IMAGE IN CARDIOLOGY

Arteria Lusoria

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CASE

A 54-year-old man with cardiovascular risk factors of diabetes mellitus and smoking was referred to our cardiology department after experiencing an episode of chest pain the previous day, which resolved spontaneously prior to arrival at his local hospital. His electrocardiogram showed a Wellen's Type B pattern suggesting a proximal left anterior descending coronary artery culprit lesion, and his troponin I level confirmed a non-ST elevation myocardial infarction.

During coronary angiography, via the right radial artery approach, the operator found the guidewire (0.035 inch GuideRight™ PTFE coated stainless steel guidewire, St Jude Medical) continually passing into the descending aorta, despite multiple maneuvers to angle it into the ascending aorta. Access into the ascending aorta was successfully gained by using a Judkins left 3.5 diagnostic catheter (Cordis Super Torque Plus™) to angle the wire from the subclavian into the ascending aorta. At this point a diagnosis of aberrant right subclavian artery (arteria lusoria) was suspected and aortography confirmed this finding (Figures 1 and 2).

Once access was gained, angiography of the left and right coronary arteries was successfully performed using 6F Judkins left 3.5 and 6F Judkins right 4.0 diagnostic catheters respectively. Left ventriculography was performed using a 6F pigtail catheter (Cordis Pigtail 145° Super Torque Plus™). The patient was found to have severe triple vessel coronary artery disease with reduced left ventricular systolic function, and coronary artery bypass graft surgery was scheduled as definitive management for his coronary disease.

DISCUSSION

Arteria lusoria is the most common aortic arch abnormality, with an incidence of 0.5 - 1.7%.[1] It develops as a result of interruption in complex remodeling of the branchial arch system resulting in the right subclavian artery connecting as the last branch of the aortic arch (Figure 3). Typically 4 large arteries arise from the aortic arch in patients with this malformation: the right common carotid artery, the left common carotid artery, the left subclavian artery, and then the right subclavian artery, although there is a higher incidence of truncus bicaroticus (both carotid arteries arising from a single trunk) than is seen normally, as was the case in our patient.[1,2] The incidence of arteria lusoria is particularly high in Trisomy 21 and other chromosomal abnormalities (26 - 35%),[3] and it has been reported that up to 91% of patients have associated congenital cardiac abnormalities. These are predominantly septal defects, left heart obstructive lesions and conotruncal anoma-

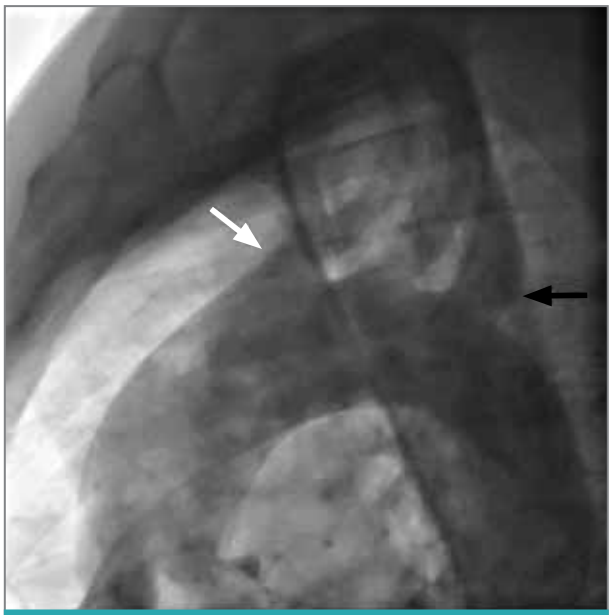

FIGURE 1: Lateral Fluoroscopic View: Coronary catheter positioned in the ascending aorta via the right radial artery approach. The catheter can clearly be seen entering the aorta through the aberrant right subclavian artery (black arrow) which attaches to the distal aortic arch as it transitions into the descending aorta. One can also appreciate both carotid arteries originating from a common trunk (truncus bicaroticus) (white arrow).

lies.[2] The aberrant right subclavian artery runs posterior to the oesophagus in 80 - 85% of cases, and can lead to symptoms of dysphagia ("dysphagia lusoria"), dyspnea, chest pain and coughing, although autopsy studies suggest 90% of cases are clinically silent.[2]

