Magnetic resonance angiography for diagnosis of right aortic arch with vascular ring

IRM pour le diagnostic de l’arc aortique droit avec anneau vasculaire

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A right-sided aortic arch is an aortic arch that crosses over the right main stem bronchus instead of the usual left main stem bronchus. A vascular ring is a malformation where vascular branches encircle the trachea and oesophagus. When the circle around the trachea and oesophagus is incomplete, the malformation is called vascular sling. In most cases, a right-sided aortic arch is present. In a double aortic arch (one of the most common vascular ring malformation patterns), the two arches encircle the trachea and oesophagus.

Symptoms of vascular ring, including stridor, wheezing and dysphagia, are due to compression of the trachea or oesophagus. If compression is minimal, vascular rings may be asymptomatic and diagnosed as incidental findings. A 37-year-old man presented with a history of chest discomfort, progressive mild dyspnoea on exertion and intermittent dysphagia for solids and liquids. Chest X-ray showed right aortic arch.

Magnetic resonance (MR) angiography showed right aortic arch, separated origin of right carotid and right subclavian arteries, and common origin of left carotid and left subclavian arteries (like a "brachiocephalic trunk") from the ascending aorta. MR angiography also identified an aberrant subclavian artery, originating from the right descending aortic arch, coursing behind the oesophagus and trachea, and, after union with the left subclavian artery, creating the vascular ring (Fig. 1). Concomitant three-dimensional coronary MR angiography excluded associated coronary abnormalities (Fig. 2).

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Figure 1. A) Contrast MR angiography of great vessels in coronal plane shows right aortic arch, isolated origin of the right common carotid artery from the aortic arch, isolated origin of the right subclavian artery from the aortic arch, and common origin of the left carotid and left subclavian arteries, like a “brachiocephalic trunk”, arising from the ascending aorta. B) Axial reconstruction of contrast MR angiography shows the origin of the “left” “brachiocephalic trunk” (white arrow) arising from the ascending aorta, and the origin of the left subclavian artery. C) Axial reconstruction of contrast MR angiography shows the union of the descending aorta, through the aberrant subclavian artery, with the left subclavian artery. AAo: ascending aorta; ASA: aberrant subclavian artery; Dao: descending aorta; L: left; LSA: left subclavian artery; T: trachea.

Figure 2. A) T1-weighted magnetic resonance imaging in axial plane shows normal origin of coronary arteries, with coronary ostia (arrows), and the proximal portion of the left anterior descending and circumflex arteries. Descending aorta located on the right side. B) Three-dimensional coronary MR angiography shows normal path of right coronary artery. C) Three-dimensional coronary MR angiography shows normal path of left anterior descending and circumflex arteries. Dao: descending aorta; Cx: circumflex artery; LAD: left anterior descending; RCA: right coronary artery.
MR angiography is useful for diagnosing vascular rings; it provides information on arch configuration and vascular branching patterns that is useful for future surgery, allowing simultaneous coronary tree evaluation.

Conflict of interest statement
The authors have no conflict of interest to declare.