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IMAGES IN INTERVENTION

Hypertrophic Left Ventricle With Small Cavity and Severe Aortic Angulation

A Dangerous Association in Case of Transcatheter Aortic Valve Replacement

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An 87-year-old woman presented with worsening symptoms of heart failure. Echocardiography revealed paradoxical low-flow aortic stenosis (mean gradient 34 mm Hg; aortic valve area 0.9 cm^2, indexed stroke volume 31 ml/m^2) together with small left ventricular (LV) cavity and septal hypertrophy. The patient was then referred for transcatheter aortic valve replacement. Pre-operative computed tomography scan showed a 64-mm annulus with severe aortic angulation (80°) (**Figure 1A**). The aortic valve was crossed with Movable-Core wire guide (Cook Medical, Bloomington, Indiana) and Amplatz-Left-1 catheter (Cordis, Milpitas, California) was advanced in the LV and changed for a pigtail: however, it was never possible to advance pigtail and the Safari Small wire (Boston Scientific, Marlborough, Massachusetts) into the LV apex (**Figures 1B and 1D**, dashed line) with the stiff wire often approaching the mitral valve (**Figures 1B, 1E, and 1F**, continuous line). During guidewire manipulation into the LV, pericardial tamponade occurred and immediate pericardiocentesis was performed (**Figure 1C**). Transesophageal echocardiography revealed a perforation of the lateral wall of the LV (Online Video 1). Due to active bleeding, surgical treatment of the perforation was performed.

We believe that this complication occurred because of 3 anatomical conditions, which together caused the guidewire never to reach the LV apex (intended wire position in **Figures 1B and 1D**, dashed line) but always to point toward the lateral wall of the LV (anticipated true wire position in **Figures 1B, 1E, and 1F**, continuous line): 1) the increase aortic angle of the aortic valve (**Figures 1A and 1B**); 2) the small LV cavity together with an hypertrophic basal septum (**Figures 1B and 1F**, red arrow); and 3) the unfavorable alignment between the LV and the aorta (**Figures 1E and 1F**).

Increased aortic angulation has already been showed to negatively impact procedural success following self-expandable prosthesis implantation, mostly because of a greater incidence of paravalvular leak (1). Our case highlights how it should be also a risk factor for LV perforation, especially if associated

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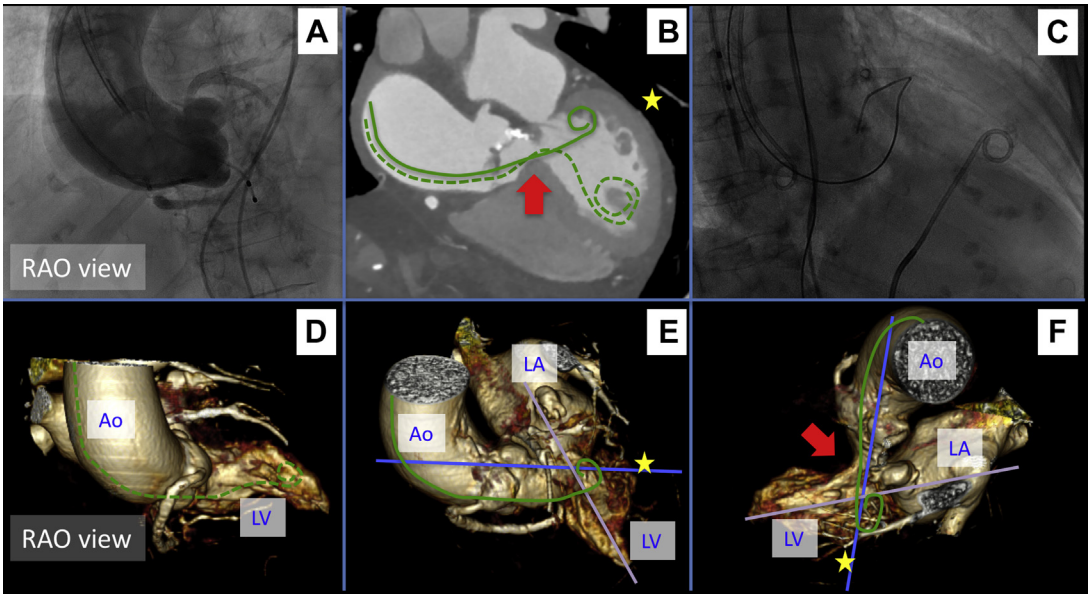
FIGURE 1 Hypertrophic Left Ventricle With Small Cavity and Severe Aortic Angulation



(A) Aortography performed in right anterior oblique (RAO) projection, showing horizontal aorta (Ao). **(B)** Computed tomography reconstruction of RAO projection: **dashed line** showing intended wire position and **continuous line** showing the anticipated true position of the wire, approaching the mitral valve and pointing toward the lateral wall of the left ventricle (LV) **(star)**, also because of the hypertrophic basal septum **(red arrow)**. **(C)** Pericardiocentesis performed. **(D to F)** Three-dimensional computed tomography reconstruction showing misalignment between the Ao axis **(blue line)** and LV axis **(purple line)**, with the wire pointing toward the lateral wall of the LV **(star)**. See Online Video 1. LA = left atrium.

with aortic-LV misalignment and small, hypertrophic LV. Efforts to fully gain apical position of the pigtail and usage of an extra small pre-shaped Safari wire are possible solutions that may lower the risk of LV perforation.

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KEY WORDS LV hypertrophy, perforation, severe aortic angulation

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