valves. Several interesting issues related to TVIs have been addressed by studies published in the year 2022 in the National Societies of Cardiology Journals (NSCJs).

Transcatheter aortic valve implantation procedures are now performed in more than 50 countries with over 1 500 000 patients treated, and thousands of lives saved. A French report of the 1780 patients who underwent a transfemoral TAVI from 2002 to 2021 in Rouen showed that the mean logistic EuroScore decreased overtime from 28% to 11%. Mortality rate also decreased to reach only 1.4% in 2021. In addition length of stay decreased considerably with a median duration of only 2 days after the procedure, and >70% of patients discharged home within 72 h (1). Similar favourable trends were observed in a single centre, 13-year experience of 313 patients in the Belgian study by *Bezzeccheri et al.* (2), with an overtime significant improvement in periprocedural outcomes and a 30% decrease in cardiovascular mortality at 1 year. Likewise, data from 5454 patients treated with TAVI in the Spanish Health System also showed dramatic impro-

vement in outcomes at a nationwide level, with a 50% drop of mortality overtime.

Transcatheter aortic valve implantation procedures have been simplified. In an eight-year experience including 324 patients from a single centre in Bulgaria, the standard operating strategy was replaced by a minimalist approach consisting of a guided percutaneous access, no intubation anaesthesia, mandatory valve pre-dilatation and use of rapid pacing (3). Anaesthesia and analgesia have significantly progressed too, as reported in a study from Croatia where periprocedural analgesedation was directly performed by the interventional cardiologists (4).

Procedural complications though less frequently observed have not completely disappeared. In a Czech study permanent pacing was required in 22.6% of 717 patients. Of note, patients with pre-existing right bundle branch block as well as men with overweight had a higher risk of permanent pacing (5). A Spanish study by *Pascual et al.* analysed the safety and efficacy of modifying the classic TAVI implantation technique to a cusp-overlap projection to achieve a higher implantation depth and to reduce the burden of new permanent pacemaker implantation. Among 226 patients treated, requirement for a new permanent pacemaker implantation was significantly less frequent in patients treated with this new approach (12.4 vs. 23%) (6).

Another interesting technical improvement has emerged. Since the final position of the neo-commissures

Reproduced from: *European Heart Journal*, Volume 44, Issue 7, 14 February 2023, Pages 554–556.

<https://doi.org/10.1093/eurheartj/ehac812> ehac676

© The Author(s) 2023. Published by Oxford University Press on behalf of the European Society of Cardiology. All rights reserved. For permissions, please e-mail: [journals.permissions@oup.com](mailto:journals.permissions@oup.com)

is uncontrolled during conventional TAVI procedures (potentially hindering coronary access and future procedures) *Redondo et al.* from Spain, proposed a standard method to achieve commissural alignment with the ACURATE neo valve using computed tomography analysis and an in silico model to predict final TAVI commissural posts position. In contrast with the conventional implantation technique, in which the method predicted coronary obstruction in six of nine patients none of the oriented implants showed coronary obstruction (7).

Vascular complications remain a substantial shortcoming of transfemoral TAVI. The use of plug-based closure devices has been suggested as a bail-out option for patients with failed suture-based closure systems. *Blumenstein et al.* (8) reported their successful experience in 10 patients among 168 treated with transfemoral TAVI who required such a bail-out option with the MANTA device.

On the basis that bleeding complications after TAVI negatively impact prognosis, *Zbronski et al.* from Poland, tested in 100 patients the safety and efficacy of routine use of protamine sulfate administration to reverse unfractionated heparin after TAVI. Despite numerically lower rates of life-threatening and major bleeding in patients randomized to protamine sulfate, a statistical significance was not reached. Further larger studies should be undertaken to ascertain the impact of protamine sulfate in this setting (9).

Staged approaches combining coronary revascularization followed by TAVI are now commonly performed in high-risk patients with associated coronary artery disease and left ventricular dysfunction, as reported in a study from Hungary (10).

