
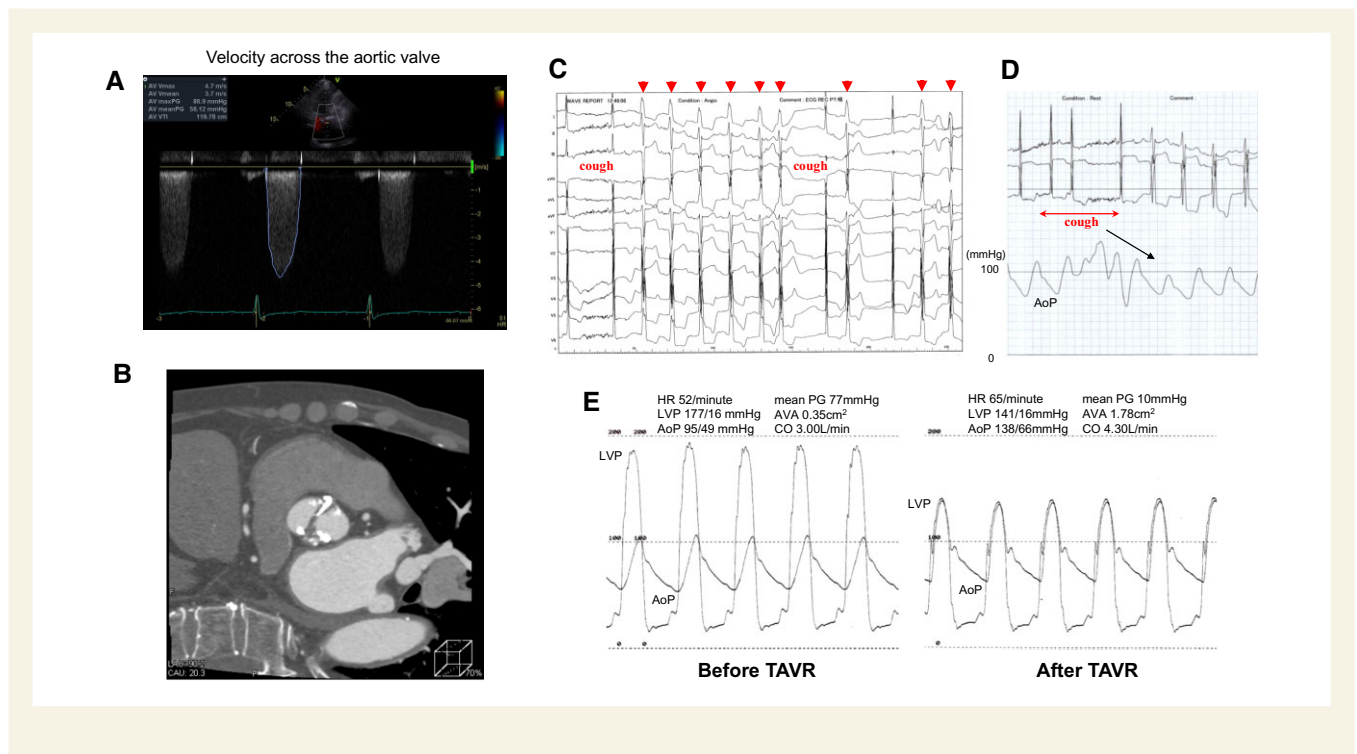


# Potential high-risk sign of cough-induced transient left bundle branch block in severe aortic valve stenosis

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An 87-year-old female with a history of atrioventricular nodal re-entrant tachycardia treated by radiofrequency catheter ablation was referred to our hospital for further investigation of exertional dyspnoea. Electrocardiogram showed a sinus rhythm 63 beats per minute with occasional premature atrial complex, prominent left

ventricular voltage, and descending ST-segment depression in leads I, II, aVL, and V2 through V6 (see [Supplementary material online, Figure S1](#)). Transthoracic echocardiography demonstrated mild left ventricular (LV) hypertrophy (11 mm) and aortic valve stenosis (AS) (aortic valve area of 0.37 cm<sup>2</sup> based on the continuity equation,

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peak velocity of 4.7 m/s across the valve, and mean systolic pressure gradient of 58 mmHg) with LV ejection fraction of 42.5% and stroke volume index of 24.8 mL/m<sup>2</sup> (*Panel A*). Computed tomography revealed a calcified bicuspid aortic valve (*Panel B*). Coronary angiography (CAG) showed no significant stenotic lesion in the coronary artery trees (see [Supplementary material online, Videos S1 and S2](#)). Dry cough was observed during CAG. The electrocardiographic monitor documented conversions from narrow QRS complexes to the appearance of complete left bundle branch block (LBBB) following a cough (*Panel C*, red arrows). Aortic pressure dropped after the patient coughed as shown in *Panel D* (arrow). LBBB returned to normal narrow QRS complexes after the cough stopped. Reproducible conversions to LBBB have been shown associated with each cough. The patient was judged to be a high-risk candidate for open heart surgery based on the Society of Thoracic Surgeons Predicted Risk of Mortality score (10.2%) and underwent transcatheter aortic valve replacement (TAVR) for severe AS. After TAVR, haemodynamic status was improved (*Panel E*), and LBBB was not induced by cough.

We experienced a severe AS case with reproducible transient LBBB provoked by cough, which disappeared after aortic valve repair by TAVR. Cough can cause an increase in intrathoracic pressure and lead to a decrease in venous return and coronary perfusion pressure. In our severe AS case, decreased aortic pressure after cough and

subsequent low coronary perfusion might contribute to transient LBBB even in the absence of chest pain or coronary artery stenosis. Other mechanisms of cough-induced LBBB can be considered. First, alterations in heart rate can cause an intraventricular conduction disturbance. In our case, the onset of LBBB appears to follow a long-short sequence (*Panel D*), suggesting that cough-induced atrial ectopy could result in phase 3 block in left bundle. Second, cough can cause various arrhythmias and conduction disturbances due to elevated pressure in the right atrium and stimulation of a neural reflex.

## Supplementary material

[Supplementary material](#) is available at *European Heart Journal – Case Reports* online.

**Slide sets:** A fully edited slide set detailing these cases and suitable for local presentation is available online as Supplementary data.

**Consent:** The authors confirm that written consent for submission and publication of this case report including images and associated text has been obtained from the patient in line with COPE guidance.

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