Coronary CT angiography and stress perfusion scan for evaluation of patients with atypical chest pain

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DESCRIPTION

A 52-year-old man presented with moderate sub-sternal chest pain lasting for more than 30 min. The pain was independent of exertion and did not respond to nitroglycerine. The patient's medical history includes hypertension, smoking, dyslipidaemia and congenital right hip dysplasia. Physical examination findings were normal. ECG showed normal sinus rhythm. Transthoracic echocardiography revealed a normal ejection fraction of 64%. ECG-gated coronary CT angiography and stress CT

perfusion scan was performed. The patient had no contraindication for β -blockers. CT examination was performed using 320-section scanner (Aquilion-ONE, Toshiba, Japan). A total of 110 ml (60 ml for coronary CTA and 50 ml for perfusion imaging) iodine contrast agent, iomeprol (Iomeron 400, Bracco, Milano, Italy), followed by 50 ml saline solution, was injected into an antecubital vein through an 18 gauge catheter at a flow rate of 5 ml/s using an automated power injector (Medrad Envision CT, Pittsburgh, Pennsylvania, USA). After

Figure 1 (A and B) Coronary CT angiograms demonstrate widespread vascular disease. A soft plaque in the midportion of RCA causes significant stenosis (arrow). (C and D) The rest CTA scan shows hypoperfused region on the inferior wall (corresponds to the vascular territory of RCA). The hypoperfused area on the inferior wall was enlarged and a new hypoperfused area in the subendocardium of the lateral wall of the left ventricle was appeared in the stress CTA scan (arrowheads). (E and F) The stress transmural perfusion ratio (TPR) map confirms the presence of the inferior wall defect (blue and purple areas). The defect is also seen in the rest of the TPR map but is smaller. That indicates a partially reversible defect. (G and H) Fusion of the TPR polar map and the anatomical cardiac three-dimensional image shows relationships between the perfusion defects and coronary vessels.

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a 10 min period (for myocardial contrast wash-out) coronary CT angiography, rest and stress scan for perfusion imaging were performed. Adenosine (pharmacological stress agent) was administered by continuous infusion via a peripheral intravenous line at a rate of 0.14 mg/kg/min after 5 min. Blood pressure and heart rate were monitored during infusion. At the end of the study, the images were reconstructed in diastolic phase (figure 1A–H). Later both images were compared and diffuse vascular disease and perfusion defects were detected in the patient. Medical treatment was started and coronary angiography was planned.

Learning points

- ▶ Cardiac multidetector CT has the ability to demonstrate high spatial resolution images and the anatomical structure in a detailed manner, and thus it successfully and rapidly brings the cardiac anatomy, morphology and coronary arteries into light.
- ▶ Recently, myocardial perfusion imaging, as a functional imaging modality, is being used with coronary CT angiography.¹

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCE

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