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Extension of calcifications into the myocardium was found in 17 of 28 patients (61%): right-sided (n = 6), left-sided (n = 2), and mixed right-left-sided (n = 9). The basal parts of the ventricles (right n = 8, left n = 9) and right ventricular outflow tract (n = 8) were preferentially involved. Deep extension into the inner half of the left ventricular myocardium was present in 7 patients (**Figure 1A**). The involved myocardial segments in these patients appeared thickened at cardiac magnetic resonance (i.e., end-diastolic wall thickness 12.2 ± 3.4 mm; hypocontractile systolic wall thickening 14 ± 6%) as compared to patients with no evidence of penetration of calcification into the myocardium (i.e., end-diastolic wall thickness 6.8 ± 1.5 mm, p = 0.009; systolic wall thickening 72 ± 26%, p < 0.0001) (**Figure 1B**, Online Video 1). Moreover, left ventricular ejection fraction was significantly lower in patients with deep myocardial extension of calcifications, (i.e., 50.7 ± 5.6%) compared to patients without myocardial penetration of calcifications (i.e., 63.4 ± 8.2%; p = 0.0023 Mann-Whitney test). Nine patients with myocardial penetration of calcification (53%) underwent pericardiectomy. During cardiac surgery, 3 patients experienced a dissection of cardiac wall (right ventricle n = 2, right atrium n = 1), all 3 had myocardial extension of calcifications. At follow-up 5 patients died, 1 of whom had deep myocardial penetration of calcification.

Pericardial calcifications are a frequent finding on CT in CP. Penetration into the underlying myocardium is not uncommon and in some cases may extend deep toward the subendocardium. If present, such involved segments are thickened as well as hypocontractile and myocardial penetration may influence surgical outcomes.

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APPENDIX For a supplemental video, please see the online version of this article.

3D Intracardiac Echocardiography During TAVR Without Endotracheal Intubation

Intracardiac echocardiography (ICE) has demonstrated comparable diagnostic imaging quality to transesophageal echocardiography (TEE) and multidetector computed tomography (MDCT) for transcatheter aortic valve replacement (TAVR) (1,2). We evaluated the safety and feasibility of ICE-guided transfemoral (TF) TAVR under conscious sedation and local anesthesia. We prospectively enrolled 21 patients who underwent TF TAVR using 3-dimensional ICE as a primary intraprocedural imaging modality. The patients were carefully selected on the basis of consensus decision of a multidisciplinary TAVR team. For the procedural planning, every patient underwent a transthoracic echocardiogram, contrast-enhanced MDCT, and coronary angiogram before the procedure.

For the TAVR procedure, in addition to the usual vascular accesses, we also placed an 11-F femoral venous sheath for the ICE probe. Standard long- and short-axis views were obtained and used for qualitative assessment of the aortic valve, implantation of the bioprosthesis, ruling out aortic annular dissection, and paravalvular leak. A transventricular long-axis view of the left ventricle was obtained to rule out pericardial effusion and to estimate left ventricular function.

All patients safely and successfully underwent ICE-guided TF TAVR without endotracheal intubation using either a balloon expandable (n = 19) or self-expanding (n = 2) bioprosthesis, without any major complication. Mean age, Society of Thoracic Surgeons score, and EuroSCORE II of patients were 85.3 ± 7.7 years, 7.3 ± 4.4%, and 11.9 ± 10.7%, respectively, and 55% of the patients were men. Immediately after valve deployment, 3 patients underwent post-dilation due to moderate paravalvular leak detected on the ICE (**Figure 1**). Brief TEE was performed in 2 patients to confirm ICE findings. As correctly identified on ICE in both the patients, 1 had moderate paravalvular leak and underwent balloon post-dilation, whereas the second patient did not have significant leak. On post-TAVR transthoracic echocardiogram obtained within 24 h of the procedure, all the bioprosthetic valves appeared to be functioning normally, without significant paravalvular leak or pericardial effusion. The average of length of stay after the procedure was 3.24 ± 4.4 days (median 2 days). There was no major vascular bleeding or in-hospital death.

There are limited data on the use of ICE-guided TAVR, especially under local anesthesia and conscious sedation. In a study that reported findings on 30 patients referred for TAVR who underwent

pre-procedural ICE followed by MDCT, good correlation was found in the aortic annulus measurements (2). A randomized study demonstrated the feasibility of ICE-guided TAVR, and found good correlation between the ICE and TEE guidance in 25 patients under general anesthesia (1).

The present investigation is first to prospectively evaluate the safety and feasibility of ICE-guided TF TAVR without endotracheal intubation. The salient findings of the study are: 1) ICE is safe and feasible in selected patients and can be performed without major complications; and 2) intraprocedural ICE can detect paravalvular leak and help guide necessary therapy. With continued interest and emphasis on using conscious sedation for TAVR procedures, consideration of ICE as a primary intraprocedural imaging tool becomes very relevant. Present-generation 3-dimensional ICE probes can be used for volumetric imaging; however, in the present configuration, cross-sectional measurement of annular size is difficult due to the limited field of view of 22°. A recent article on recommendations for intraprocedural imaging acknowledges that ICE is comparable and an attractive alternative to TEE for TAVR (3). In addition to providing imaging guidance, ICE obviates the necessity for endotracheal intubation, shortens the procedural time, and avoids the complications of general anesthesia and TEE (4).

The small number of patients limits our single-center study, and the results will need to be confirmed in a larger population. The study is also limited due to selection bias because the patients were carefully screened and selected. There was no control cohort in this study, and hence, the incremental value and cost-effectiveness of ICE cannot be established. In conclusion, ICE-guided TF TAVR without endotracheal intubation is a viable option in selective patients who are deemed appropriate by the multidisciplinary team.

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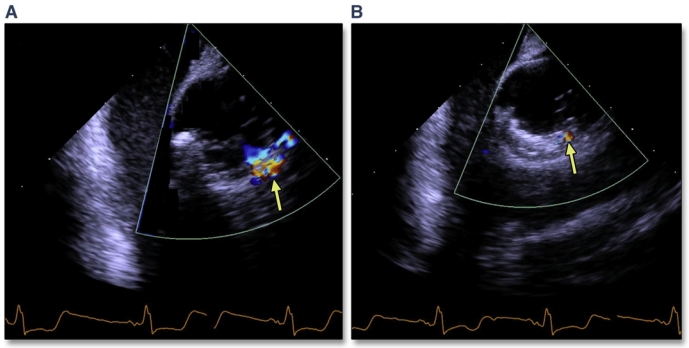
FIGURE 1 Example of Paravalvular Leak Demonstrated on ICE



(A) Moderate leak **(arrow)** immediately after the valve deployment. **(B)** The leak **(arrow)** became mild after post-dilation with a balloon. ICE = intracardiac echocardiography.

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Acute MI and Contrast-Enhanced CMR: We Need the Whole Map of the Archipelago, Not Just Half of It!

We read with great interest the article by Jablonowski et al. (1) showing that contrast-enhanced cardiac magnetic resonance (ce-CMR) overestimates infarct size at 6 h post-reperfusion compared with pathology and that infarct imaging timing by ce-CMR is critical. Although this is not an entirely new finding, the careful and meticulous work performed by the authors demonstrates the rapidly changing nature of acute infarction and reperfused myocardial