Transcatheter valvular interventions have also emerged as an alternative treatment for symptomatic periprosthetic valvular regurgitation or paravalvular leak (PVL). Although most PVLs remain clinically silent 1%–3% of these patients require re-operation due to congestive heart failure, haemolysis or both. *Galrinho et al.* from Portugal performed 33 percutaneous PVL closures in 26 patients, including 14 for mitral, 11 for surgical aortic

prosthetic valves, and 3 after TAVI. Closure was completely successful in 17 patients (65.4%) partially successful in 4 (15.4%) and unsuccessful in 5 (19.2%) (11). Transcatheter mitral valve repair (TMVR) is also increasingly performed. A German study by *Hohmann et al.* investigated current anticoagulant treatment strategies and clinical outcome in 1342 patients undergoing TMVR with the MitraClip device. A very heterogeneous pattern of anticoagulant therapies was seen [antiplatelet monotherapy, oral anticoagulation (OAC), antiplatelets and OAC dual antiplatelet therapy, triple therapy and no anticoagulation]. Considering relevant differences in clinical outcome across treatment groups, controlled trials to establish evidence-based recommendations on anticoagulant treatment after TMVR are needed (12).

In the Anatolian Journal of Cardiology, *Bugan et al.* published a meta-analysis of nine studies including 321 patients undergoing transcatheter tricuspid valve replacement (TTVR). Most procedures were performed in old patients, in NYHA functional class III/IV, with massive tricuspid regurgitations (TR). NYHA functional class and 6-minute walking distance significantly improved after TTVR. Concomitantly the prevalence of  $\geq$ severe TR was significantly reduced after TTVR (13).

Transcatheter valvular interventions have emerged as effective and safe approaches to treat a growing spectrum of valvular heart diseases, generating new challenges with regard to the clinical indications and potential complications. Many of these burning topics have been addressed by the National Society of Cardiology Journals affiliated to the European Society of Cardiology.

## Acknowledgements

ESC staff: Michael Alexander, Publications Team Manager; Margot Lauret, Publications Officer.

## Disclosure of Interest

All authors declare no disclosure of interest for this contribution.

Reproduced from: European Heart Journal, Volume 44, Issue 7, 14 February 2023, Pages 554–556.

<https://doi.org/10.1093/eurheartj/ehac812> ehad676

Drug and Material Disclaimer:

The mention of trade names, commercial products organizations, and the inclusion of advertisements in the journal does not imply endorsement by the European Heart Journal, the editors, the editorial board, Oxford University Press or the organization to which the authors are affiliated. The editors and publishers have taken all reasonable precautions to verify drug names and doses, the results of experimental work and clinical findings published in the journal. The ultimate responsibility for the use and dosage of drugs mentioned in the journal and in interpretation of published material lies with the medical practitioner, and the editors and publisher cannot accept liability for damages arising from any error or omissions in the journal. Please inform the editors of any errors.

The opinions expressed in the European Heart Journal are those of the authors and contributors, and do not necessarily reflect those of the European Society of Cardiology, the editors, the editorial board, Oxford University Press or the organization to which the authors are affiliated.

Published on behalf of the European Society of Cardiology. © The Author(s) 2023.

For Permissions, please e-mail: [journals.permissions@oup.com](mailto:journals.permissions@oup.com)

All rights reserved; no part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise without the prior written permission of the Publishers.

## Appendix

### Editors' Network of the National Societies of Cardiology Journals, European Society of Cardiology

*Jean-Jacques Monsuez* (Editor-in-Chief of Archives des Maladies du Cœur et des Vaisseaux Pratique, Chairman of the Editors' Network of the European Society of Cardiology), France; *Plamen Gatzov* (Editor-in-Chief of Forum for Interventional Cardiology Journal), Bulgaria; *Michael Aschermann* (Editor-in-Chief of Cor et Vasa), Czech Republic; *Michael Boehm* (Editor-in-Chief of Clinical Research in Cardiology), Germany; *Nuno Cardim* (Editor-in-Chief of Revista Portuguesa de Cardiologia), Portugal; *Ariel Cohen* (Editor-in-Chief of Archives of Cardiovascular Diseases), France; *Jose M De La Torre Hernandez* (Editor-in-Chief of REC Interventional Cardiology), Spain; *Cetin Erol* (Editor-in-Chief of Anatolian Journal of Cardiology), Turkey; *Mario Ivanusa* (Editor-in-Chief of Cardiologia Croatica), Croatia; *Robert Gabor Kiss* (Editor-in-Chief of Cardiologia Hungarica), Hungary; *Patrizio Lancellotti* (Editor-in-Chief of Acta Cardiologica), Belgium; *Juan Sanchis* (Editor-in-Chief of Revista Española de Cardiología), Spain; *Anetta Undas* (Editor-in-Chief of Kardiologia Polska), Poland; *Fernando Alfonso* (past-Chairman of the Editors' Network of the European Society of Cardiology), Spain; *Ignacio Ferreira-Gonzalez* (past-Chairman of the Editors' Network of the European Society of Cardiology), Spain.

