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EDITORIAL COMMENT

TAVR and Left Main Stenting

Can 2 Giants Live in Harmony in a Small Room?*

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Coronary artery disease is commonly found in patients with severe aortic stenosis undergoing transcatheter aortic valve replacement (TAVR) (1-3). Although there is little evidence from published reports supporting a specific management approach to severe coronary artery disease in the setting of TAVR, today staged or combined percutaneous coronary intervention (PCI) is generally contemplated for severely stenotic lesions in proximal coronary arteries that subtend a large area of myocardium at risk (3).

In the early years of TAVR, the idea of placing a metallic stent into the aortic root without removing the calcific aortic cusps raised concerns for the subsequent approach to the coronary arteries. Indeed, it had been argued that the valve struts could interfere with future coronary interventions and that catheter manipulation could potentially even dislodge the valve. However, history has told us something different; these worries have emerged as more theoretical than real, and today PCI is performed, even after TAVR, without any particular issues, no matter what type of prosthesis is implanted (3). That said, significant left main coronary artery (LM) disease in the context of TAVR represents an additional challenge for 2 reasons: 1) the potential interaction between the coronary stent and the prosthesis due to the anatomic proximity of the LM ostium to the aortic annulus; and 2) the risk for hemodynamic compromise during LM PCI in the presence of severe aortic stenosis or TAVR in the presence of critical LM stenosis.

In this issue of the *Journal*, Chakravarty et al. (4) report a study in which they aimed to address these important questions, presenting a well-conducted, multicenter, retrospective registry, which enrolled 204 patients undergoing TAVR and LM PCI. Among the study population, planned LM PCI for pre-existing LM disease was performed in 176 patients, whereas unplanned LM PCI for TAVR-related coronary occlusion or dissection was performed in 19 patients. In the first part of the study, the investigators performed a comparison of propensity-matched patients with pre-existing LM stents with a historical cohort of patients undergoing TAVR without LM revascularization.

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Clinical outcomes were similar between the TAVR plus LM PCI cohort and matched control subjects, except for a trend toward increased target vessel revascularization in the PCI group. In the second part of the study, the investigators performed a granular examination of the study population, reporting comparative outcomes according to LM protection, stent location, timing, and status (planned or unplanned) of PCI. Interestingly, they observed that outcomes of TAVR plus LM PCI were not influenced by whether the LM was unprotected or protected, the location of the stent, or the timing of PCI. The investigators then concluded that the presence of coexisting LM disease in patients with severe aortic stenosis should not deter physicians from referring patients for TAVR. At the same time, they confirmed the observation recently made by Ribeiro et al. (5), reporting poorer prognosis in patients undergoing unplanned LM PCI for acute coronary occlusion after TAVR.

It is undeniable that the results of the TAVR-LM registry add another small piece of evidence to the big TAVR puzzle, removing many doubts about the feasibility and safety of LM PCI in subjects with

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transcatheter aortic valves in place or who will receive these valves. However, these favorable outcomes should not induce physicians to consider the presence of LM disease as a minor issue in TAVR patients. In fact, as appropriately emphasized by the investigators of the study, subjects with long protruding segments of the LM stent, ostial LM disease, heavily calcified cusps, tubelike aortic sinuses, and low-lying LM ostia still warrant special attention, because of the high risk for stent or coronary ostium impairment by the transcatheter aortic valve or the displaced calcific cusps. Definite and robust conclusions regarding the safety in these specific subsets cannot yet be drawn, and this study represents only the first step toward a deeper understanding of the prognosis of TAVR in these particular situations. In addition, we cannot exclude that a number of patients with these features were denied TAVR at each center, thus introducing potential selection bias into the study. In this scenario, even though the conclusions of the investigators seem reasonably well supported, the importance of case-by-case TAVR patient selection in the presence of LM stent or critical stenosis must be underlined.

During the pre-TAVR screening phase, multidetector computed tomography probably represents the most important tool for assessing the risk for LM occlusion or LM stent impingement during valve deployment. Besides providing precise aortic root measurements, it allows operators to obtain information regarding LM stent protrusion and potential interaction between the frame of the prosthesis and the calcified aortic cusp with the LM stent once the valve is deployed. In very high risk cases for interaction of the LM stent and transcatheter aortic valve, the physician must decide whether the patient should be turned down for TAVR or to adopt strategies aimed at reducing the risk for stent-valve interaction and planning bailout approaches to treat LM stent distortion or coronary flow impairment. The use of valves allowing commissural alignment as well as leaflet capturing might reduce the risk, but this hypothesis is frankly highly speculative and needs to be proved. In contrast, coronary protection by placing a wire and a balloon or stent in the coronary vasculature before transcatheter aortic valve replacement is the most popular strategy adopted in these cases (3). When an undeployed stent or a balloon is parked in the coronary vascular bed, PCI in the coronary ostium is usually straightforward and can be performed rapidly by pulling the stent or balloon back to the correct location. If no preventive measures are taken, coronary obstruction or LM stent distortion by a displaced aortic cusp or the prosthesis itself is a therapeutic challenge. Patients with coronary obstruction are frequently unstable, and it may be extremely challenging to deliver a wire and subsequently a device to the coronary vasculature. Chakravarty et al. (4) appropriately emphasize the importance of preprocedural planning and coronary protection. Even though there was no statistical significance, because of the small number of cases, it cannot be denied that there were no deaths among 9 patients undergoing unplanned LM PCI with coronary occlusion, compared with 4 deaths among 13 patients undergoing unplanned LM PCI without coronary protection.

In conclusion, the study by Chakravarty et al. (4) adds considerably to current knowledge about the feasibility and the safety of TAVR and LM PCI, thus overcoming many outdated preconceptions. However, the management of patients with severe aortic stenosis and LM disease requires special considerations, including extremely accurate screening, pre-procedural planning, experience, and common sense. After all, surgical aortic valve replacement remains an extraordinary therapy for many of our patients with severe aortic stenosis.

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REFERENCES

1. Ortlepp JR, Schmitz F, Bozoglu T, et al. Cardiovascular risk factors in patients with aortic stenosis predict prevalence of coronary artery disease but not of aortic stenosis: an angiographic pair matched case-control study. Heart 2003;89:1019–22.

2. Rapp AH, Hillis LD, Lange RA, et al. Prevalence of coronary artery disease in patients with aortic stenosis with and without angina pectoris. Am J Cardiol 2001;87:1216–7.

3. Goel SS, Ige M, Tuzcu EM, et al. Severe aortic stenosis and coronary artery disease—implications for management in the transcatheter aortic valve replacement era: a comprehensive review. J Am Coll Cardiol 2013;62:1–10.

4. Chakravarty T, Sharma R, Abramowitz Y, et al. Outcomes in patients with transcatheter aortic valve replacement and left main stenting: the TAVR-LM registry. J Am Coll Cardiol 2016;67:951–60.

5. Ribeiro HB, Webb JG, Makkar RR, et al. Predictive factors, management, and clinical outcomes of coronary obstruction following transcatheter aortic valve implantation: insights from a large multicenter registry. J Am Coll Cardiol 2013;62:1552–62.

KEY WORDS aortic stenosis, coronary artery disease, myocardium, percutaneous coronary intervention, transcatheter aortic valve replacement