

Sinus of Valsalva Aneurysm with Right Ventricular Outflow Tract Obstruction

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SUMMARY

The aneurysms of the sinus of Valsalva are rare and can be either congenital or acquired. They may not produce symptoms or present with complications which are often related to aneurysm rupture producing a communication between the aorta and a cardiac chamber or, rarely, to mass effect on adjacent cardiac structures. We describe the case of a right sinus of Valsalva aneurysm producing right ventricular outflow tract obstruction.

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Key words > Sinus of Valsalva aneurysm – Aortic root – Computed tomography - Aorta

Abbreviations >

| | | | |
|--------------|-----------------|---------------|------------------------------------|
| SVA: | Right ventricle | RVOTO: | Systolic pulmonary artery pressure |
| MDCT: | Left ventricle | | |

BACKGROUND

Congenital sinus of Valsalva aneurysms (SVA) constitute a rare pathology. Their main complication is the rupture with generation of a shunt towards another cardiac cavity. The finding of another type of complications is infrequent, as the case studied in this presentation

CLINICAL CASE

45-year-old patient with hypertension, slowly progressive dyspnea, throughout a year, in functional class III with fatigue. In the physical examination, the patient presented regular pulse, a heart rate of 85 bpm, blood pressure 110/50 mmHg, an ejection systolic heart murmur 4/6 more audible in the precordia and lower limb edema 2/4.

The electrocardiogram reported sinus rhythm and enlargement of the right ventricle. A right ventricular outflow tract obstruction (RVOTO) with a maximum gradient greater than 86 mmHg and another of 40 mmHg was observed in the echocardiogram (Figure 1 A-B). With a supposed diagnosis of pulmonary stenosis, a coronary magnetic resonance angiography was requested (See Figure 1 B) which showed the presence of a mass and a RVOTO.

With the diagnosis of right ventricular tumor versus pulmonary stenosis, the patient was derived to cardiac surgery. As part of the pre-operative assessment, a 64-slice MDCT was requested (Figures 2 and 3). This showed the presence of an aneurysm in the right sinus of Valsalva, 2.5 x 2.5 cm, with no rupture and with a protrusion over the right

ventricular outflow tract which resembled a tumor of this ventricle. The removal of the aneurysm with the use of extracorporeal circulation was performed. With event-free postoperative evolution.

DISCUSSION

Sinus of Valsalva aneurysms represent an infrequent finding (0.09% in autopsies) whose origin may be congenital associated with a localized structural defect in the elastic layer or linked to a systemic syndrome as Marfan or Ehlers-Danlos syndromes; aneurysms may be secondary to acquired processes, as infective endocarditis, syphilis, atherosclerosis or trauma. They predominate in male patients (relationship 3-4 to 1), in Eastern race (relationship 5 to 1) and they may be associated with another congenital anomalies. If they do not develop complications, they may evolve as asymptomatic and be discovered in complementary studies. (1-3)

The most frequent complications of SVA with rupture is represented by the resulting communication between the aorta and another cavity, generally the right ventricle (55%) followed in frequency by the right atrium (30%)

SVA with no rupture eventually may develop complications according to its extension and the compromise of neighboring structures, as it happened in our patient. RVOTO as a manifestation of SVA is very infrequent, with few published cases with right ventricular outflow tract obstruction, total or partial. (3-6)

Complementary methods initially used in our

patient guided us towards a pulmonary stenosis or a right ventricular tumor with RVOTO (See Figure 1 A-B) without the detection of SVA. In this sense and, although most aneurysms are detected through echocardiography, as Bricker et al. consider it in a recent assessment over 177 SVA published in the last 10 years where 90% were detected during such assessment, other authors as Mohanakrishnan et al. reduce the diagnostic capacity of the method, for SVA with no rupture, in a 75%. (3, 7)

As in our presentation, in a communication of SVA in the right sinus, in this case complicated with rupture which was not detected in the echocardiogram and that it was subsequently observed through a MDCT, Das et al. set out the diagnostic difficulties that occasionally may present the echocardiography. (8)

Although conventional angiography represents the diagnostic method of election, it may present limitations due to the planar nature of its images, a restricted angle of angiographic projection, and due to the fact that contrast should be used with the subsequent risk of nephrotoxicity. MDCT, especially with the use of 64 and 128-slice equipment, is emerging as an effective method for the study of the cardiac pathology due to its high temporal and spacial resolution that allows us to obtain images of high quality with the simultaneous assessment of coronary arteries in a non-invasive way in a minimum interval of time (seconds). The existing worry as regards the risk secondary to the use of radiations (3, 8-9) should be pointed out.

In our patient, MDCT allows us to detect SVA originated in the right sinus which is the most frequently implicated without affecting the right coronary artery (See Figures 2 and 3). Diagnostic criteria for the assessment of images about this entity involve:

1. Origin placed over the aortic valvular plane and below the sinotubular junction.
2. Saccular form.
3. Absence of dilation of the adjacent aortic root. (1, 3).

Surgical indication

SVA with rupture should be repaired to solve the generated abnormal communication. In cases with no rupture, surgical resolution is considered as a way of preventing potential future complications. In our patient, the need of solving the RVOTO established the intervention in which the closure of the aneurysm mouth with a constant suture without the need of using a patch or repairing or replacing the aortic valve, under extracorporeal circulation (3) was carried out.

There are communications about the percutaneous closure of the broken SVA; nevertheless, nowadays surgical resolution is mainly accepted. (10)

RESUMEN

Aneurisma del seno de Valsalva con obstrucción del tracto de salida del ventrículo derecho

Los aneurismas del seno de Valsalva representan una patología infrecuente, congénita o adquirida, que puede permanecer asintomática por largo tiempo, o presentarse con complicaciones, principalmente por su rotura y la consiguiente generación de una comunicación anormal entre la aorta y otra cavidad o, más raramente, por su extensión, que lleva a la compresión o a la invasión de estructuras vecinas. En esta presentación se describe un caso de aneurisma del seno de Valsalva derecho con desarrollo de obstrucción del tracto de salida del ventrículo derecho.

Palabras clave > Aneurisma del seno de Valsalva - Raíz aórtica - Tomografía computarizada - Aorta

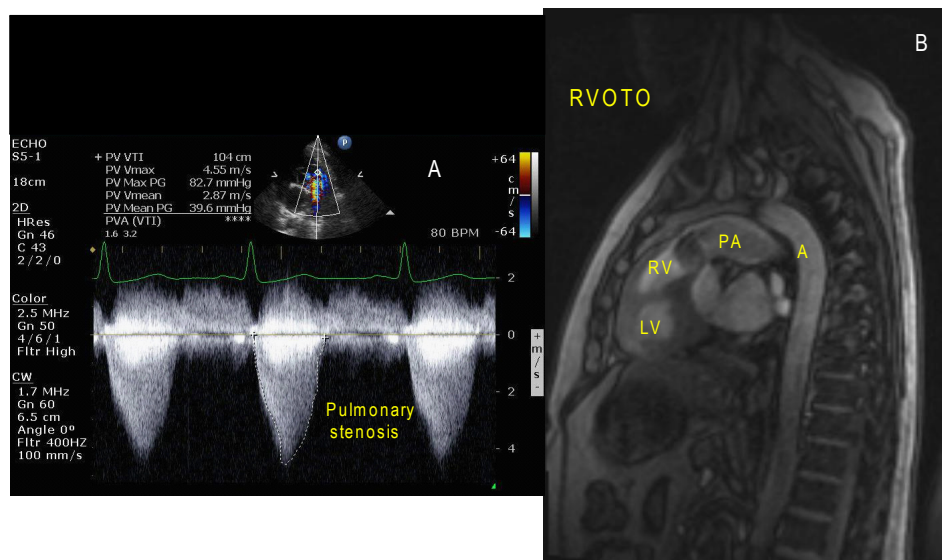


Fig. 1. A. Echocardiogram in which pulmonary stenosis and a maximum gradient of 80 mmHg, with mid gradient of 40 mmHg are shown. **B.** Cardiac MRI that shows right ventricular outflow tract obstruction (RVOTO). LV: Left ventricle. RV: Right ventricle. PA: Pulmonary artery. A: Aorta.

Fig. 2. Posteroanterior chest-X ray. The radiolucent band corresponds to air (arrows) surrounding the cardiac silhouette separating both pericardial layers, with opacity corresponding to fluid (asterisks) in the lower part of the pericardial sac.

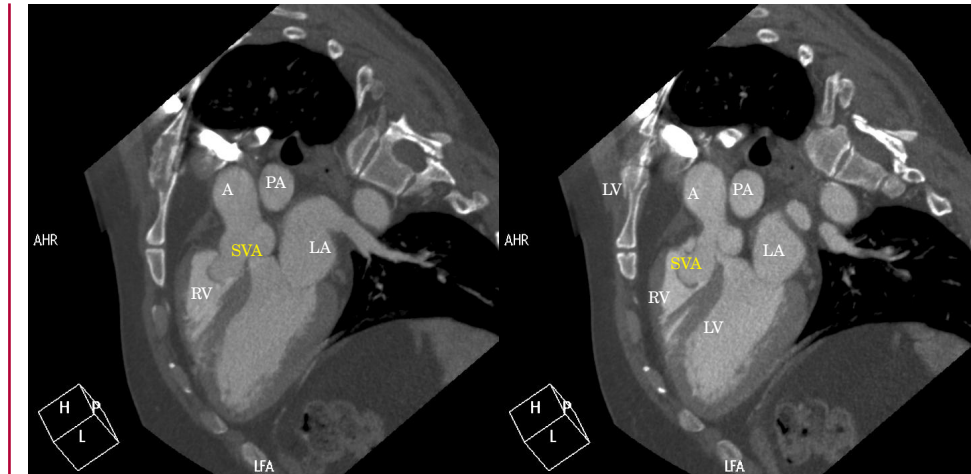


Fig. 3. Multislice computed tomography in which sinus of Valsalva aneurysm (SVA) is observed. RS: Right sinus. LS: Left sinus. NCS: Non-coronary sinus.



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Conflict of interest statement

Authors declare no conflict of interest.