Aneurysms of the sinus of Valsalva revealed by an acute coronary syndrome

Keywords: Aneurysm; Thoracic aorta; Sinus of Valsalva; MDCT

Aneurysms of the sinus de Valsalva (ASV) are rare, and are usually discovered due to an acute complication, most often a rupture in the adjacent chamber of the heart. We describe a case of unruptured ASV, identified further to acute coronary syndrome.

Case report

A 66-year-old male was managed for acute coronary syndrome, without ST elevation, with raised troponin. A coronary angiogram was carried out, showing two areas of stenosis in the right coronary artery. We also discovered two ASV (Figs. 1 and 2), which led to a CT being carried out (Philips, Brilliance 64) in the immediate aftermath. The acquisition included the thoracic aorta and the heart, and was contrast-enhanced (80 ml of iodixanol, 320 mg iodine per ml, at 5 ml/s). The acquisition parameters were as follows: cardiac synchronisation through retrospective gating, no ECG-based dose modulation, slice thickness: 64 × 0.625 mm, kilovoltage: 120 kV, rotation time: 0.4 s, reconstruction of 1.2 mm every 0.8 mm, using phases covering the whole RR interval from 0 to 90%.

This CT scan meant that we could perform a morphological analysis of these two ASV (Figs. 3–5) at the anterior right and left sinuses, which measured 25 × 23 mm and 30 × 27 mm respectively. The ascending aorta was dilated, measuring 39 mm at the sinuses (excluding the ASV), 29 mm at the sinotubular junction, and 30 mm in its mid-portion. A phase-by-phase analysis using multiplanar reformatting allowed us to examine the free movement of the aortic valve, which showed no abnormality in spite of its proximity to the two ASV.

The right coronary stenosis was considered to be the cause of the coronary syndrome and a double angioplasty was carried out on the second day of the admission.

Further to this, the indication for an ascending aorta replacement was considered. This non-emergent surgical
intervention would entail replacing the aortic valve and root and reimplanting the coronary arteries. There was no strip of aortic tissue between the valve and the neck of the two ASV.

Pathology showed alteration to the tunica intima with plaques of atherosclerosis; there were slight changes in the tunica media with the rupture of some elastic fibres; there were no signs of inflammatory or infectious arteritis.

Discussion

Our case is unusual in terms of the way in which these two ASV were revealed, unruptured and through the CT of the thoracic aorta with cardiac synchronisation. This played a major role in diagnosis and mapping the area prior to surgery. It allowed us to make a full assessment of the morphology of these ASV, as well as their relationships to the valve, and the origins of the coronary arteries (Figs. 3–5).

An ASV is defined as a saccular ectasia localised to the wall of the aorta, located just above the aortic valve. It is a different entity from aeurysms of the ascending aorta in their classic presentation [1]. They are distinct in their aetiology and pathogenesis, the ways in which they are discovered, and their therapeutic management [2].

ASV are rare, with a frequency of somewhere between 0.15% and 0.96% [3]. The majority of these ASV are thought to be caused by abnormal fusion of the aortic tunica media with the cardiac structures during prenatal development; the absence of elastic lamina in the tunica media is thought to weaken the artery wall [4,5]. In our case, we found no evidence of an acquired origin for these ASV; specifically, there was no history of chest trauma, bacterial endocarditis, or tuberculosis.

The ASV located in the right anterior sinus, as seen in our patient, was found in by far the most common site (94% of

Figure 3. MDCT of the thoracic aorta and coronary arteries in volume rendering (a and b). These views show the aneurysms, the first over the right anterior sinus and the second over the left anterior sinus (dotted white arrows). The left main artery is compressed by the aneurysm. It also shows stenosis of the right coronary artery in its first and third segment (white arrows).

Figure 4. View in thin-slab MIP on the main left artery. This left main artery is compressed (white arrow) by the aneurysm (black arrow).

Figure 5. Multiplanar reformat of the aortic valve, in diastole, at 75% of the RR interval. The aortic valve has three cusps. Visualisation of the two ASV, one on the right-anterior cusp (white arrow) and the second on the left-anterior cusp (black arrow).
cases); by contrast, ASV located in the left anterior sinus are uncommon (1%) [3].

The majority of patients presenting an unruptured ASV, like our patient, are asymptomatic. In spite of the size and location of these ASV, they do not obstruct either the right ventricular outflow tract or the coronary arteries [6].

We chose surgical treatment for this case of two asymptomatic ASV in view of the risk of progression to rupture, especially into one of the heart chambers, usually the right ventricle [7].

An MRI could have been carried out, adding precise morphological and diagnostic information about the aortic valve in particular [8]. When we performed the CT scan, ECG-based dose modulation could have been used in order to reduce radiation exposure [9].

Disclosure of interest
The authors declare that they have no conflicts of interest concerning this article.

References

M. Urdulashvili a, b, L. Bière c, C. Baufreton d, C. Nedelcu a, A. Bouvier a, W. Abi-khalil b, F. Thouveny a, C. Aubé a, S. Willoteaux a
a Department of Radiology, Angers University Hospital, 4, rue Larrey, 49933 Angers cedex 9, France
b Department of Cardiology, Angers University Hospital, 4, rue Larrey, 49933 Angers cedex 9, France
c Department of Cardiac Surgery, Angers University Hospital, 4, rue Larrey, 49933 Angers cedex 9, France
* Corresponding author.

E-mail address: madiurd@yahoo.fr
(M. Urdulashvili)