Dehiscence of Freestyle aortic valve visualized by real-time three-dimensional transoesophageal echocardiography and dual-source computed tomography: a rare cause of aortic regurgitation

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A 54-year-old man was admitted because of acute decompensated heart failure. Ten years ago, he underwent implantation of a 27 mm Freestyle aortic root stentless bioprosthesis (Medtronic Inc., Minneapolis, Minnesota) with a subcoronary technique for severe aortic regurgitation (AR) due to the bicuspid valve, combined with mitral valve repair for moderate mitral regurgitation (MR) due to anterior leaflet prolapse.

On admission, transthoracic echocardiography revealed a flap-like structure (asterisk) at the non-coronary cusp (Panel A; Supplementary data online, Movie A). Colour Doppler images showed an AR jet between the left and right coronary cusps (Panels B and C; Supplementary data online, Movies B and C), and moderate MR due to degenerative change. Aortic and mitral regurgitant fractions were 30 and 43%, respectively. Real-time three-dimensional transoesophageal echocardiography (RT3D-TEE) using iE33 (Philips Medical Systems, Bothell, WA, USA) was conducted to evaluate the cause of AR. RT3D-TEE depicted a partial dehiscence of the Freestyle bioprosthesis at the non-coronary cusp (Panel D; Supplementary data online, Movie D). A 128-slice dual-source computed tomography (DSCT) system (Somatom Definition FLASH, Siemens Healthcare, Forchheim, Germany) with 4D volume rendering confirmed the RT3D-TEE finding (Panel E; Supplementary data online, Movie E). We suspected that the dehiscence of the bioprosthesis at the non-coronary cusp induced disconnection of the leaflets, deforming the aortic valve and causing a gap between the left and right coronary cusps on the opposite side, through which AR occurred.

Moderate AR and moderate MR were considered to have caused heart failure, and aortic and mitral valve replacements were performed. The operative findings (Panel F) were consistent with the RT3D-TEE and DSCT findings. The patient recovered uneventfully and was discharged on the 23rd postoperative day.

Supplementary data are available at European Heart Journal – Cardiovascular Imaging online.