Abnormal Origin of the Right Subclavian Artery: A Case Report

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To the Editor: A 38-year-old male presented with chest pain for coronary angiography to exclude coronary heart disease in the Second Affiliated Hospital of Nanchang University. During coronary angiography, a 6 Fr sheath was inserted without any difficulty after right radial artery access was obtained. However, the Loach guidewire could only be advanced to the descending aorta, and repeated attempts failed to enter the ascending aorta. Therefore, an abnormal origin of the right subclavian artery (aberrant right subclavian artery [ARSA]) was suspected. This had been confirmed by performing angiography near the origin of the right subclavian artery, which showed the right subclavian artery arising from the descending aorta. Since it will be very difficult to get to the ascending aorta through the ARSA, this approach was abandoned. The left radial artery approach was chosen, which was completed without any difficulty. An arch aortogram was also performed during left radial artery approach, which revealed the right carotid, left carotid, and left subclavian arteries (LSAs) arising from the arch as separate branches. We simultaneously inserted a Loach guidewire and a pigtail catheter into the right subclavian artery and aorta arch, which helped better delineate the abnormality and confirmed the diagnosis [Figure 1].

ARSA was first described by Hunauld in 1735. Normally, the typical aortic arch branching pattern (with an incidence rate from 64.9% to 94.3%) consists of three divisions: the brachiocephalic trunk, the left common carotid artery, and the LSA. The brachiocephalic trunk is further divided into the right subclavian artery and the right common carotid artery. ARSA is a relatively rare aberration (incidence: 0.6–1.4%) in the general population with female predominance. ARSA incidence is up to 3% in patients with congenital heart defects and ranges from 2.9% to 100% in patients with Down syndrome.[1] ARSA may follow a retroesophageal course (80–84%), a course between the trachea and the esophagus (12.7–15%), or a pretracheal route (4.2–5%).[2] The

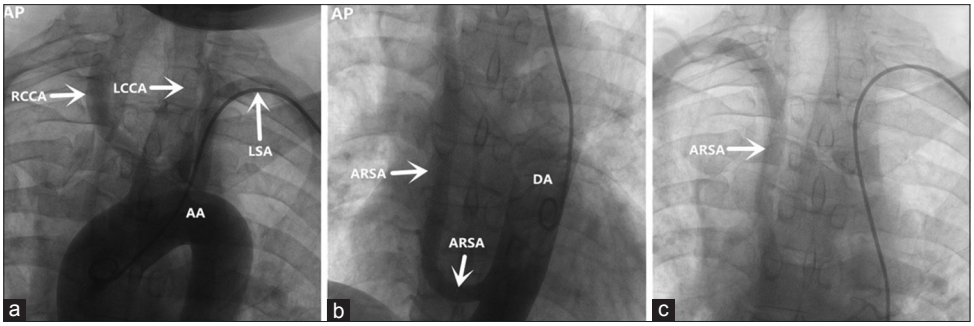

Figure 1: Angiographic findings of a 38-year-old male complaining with chest pain. (a) Arch aortogram performed through the ascending aorta using a pigtail catheter through the left radial artery approach, which shows the RCCA, LCCA, and LSA arising from the arch as separate branches; (b) abnormal origin of the ARSA from the DA instead of the right brachiocephalic trunk; (c) angiography near the origin of the RSA showing the ARSA arising from the DA. RCCA: Right common carotid artery; LCCA: Left common carotid artery; LSA: Left subclavian artery; RSA: Right subclavian artery; ASRA: Aberrant right subclavian artery; AA: Aortic arch; DA: Descending aorta.

atypical vessel may compress the trachea and the esophagus while forming an incomplete vascular ring around them. Retroesophageal ARSA is particularly susceptible to extrinsic compression and pressure necrosis secondary to nasogastric and endotracheal tube insertion, with a predisposition to arterio-esophageal fistula formation. However, most patients with ARSA are asymptomatic

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and rarely require treatment. ARSA is clinically silent until right radial coronary angiography is performed.[2]

The diagnosis should be suspected if the guide wire repeatedly enters the descending aorta rather than the ascending aorta from the right subclavian artery during coronary angiography. In such a case, catheterization of the ascending aorta may be difficult or even impossible because of the angular course of arteria lusoria to the ascending aorta. Owing to increased anatomical complexity, ARSA may require additional catheters and prolonged angiography time. In addition, caution should be taken as dissection of an arteria lusoria and aorta during transradial catheterization has been previously reported.[3]

ARSA detection is usually an incidental finding. ARSA may be diagnosed by chest roentgenography. Barium-contrast esophagography can more accurately depict the oblique defect or indentation along the posterior esophageal wall. Meanwhile, color Doppler can be used to trace the abnormal vessel course. Either computed tomography or magnetic resonance angiography is considered the gold standard for the diagnosis because a detailed visualization of the arch anatomy and ARSA is provided, particularly in cases of aneurysm, and shows the degree of tracheal compression.[1] Differential diagnosis may include the azygos vein which may follow a course behind the trachea before entering the superior vena cava, the thoracic outlet syndrome and esophageal dysphagia caused by ARSA, motility disorders, as well as mechanical and inflammatory diseases. When ARSA coexists with esophageal carcinoma, dysphagia is causally attributed to the tumor growth, and the aberrant vessel may be missed during imaging.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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