#### References

1. Barbe T, Levesque T, Durand E, et al. Transcatheter aortic valve implantation: the road to a minimalist "stent-like" procedure. Arch Cardiovasc Dis 2022; 115: 196–205. <https://doi.org/10.1016/j.acvd.2022.03.004>
2. Bezzeccheri A, Vermeersch P, Verhey S, et al. Trends and outcomes in transcatheter aortic valve implantation in Belgium: a 13-

- year single center experience. Acta Cardiol 2022; 77: 960–9. <https://doi.org/10.1080/00015385.2022.2130444>
3. Petrov I, Stankov Z, Polomski P, Boychev D. Eight-year single-center experience with transcatheter aortic valve implantation (TAVI). Forum Interv Cardiol 2022; 2: 52–63. <https://doi.org/10.3897/icf.2.e98590>
4. Matetic A, Romic M, Crncevic N, et al. Analgosedation during transcatheter aortic valve implantation. Review and protocol at University Hospital Center split. Cardiol Croatica 2021; 16: 293. <https://doi.org/10.15836/ccar2021.293>
5. Drozdova A, Jiravsky O, Balusik J, et al. Permanent pacemaker implantation in patients undergoing TAVR single center study between years 2009 and 2020. Cor Vasa 2022; 64: 403–9. <https://doi.org/10.33678/cor.2022.028>
6. Pascual I, Almendarez M, Avansaz P, et al. Cusp overlapping technique with a selfexpanding device optimizes implantation depth and reduce permanent pacemaker implantation. Rev Esp Cardiol 2022; 75: 412–20. <https://doi.org/10.1016/j.recesp.2021.05.014>
7. Redondo A, Valencia-Serrano F, Santos-Martinez S, et al. Accurate commissural alignment during ACURATE neo TAVI procedure. Proof of concept. Rev Esp Cardiol 2022; 75: 203–12. <https://doi.org/10.1016/j.recesp.2021.02.008>
8. Blumenstein J, Maruskin T, Eckel T, et al. Simple option for large vascular closure in case of failed suture-based closure device after TAVI. REC Interv Cardiol 2022; 4: 33–8. <https://doi.org/10.24875/recice.m21000238>
9. Zbronski K, Grodecki K, Gozdowska R, et al. Protamine sulfate during transcatheter aortic valve implantation (PS TAVI): a single-center, single-blind, randomized, placebo-controlled trial. Kardiologia Pol 2021; 79: 995–1002. <https://doi.org/10.33963/KP.a2021.0070>
10. Judit A, Zalan G, Laszlo S, et al. Aortic stenosis from a challenging diagnosis to a non-routine therapy. Cardiol Hungarica 2023; 53: 43–7. <https://doi.org/10.26430/chungarica.2023.53.1.43>
11. Galrinho A, Branco LM, Fiarresga A, et al. Paravalvular leak closure: still a challenge with unpredictable results. Rev Port Cardiol 2021; 40: 261–9. <https://doi.org/10.1016/j.repc.2020.07.016>
12. Hohmann C, Ludwig M, Walker J, et al. Real-world anticoagulatory treatment after percutaneous mitral valve repair using MitraClip: a retrospective, observational study on 1300 patients. Clin Res Cardiol 2022; 111: 889–99. <https://doi.org/10.1007/s00392-022-01988-2>
13. Bugan B, Çekirdekçi EI, Onar LC, Barçın C. Transcatheter tricuspid valve replacement for tricuspid regurgitation: a systematic review and meta-analysis. Anatol J Cardiol 2022; 26: 505–19. <https://doi.org/10.5152/AnatolJCardiol.2022.1440>

