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EDITORIAL COMMENT

Transcatheter aortic valve implantation-associated conduction disturbances are moving to center stage

Perturbações da condução associadas a implantação percutânea valvular aórtica: em trânsito para o palco central

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Increased operator experience, advances in transcatheter heart valve technologies and preprocedural planning are among the key factors that have improved outcomes in transcatheter aortic valve implantation (TAVI).[1] TAVI is now performed not only in elderly, high-risk patients, but also in younger patients with lower surgical risk. These patients have a longer life-expectancy and conduction disturbances such as new left-bundle branch block (LBBB), new atrioventricular (AV) block, a need for a new permanent pacemaker and new-onset atrial fibrillation (AF) may become increasingly important for periprocedural management, prognosis, and costs. Indeed, several studies have now confirmed that new onset LBBB or the need for a permanent pacemaker have a significant, detrimental association with prognosis.[2–5] However, despite advances in biomedical engineering and increased operator experience, the incidence of TAVI-associated new conduction disturbances remains high.

In this issue of the Portuguese Journal of Cardiology, Manuel et al. investigated the incidence and predictors of new conduction disturbances following TAVI. After excluding patients with a preprocedural pacemaker, a postprocedural new permanent pacemaker and those who were lost to follow-up, they observed new-onset AF in 11% and new LBBB in as many as 25% of patients. QRS duration (permanently) and PR interval (transiently) increased after TAVI. This transient PR prolongation is also observed in the general population with normalization in 30% of individuals, without any prognostic relevance.[6] They also found that deep (ventricular) valve implantation was significantly associated with new-onset LBBB. This finding, which corroborates previous studies, should encourage operators to aim for a high implantation for most of the currently available transcatheter heart valves. The exception is the ACURATE neo, where an implantation with the inflow 7 mm below the annular level results in optimal sealing without a relevant increase in conduction disturbances.[7–9]

New-onset atrial fibrillation

Calcium deposits, fibrosis and advanced age are risk factors common to severe aortic stenosis and AF. Not surprisingly, about a third of all patients undergoing TAVI have pre-existing AF.[10,11] An additional 5-10% may have pre-existing, but undetected AF. Previous studies have reported new-onset AF after transcatheter aortic valve replacement (TAVR) in about 7-8% of patients,[12,13] similar to the 11% reported in the study by Manuel et al. Changes in volume state, systemic inflammatory response and non-transfemoral access may all act as a trigger of new onset atrial fibrillation.[10] Studies have consistently demonstrated an increased stroke risk in such patients. Indeed, new onset AF after TAVI has been linked to an absolute stroke increment as high as 3% and to increased mortality.[12] Early diagnosis and proper treatment of new onset AF is of importance, however scientific evidence guiding optimal anticoagulation management in TAVI patients is scarce. Direct oral antico-

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agulants appear to be safe and effective in patients with bioprosthetic valves, but not in patients with mechanical prostheses.[14] Moreover, data from our group suggest that continuation of oral anticoagulation may be equally safe and efficacious as the interruption of anticoagulation in patients with pre-existing AF undergoing TAVI.[11]

New-onset left bundle branch block

During TAVR, there is a direct interaction beetween the conduction system and the stiff wire, the balloon, the delivery catheter and the transcatheter heart valve itself. New LBBB is most frequently observed and thus, patients with a pre-existing right bundle branch block are at high risk for the development of an intra- or postprocedural high-grade AV block. Identification of new LBBB is important as it may progress further to a delayed high-grade AVblock. Also, studies have consistently associated new LBBB with an increased risk for sudden cardiac death, reduced left ventricular ejection fraction and heart failure, especially in patients with a long QRS duration.[2–4] Choice of prosthesis, depth of implantation and the degree of oversizing are the main predictors of new LBBB. Indeed the risk of a new LBBB shows a relative increase of ~20-30% per 1 mm of implantation depth.[2] To achieve a high implantation with self-expanding valves, the cusp-overlap technique has become popular.[15] With this technique (often a right anterior oblique/caudal projection), the right and the left coronary cusps are overlapped and the non-coronary cusp is used as a reference for implantation depth. This technique enables a high implantation and at the same time mitigates the risk of device pop-out.

The continuing importance of postprocedural monitoring

In recent years, physicians have attempted to simplify and streamline the procedure and early discharge has been advocated to reduce the duration of hospitalization and healthcare costs.[16] However, this should not come at the price of patient safety and we should not forget that postprocedural conduction disorders are frequent complications. Therefore, it appears reasonable to monitor patients for 24-48 hours after TAVI. Finally, negative dromotropic medication such as betablockers, verapamil, amiodarone or digoxin should be discontinued periprocedurally to reduce the incidence of high-degree AV blocks and the need for a permament pacemaker.[7,17]

Conflicts of interest

ST is a consultant and proctor for Boston Scientific, New Valve Technology and Abbott Vascular. He has received institutional research grants from Boston Scientific and Fumedica, has received speaker honoraria from Medtronic. He holds equity in Hi-D Imaging.

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