



Paravalvular leak vanishing at end-diastole during transcatheter aortic valve replacement

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A 90-year-old woman underwent transcatheter aortic valve replacement (TAVR). After the implantation of a self-expandable valve, paravalvular leak (PVL) was found at posteromedial side (Fig. 1a, b). The regurgitation jet on the color Doppler image was not enough to confirm the presence of severe regurgitation because of the vanishing at end-diastole (Fig. 1c, Supplementary video 1), although circumferential extent of the PVL occupied > 30% and a holodiastolic flow reversal was observed in the descending aorta. Soon after, the patient's blood pressure dropped from 123/70 mmHg to 93/30 mmHg. There were neither electrocardiogram changes nor left ventricular (LV) asynergy suggesting myocardial ischemia. Aortic root angiography showed significant PVL (Fig. 1d, Supplementary video 2) and simultaneous recording of the LV and aortic pressures revealed an increased LV end-diastolic pressure up to the level of systemic diastolic pressure (Fig. 1e). Before the TAVR, an abnormal relaxation pattern in transmitral Doppler waveform was observed and LV end-diastolic pressure

was 8 mmHg, which could exclude severe LV diastolic dysfunction. Accordingly, the PVL was judged as severe and the equalization of the LV and systemic pressure was thought to be the cause of reduced leakage at end-diastole. Because of high risk of annulus rupture due to a protruding LV outflow tract calcification and the PVL was expected to reduce with gradual valve expansion, post-dilation was deferred. Postoperative echocardiography after the TAVR showed a reduction to moderate to severe PVL (Fig. 1f, g) based on VARC-3 criteria [1] with pressure half-time of 349 ms (Fig. 1h). She was finally transferred to another hospital with a blood pressure of 131/48 mmHg and no symptoms.

Because of the equalization of diastolic LV and systemic pressures in severe PVL, we need to avoid underestimation when PVL vanishing at end-diastole was observed. Comprehensive hemodynamic and angiographic assessment is mandatory for precise grading of the PVL severity.

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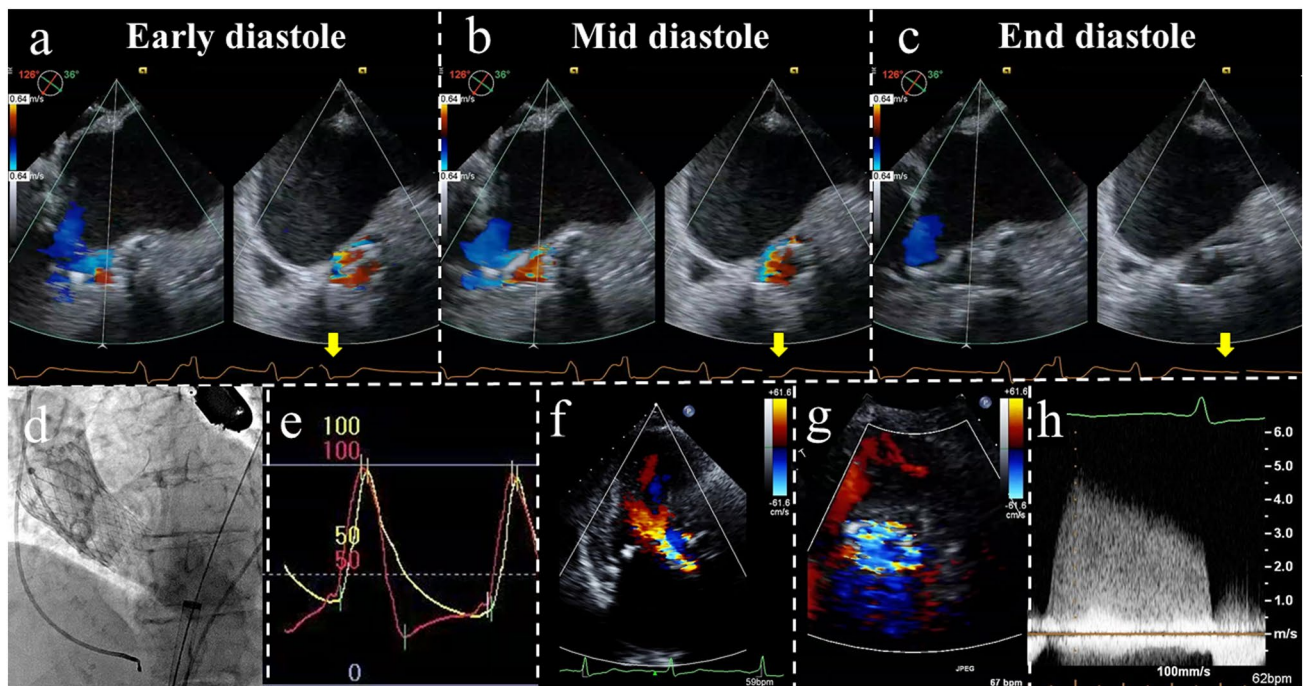


Fig. 1 Transeophageal echocardiographic images at early-diastole (a), mid-diastole (b), and end-diastole (c). Yellow arrows on electrocardiogram indicate the phase of the still images. Aortic root angiography with contrast volume of 20 mL (d). Simultaneous recording

of left ventricular and aortic pressures (e). Postoperative transthoracic echocardiography (f, g) and continuous wave Doppler image of paravalvular leak (h)

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Declarations

Conflict of interest Yoji Tamaki, Shingo Tsujinaga, Hiroyuki Iwano, Kiwamu Kamiya, Toshiyuki Nagai and Toshihisa Anzai declare that they have no conflict of interest.

Human rights statements All the procedures followed were in accordance with the ethical standards of the responsible committee on human

experimentation (institutional and national) and with the Helsinki Declaration of 1964 and later versions.

Informed consent Informed consent was obtained from the patient for being included in the study.

Reference

1. Varc Writing C, Genereux P, Piazza N, et al. Valve academic research consortium 3: updated endpoint definitions for aortic valve clinical research. *Eur Heart J*. 2021;42:1825–57.

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