

Editorial



Post-Procedural Computed Tomography after Transcatheter Aortic Valve Replacement: New Insights into Patient Management

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Conflict of Interest

The author has no financial conflicts of
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► See the article “Sinus of Valsalva Thrombosis Detected on Computed Tomography after Transcatheter Aortic Valve Replacement” in volume 50 on page 572.

Transcatheter aortic valve replacement (TAVR) has been used as an alternative to surgical aortic valve replacement in severe aortic stenosis patients with successful mid-term outcomes.^{1,2} Hypoattenuated leaflet thickening (usually indicating leaflet thrombosis) and reduced leaflet motion have been reported in association with both transcatheter and surgical aortic bioprosthetic valves.³ Using multidetector by computed tomography (CT), subclinical leaflet thickening is documented more frequently than expected, as transthoracic echocardiography is considered being unsuitable for the detection.^{3,4} A recent meta-analysis reported that subclinical leaflet thrombosis is seen on CT in 11.5% of patients after TAVR and is associated with increased risk of stroke.⁵ However, whether anticoagulation can reduce these phenomena after TAVR is not established, because data on this topic from randomized trials are lacking.

Besides hypoattenuated leaflet thickening, other findings such as subvalvular thickening and thrombosis of Sinus of Valsalva are not uncommonly encountered on post-TAVR CT.⁶ Although alterations of hemodynamics in sinuses of Valsalva can affect the development of thrombosis, sinus of Valsalva thrombosis after TAVR has been scarcely reported. In this issue of *Korean Circulation Journal*, Lim et al.⁷ reported the clinical and cardiac CT findings of patients with sinus of Valsalva thrombosis after TAVR. On a retrospective review of 192 patients underwent cardiac CT after TAVR, 9 patients (4.7%) had sinus of Valsalva thrombosis on cardiac CT, 3 of which had concomitant leaflet thrombosis. Sinus of Valsalva thrombosis was frequently detected in the non-coronary sinus, and predominantly located in the bottom of the sinus extending upward towards the sinotubular junction. Three of 9 patients with sinus of Valsalva thrombosis had subclinical embolic stroke on brain magnetic resonance imaging. The authors suggested that Sinus of Valsalva thrombosis after TAVR should be regarded as a potential target of anticoagulation treatment to prevent systemic embolization or coronary obstruction.

The findings of the study are interesting, but clinical implication is limited because of the selection bias and lack of relationship between sinus of Valsalva thrombosis and clinical consequence. First, the study population consisted of patients who underwent post-TAVR CT with various clinical indications and heterogeneous time interval from TAVR, and only

28.9% of the entire patients who underwent TAVR was included in the study. Moreover, brain magnetic resonance imaging to investigate embolic stroke was performed in only one-third of the study population. Second, the association between sinus of Valsalva thrombosis and embolic stroke after TAVR was unclear because only borderline statistical significance was demonstrated on the univariate logistic regression analysis.

To date, clinical implication of sinus of Valsalva thrombosis detected on post-TAVR CT is not sufficient to provide new insight to post-TAVR follow-up, despite this finding is novel and unexpected. However, the importance of post-procedural CT imaging should not be overlooked, as we noted in the case of leaflet thrombosis. There is an increasing awareness of bioprosthetic aortic valve thrombosis after TAVR owing to the usage of post-procedural CT in clinical trials,⁸⁾ which can have potential to change post-procedural patient management such as anticoagulation. Another issue regarding the leaflet thickening in bioprosthetic aortic valve is its potential relationship with early structural valve degeneration.⁹⁾¹⁰⁾ Recently, long-term durability of transcatheter aortic valve has received attention as TAVR is increasingly being used for younger, lower-risk patients. A recent study suggested a time-dependent degeneration of transcatheter valves consisting of thrombosis formation, endothelial hyperplasia, fibrosis, tissue remodeling, proteinase expression, and calcification.¹⁰⁾ Until now, the mechanism contributing leaflet thrombosis and structural valve degeneration and impact on the post-procedural anticoagulation should be further investigated. Although optimal follow-up interval of post-procedural CT is not established, future investigation using post-procedural CT imaging as an endpoint is warranted to further understand mechanisms of post-procedural findings and their clinical implications.

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