

## Global Spotlights

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

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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 1500 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.<sup>1</sup> Similar favourable trends were observed in a single centre, 13-year experience, of 313 patients in the Belgian study by Bezzeccheri *et al.*<sup>2</sup>, 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 improvement 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.<sup>3</sup> Anaesthesia and analgesia have significantly progressed too, as reported in a study from Croatia, where periprocedural analgesedation was directly performed by the interventional cardiologists.<sup>4</sup>

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.<sup>5</sup> 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%).<sup>6</sup>

Another interesting technical improvement has emerged. Since the final position of the neo-commissures 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.<sup>7</sup>

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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.*<sup>8</sup> 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.<sup>9</sup>

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.<sup>10</sup>

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%).<sup>11</sup>

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), 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.<sup>12</sup>

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.<sup>13</sup>

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.

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## Declarations

## Disclosure of Interest

All authors declare no disclosure of interest for this contribution.

## Appendix

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

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