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Technologist presentation

Imaging of vascular complications of Takayasu arteritis using Cardiovascular Magnetic Resonance

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Introduction

Takayasu disease is a rare idiopathic inflammatory vascular disease with world-wide distribution but most commonly found in Asian females. It involves the thoracoabdominal aorta and its branches, including the pulmonary arteries. Arterial media destruction may cause stenosis and aneurysm formation, carrying risk of ruptures. We report a 42 year old female with known Takayasu arteritis presenting with neck and back pain radiating to left arm, pan-systolic murmur over entire precordium with increased intensity over left sternal edge and radio-femoral delay. There was reduced blood pressure in left arm in comparison with right arm, but no peripheral oedema. A 12-lead ECG demonstrated sinus rhythm with voltage criteria for left ventricular hypertrophy. Blood tests showed no active inflammation, with erythrocyte sedimentation rate (ESR) of 5 mm/hr and C-reactive protein (CRP) of 1 mg/L. Chest x-ray was normal; a nuclear medicine stress test, trans-thoracic echo and a Cardiac MRI (including a carotid angiogram) were ordered.

Purpose

Exclusion of aortic aneurysm, stenosis and active inflammation of aorta, arch vessels and carotid arteries. Investigating the underlying cause of the systolic murmur and radio-femoral delay.

Methods

Cardiovascular magnetic resonance (CMR) scan including carotid Contrast Enhanced Magnetic Resonance Angiogram (CE MRA) performed on a 1.5T Siemens Avanto. Pulse sequences included: T1-weighted Turbo Spin Echo (TSE), Phase Contrast (PC) MRI, Fast Low Angle Shot 3D CE MRA of aorta and supra-aortic vessels.

Results

CE MRA showed severe diffuse arterial disease of the aortic arch and carotid vessels, with long lengths of disease in both subclavian arteries with associated collateral filling. The combined clinical, serological and radiological findings all suggested the changes to the subclavian and carotid arteries to be old.

CMR demonstrated circumferential thickening of thoracic aortic wall. In addition there was severe focal stenosis of distal descending thoracic aorta, with recorded flow velocity of 4.5 m/s, believed to be a recent development. The patient was subsequently referred for percutaneous aortic stenting.

Conclusions

The study confirmed the ability of CMR/CE MRA for diagnosing Takayasu's arteritis and demonstrating vascular complications caused by this condition. By combining CE MRA with TSE and PC MRI, one can get information about luminal obstruction, outward remodelling as well as jet velocity through stenotic areas.

CMR/CE MRA can therefore be recommended for initial diagnosis and follow-up scans for such patients, reducing the need for costly and invasive Digital Subtraction Angiogram, saving the patient large radiation doses associated with this imaging modality.