Thoracic outlet syndrome: findings on MR angiography
Published on 20.01.2003

DOI: 10.1594/EURORAD/CASE.1866
ISSN: 1563-4086
Section: Cardiovascular
Technique: MR-Angiography
Case Type: Clinical Cases
Authors: M. Celestre, C. Miglio, D. Marin, P. Paolantonio, R. Passariello
Patient: 29 years, female

Clinical History:

Pain, numbness and tingling of the left arm during hyperabduction of the arm.

Imaging Findings:

The patient presented with episodes of pain, numbness or tingling and coldness, localised in the left arm and hand, that worsened when the arm was used in outstretched or overhead positions. The pain had been present for several years, but it had worsened in intensity and frequency in the months prior to presentation.

The patient underwent a plain film of the chest which demonstrated the presence of an extra first left rib. MR-angiography of the left subclavian artery and the aortic branches was performed with the left arm in adduction and then with the arm in abduction on a 1.5T magnet (Magnetom vision plus, Siemens, Erlange, Germany) equipped with a phased-array coil. 3D GRE T1-weighted images were acquired after injection of Gd-DTPA. Post-processing included MIP reconstruction performed on the main console.

Discussion:

Thoracic outlet syndrome (TOS) is a combination of pain, numbness, tingling, weakness or coldness in the upper extremity caused by pressure on the blood vessels and/or the nerves in the thoracic outlet. Possible causes of compression are an extra first rib, an old fracture of the clavicle, a broad insertion of the musculus scalenus anterior on the clavicle or the wedge formed by the coracoid process and the tendon of the musculus pectoralis minor, which reduces the space of the outlet between the rib cage (thorax) and the collar bone (clavicle) through which the main blood vessels and nerves pass from the neck and thorax into the arm. These factors can cause an impingement of the vascular and neural structures during abduction of the arm.

The symptoms can mimic many other conditions, such as a herniated disk in the spine neck, carpal tunnel syndrome, and even bursitis of the shoulder. Investigations should include chest radiography to rule out cervical ribs or other bone anomalies.

Conventional angiography is usually performed when surgical intervention is considered in order to confirm the extrinsic compression of the artery. MR angiography is a non-invasive approach and doesn't require ionising radiation or iodinated contrast material administration. It allows a good evaluation of the subclavian artery in both
adducted and abducted positions of the arm.

**Differential Diagnosis List:** Thoracic outlet syndrome

**Final Diagnosis:** Thoracic outlet syndrome

**References:**


Description: Plain film of the chest: note the extra first left rib. Origin:
Description: MIP reconstruction of the left subclavian artery acquired with left arm adducted shows the normal calibre of the artery. Origin:
Description: MIP reconstruction of the left subclavian artery acquired with left arm hyperabducted: note the stenosis of the artery due to external compression at the level of the thoracic outlet. Origin: