Aorta–right atrial tunnel

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Aorta–right atrial tunnel is rare. We report a case of aorta–right atrial tunnel in which the right coronary artery arose from the tunnel. Successful surgical treatment was performed.

The aorta–right atrial tunnel was first described in 1980.¹ In this congenital anomaly the shunt is established through a vascular communication arising from the aortic root and terminating in the right atrium (RA). We present a new case with this unusual communication and surgical treatment.

Case Report

A 29-year–old man who had palpitation and effort dyspnea was referred to our institution for evaluation.

Results of physical examination were within normal limits, except for the murmur. A continuous grade 3/6 heart murmur was best heard along the right upper sternal border. Results of a chest radiograph were within normal limits. A 2-dimensional echocardiogram revealed a suspicious interatrial septal defect and enlargement of the RA and right ventricle. Aortography revealed a large tunnel originating from the right sinus of Valsalva and terminating in the RA. The pulmonary/systemic blood flow ratio was estimated at 2.1:1. Although coronary angiography revealed the left coronary artery, the right coronary artery (RCA) orifice could not be identified because contrast medium was rapidly disseminated from the aorta. Electron beam tomography showed a large tunnel beginning in the right sinus of Valsalva and terminating in the RA, and the RCA ostium arose from the tunnel (Figure 1). During cardiopulmonary bypass, the tunnel and the RCA were mobilized (Figure 2, A). The RCA orifice was located 2 cm distal to the aortic tunnel orifice. First, the tunnel was cut from the distal end of the RCA orifice, and its right atrial part was then sutured with a 4-0 monofilament running suture. Second, the RCA orifice with a part of the tunnel wall was reimplanted to the right sinus of Valsalva wall (Figure 3). An oblique right atriotomy revealed an orifice 5 mm in diameter in the lateral aspect of the RA, 3 cm below the orifice of the superior vena cava. This orifice was obliterated with a 4-0 monofilament running suture (Figure 2, B).

Discussion

Seven cases of aorta–right atrial communication have been described in the literature. The communication between the aortic root and the RA arose from above or inside the left sinus of Valsalva in 6 patients^{2,3} and from above the noncoronary sinus in 1 patient.¹ Our patient had the communication arising from inside the right sinus of Valsalva, and the RCA arose from the tunnel. The distribution of the left and right coronary arteries appeared normal. The tunnel did not show aneurysmal dilatation and had no calcification.

Although all patients with aorta–right atrial communications reported were asymptomatic,¹⁻³ our patient had palpitation and effort dyspnea. A continuous murmur was best heard at the right upper sternal border in 7 patients, including ours, and the left infraclavicular area in 1 patient.¹⁻³ The differential diagnosis of an aorta–right atrial tunnel can include the possibility of a ruptured aneurysm of the

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Figure 1. Electron beam tomography showing a large tunnel beginning in the right sinus of Valsalva and terminating in the RA. The RCA ostium arose from the tunnel. SCV, Superior caval vein; AORT, aorta; RA, right atrium; RCA, right coronary artery; Svc, superior vena cava. A, aorta; LMCA, left main coronary artery.

Figure 2. A, Large tunnel beginning in the right sinus of Valsalva. B, Right atrial orifice of the tunnel.

sinus of Valsalva or the RCA,⁴ which can become more confounding when the tunnel presents aneurysmal dilatation. Although the tunnel could be readily identified by means of 2-dimensional echocardiography and retrograde aortography combined with selective coronary angiography,² 2-dimensional echocardiography revealed a suspicious interatrial septal defect, and selective coronary angiography did not show the RCA and its orifice in our

patient. Therefore, confirmation was obtained by means of electron beam tomography, which clearly demonstrated the RCA arising from the tunnel.

Because the patency of the communication can result in volume overload of both ventricles, bacterial endocarditis, aneurysm formation, or spontaneous rupture, the closure of an aorta–right atrial tunnel is recommended.³ In this patient we reimplemented the RCA orifice with a part of the tunnel

Figure 3. Reimplantation of the RCA orifice with a part of the tunnel wall to the right sinus of Valsalva wall. *RCA*, Right coronary artery.

wall to the right sinus of Valsalva wall and obliterated the orifice of the tunnel in the RA.

In summary, if ascending aortography combined with selective angiography is insufficient in diagnosis of the orifice of the RCA arising from the aorta–right atrial tunnel, electron beam tomography can be a good diagnostic tool, showing the tunnel taking its origin from the aortic root and entering the RA through a tortuous communication. Surgical treatment should be done soon after diagnosis because the patency of the tunnel might be predisposed to some complications, such as cardiac failure, endocarditis, aneurysm formation, or rupture.

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