

## IMAGES IN INTERVENTION

# Unexpected Cardiac Tamponade Due to Bleeding From the Left Atrium During Transcatheter Aortic Valve Replacement

Hirofumi Hioki, MD, Yusuke Watanabe, MD, PhD, Shintaro Takamura, MD, Ken Kozuma, MD, PhD

An 88 years-old woman admitted undergoing transcatheter aortic valve replacement (TAVR) because of severe aortic valve stenosis. Pre-procedural computed tomography demonstrated that annulus area was 345 mm<sup>2</sup> (Figure 1A) and minimum diameter of Valsalva was 27.4 mm (Figure 1B). Calcification was present between the left atrium (LA) and aortic root (Figure 1C). Diameter of the lower limbs were suitable for transfemoral access. Based on these findings, transfemoral TAVR was performed under general anesthesia with transesophageal echocardiography guidance. After pre-dilatation using 20-mm balloon, a SAPIEN XT 23-mm (Edwards Lifesciences, Irvine, California) at 1 cm<sup>3</sup> underfilling was successfully implanted under rapid pacing. However, after that, the patient became hemodynamically unstable and transesophageal echocardiography demonstrated pericardial effusion. Surgical repair was performed to

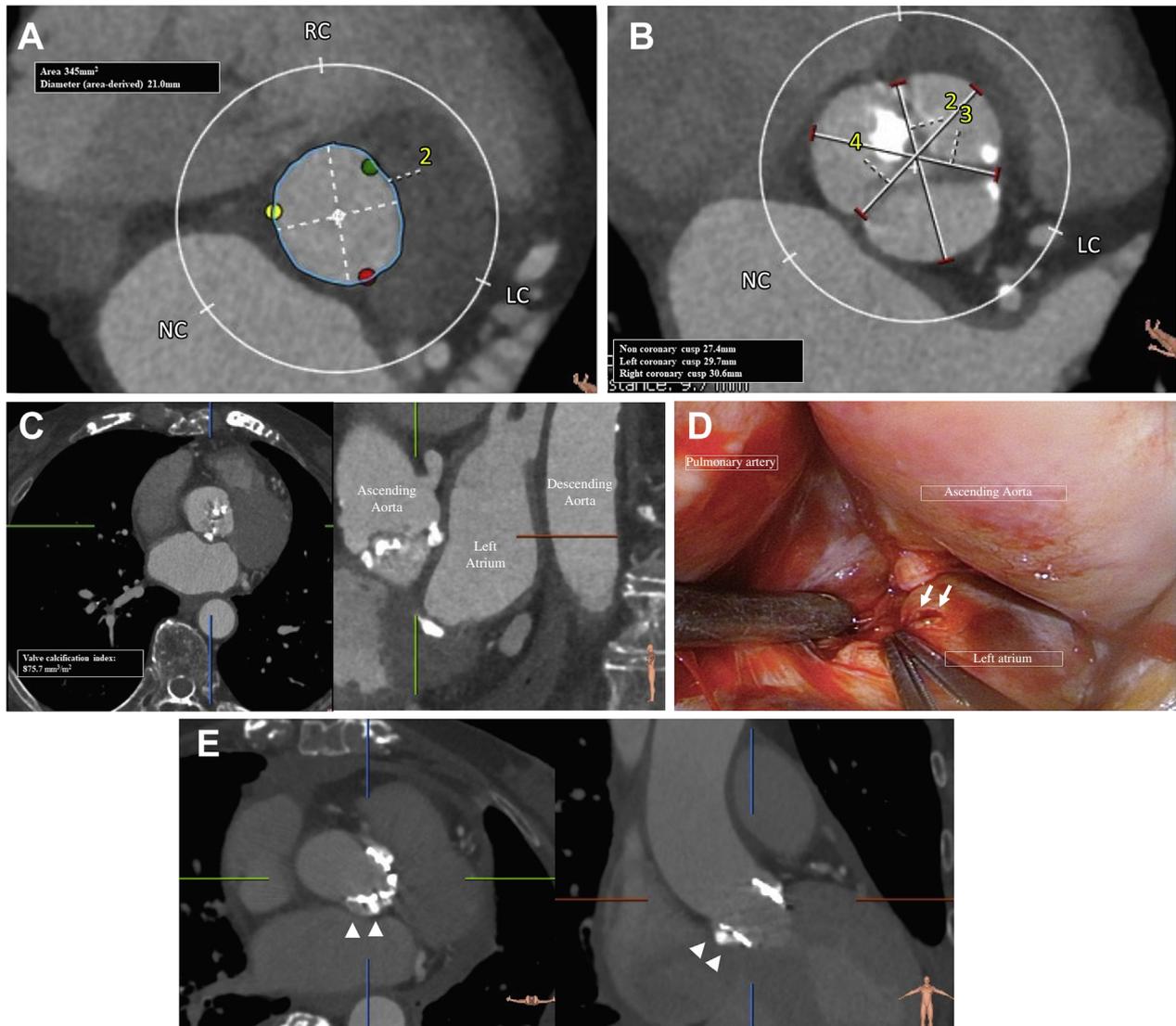
achieve hemostasis and identified bleeding from the LA (Figure 1D). Post-procedural computed tomography showed that calcification was pushed away in the direction of LA (Figure 1E). Seven days after surgical repair, she was discharged without further complications.

Although cardiac tamponade occurs in ≤5% of TAVR (1), this is the first description of cardiac tamponade of LA perforation. With insight of pre-procedural images, we presumed that combination of protruded calcification and high valve calcification index might increase risk of LA injury during TAVR.

**ADDRESS FOR CORRESPONDENCE:** Dr. Hirofumi Hioki, Division of Cardiology, Department of Internal Medicine, Teikyo University Hospital, 2-11-1 Kaga, Itabashi-ku, Tokyo 173-0003, Japan. E-mail: [hhioki@shinshu-u.ac.jp](mailto:hhioki@shinshu-u.ac.jp).

From the Division of Cardiology, Department of Internal Medicine, Teikyo University Hospital, Tokyo, Japan. Dr. Watanabe has served as a proctor for Edwards Lifesciences and Medtronic. All other authors have reported that they have no relationships relevant to the contents of this paper to disclose.

Manuscript received June 21, 2016; revised manuscript received November 16, 2017, accepted November 21, 2017.

**FIGURE 1** Computed Tomographic and Macroscopic Images

(A) Computed tomography (CT) images at the level of annulus. Annulus area was 345 mm<sup>2</sup>. (B) CT images at the level of sinuses of Valsalva. Diameter of Valsalva was suitable for 23-mm prosthesis implantation. (C) Horizontal and axial CT images. There was calcification between aortic root and left atrium (valve calcification index: 875.7 mm<sup>3</sup>/m<sup>2</sup>). (D) Macroscopic images. Hemorrhagic origin was present at left atrium (white arrows). (E) Post-procedural CT images. Calcification was pushed away in the direction of left atrium (white arrows). LC = left coronary cusp; NC = non-coronary cusp; RC = right coronary cusp.

## REFERENCE

1. Rezq A, Basavarajiah S, Latib A, et al. Incidence, management, and outcomes of cardiac tamponade during transcatheter aortic valve implantation. *J Am Coll Cardiol Intv* 2012;5:1264-72.

**KEY WORDS** cardiac tamponade, left atrium perforation, transcatheter aortic valve replacement