Assessment of coronary flow reserve by transthoracic Doppler echocardiography in left apical ballooning syndrome

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We present the time course of transthoracic coronary flow reserve in the left anterior descending artery in a patient who suffered a transient left apical ballooning syndrome.

A 73-year-old woman was admitted to our coronary care unit with chest pain, starting 2 h before. She had a history of hypertension and dyslipidemia. Her husband had been hospitalized in emergency a few hours before and he was referred for acute surgery. Physical examination revealed a mild heart murmur and no signs of heart failure. ECG showed slow R wave progression in the precordial leads. Sublingual nitroglycerin had no effect. Treatment for an acute coronary syndrome was started, including aspirin, low molecular weight heparin, and clopidogrel. Transthoracic echocardiography (TTE) revealed balloon-like left ventricular (LV) wall motion abnormalities (WMA) at the apex with hypercontraction of the basal segments, mild mitral regurgitation, normal LV mild-cavity dimensions and no LV obstruction (Figure 1A). The LV angiogram showed typical apical ballooning (Figure 2) and coronary angiography showed normal coronary arteries (Figure 2). Mild elevation of troponin was present (peak 0.84 μg/l). Twenty-four hours after hospitalisation, transthoracic coronary flow reserve (TTE-CFR) was measured in the distal part of the left anterior descending artery (LAD), using intravenous adenosine infusion (0.14 mg/kg/min over 2 min). The mean diastolic CFR was 2.1 (Figure 2A). After 2 days, the ECG showed diffuse T wave inversion and a QTc interval of 426 ms. No complication occurred during the hospital course. Four weeks later, a new TTE revealed a normalisation of LV wall motion (Figure 1B) while TTE-CFR, performed with the same way as initially, was 2.7 (Figure 3B). The increase of TTE-CFR was confirmed 3 months later with a value of 3 (Figure 3C).

The pathophysiology of the transient cardiomyopathy called tako-tsubo or left apical ballooning syndrome, which affects post-menopausal women who experienced a stressful event, is still debated. Serial non-invasive measurements of CFR in this case suggest transient impairment of the coronary microcirculation during the acute phase of the syndrome.
The improvement of the microcirculation parallels the regression of the WMA suggesting a relationship between these two variables.

Reference