The use of right radial artery access for coronary angiography has been rapidly increasing due to reduced access site complications and early mobilisation when compared to femoral artery access.[4] Initial published experience with transradial coronary angiography in the setting of arteria lusoria suggested a high crossover rate to femoral access of 40% (4 out of 10 cases).[5] However, more contemporary publications suggest transradial coronary angiography and percutaneous coronary intervention (PCI) can be performed safely, even with a similar procedure time and radiation exposure when compared to normal anatomy, albeit with a slightly higher rate of vasospasm and minor bleeding.[6,7] Spiral dissection from the ostium of the aberrant right radial artery has been reported after failed attempts at transradial coronary angiography, and this should serve as a caution that over-vigorous guidewire and catheter manipulation in attempting to enter the ascending aorta should be avoided.[8,9]

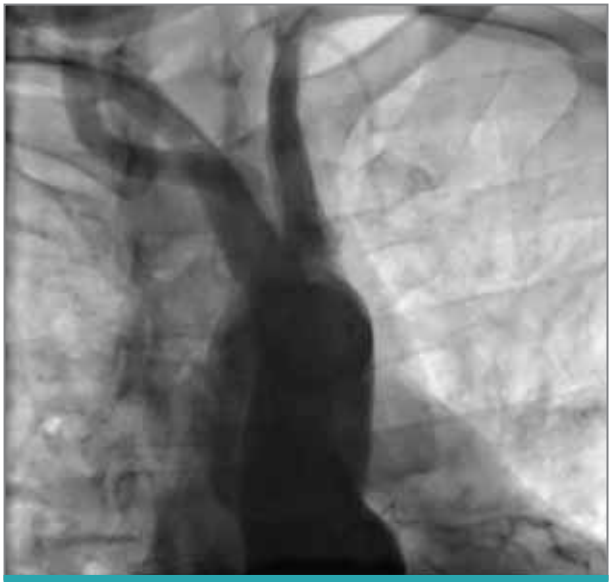

FIGURE 2: Posterior-Anterior Fluoroscopic View: The coronary catheter in the aberrant right subclavian artery is seen to cross the midline and enter the aorta in line with the other head and neck vessels in this projection.

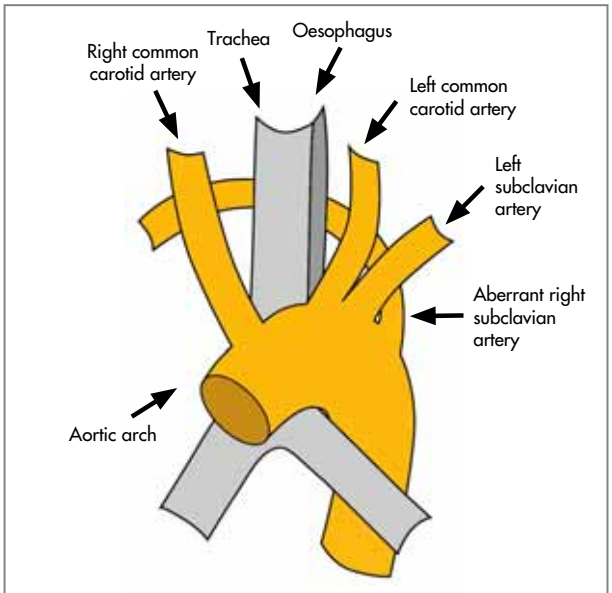

FIGURE 3: Diagramatic representation of the aberrant origin of the right subclavian artery from the distal aortic arch and traversing posterior to the trachea and oesophagus.

In summary, arteria lusoria is a common congenital abnormality that every interventional cardiologist practicing transradial coronary angiography is likely to encounter at some point in time. This condition does create specific challenges with regard to the technical aspects of angiography and PCI, and requires a carefully individualised assessment of the anatomy (take-off angle from the aorta; ease of diagnostic angiography; stability of diagnostic catheters) before proceeding to PCI with stiffer guiding catheters, the latter having more potential to cause harm. This having been said, in most cases an experienced operator with careful technique can expect a successful result through transradial access without an increased complication rate.

Conflict of interest: none declared.

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