



Case Report

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A Cavernous Sinus of Valsalva Aneurysm

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Abstract

A 47 year old female healthy, asymptomatic farmer underwent routine medical screening in rural China. A early diastolic murmur was detected. Subsequent color doppler echocardiogram showed a competent aortic valve but a fistulous communication of a perforated Valsalva aneurysm into the left ventricle. Computed tomography revealed a multi cavernous cauliflower-shaped Valsalva aneurysm involving the whole aortic basis or bulbous aortae and all sinuses.

Keywords: Aneurysm; Valsalva; Aorta

Introduction

A sinus of Valsalva aneurysm (SVA) was first described by Thurman in 1840 [1]. A rare abnormality of the heart, a sinus of Valsalva aneurysm, may be caused by a separation or localized connective tissue dystrophy of the aortic tunica media and the annulus fibrosus of the aortic valve [2]. Such a SVA may be congenital or acquired [3] with an incidence as low as <1.5% among congenital heart disease repairs [4]. It is the least common of all aortic aneurysms. If not congenital but acquired causes include atherosclerosis, cystic media necrosis, infective or post-traumatic injuries [5]. Sinus of Valsalva aneurysm more prevalent originates from the right coronary sinus (70-90%), have been seen less commonly from the non-coronary sinus (10-20%), and rarely from the left sinus (<5%) [6]. The incidences of SVA are reported to be higher in Asian than Western populations, and the male: female ratio was found to be 4:1 [7]. Un-ruptured sinus of Valsalva aneurysms normally do not cause any symptoms unless they rupture, causing fistulous communications, heart failure and death [3,4,8,9].

Case Report

A 47 year old female patient was admitted because of an early diastolic murmur which was detected during a routine medical screening of the rural population in north-east China in Jilin Province, close to the North Korean border. The female patient, working as a farmer and doing heavy work in the fields, was completely asymptomatic and had no shortness of breath and no dyspnea during her work. On admission she was in New York

Heart Association class I, regular sinus rhythm and normal blood pressure, no diabetes, normal body mass index, no prevalence of metabolic syndrome, but a heavy smoker. The early diastolic murmur was confirmed but color doppler echocardiogram showed a somewhat 'difficult' result. Investigated by different cardiologists we received different interpretations. The first reported signs of a congenital heart disease and a moderate 'aortic' incompetence but a competent aortic bicuspid valve, however some signs of aortic valve (AV) perforation.

The AV opening area was calculated 1.9cm², the AVmax peak gradient (PG) 56mmHg, Ejection Fraction (Simpson) 74%, the ascending aorta with a post-stenotic dilatation with a diameter of ø4.2cm, LVIDd 4.2cm and AV Vmax 376 cm/sec. The other reported a combined aortic valve lesion with stenosis and incompetence, some AV vegetations, Vmax 471cm/sec and AVmax PG 89mmHg. Repeated color doppler echocardiograms showed a moderate flow through a perforated SVA into the outflow tract of the left ventricle and thickened and deformed obviously bi-leaflet aortic valve leaflets (Figure 1). Computed tomography confirmed cavernous sinus of Valsalva aneurysmatic structures right below the level of the sinutubular junction and fistulous communications of a perforated SVA (Figure 2). Three-dimensional computed tomography confirmed a dilated ascending aorta and multiple cavernous, cauliflower-like Sinus of Valsalva structures surrounding the deformed base of the aorta (Figure 3).

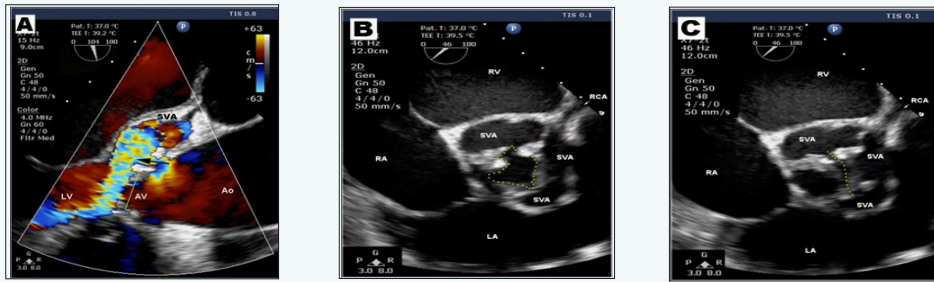


Figure 1:

A. Color Doppler echocardiogram showing moderate ‘aortic’ incompetence caused by flow through a perforated SVA into the outflow tract of the left ventricle (arrow). The aortic valve looks competent but structural altered with thickened leaflets. The ascending aorta is dilated (4.2cm).
B. Parasternal short axis view of the aortic valve during systole. Clearly visible the thickened and deformed obviously bi-leaflet aortic valve with an opening area of 1.9cm² [RA: Right Atrium; RV: Right Ventricle; LA: Left Atrium; RCA: Right Coronary Artery]
C. Same view of the aortic valve during diastole. Clearly visible the cavernous structures of multiple Valsalva aneurysm (SVA) surrounding and deforming the bulbous aortae.

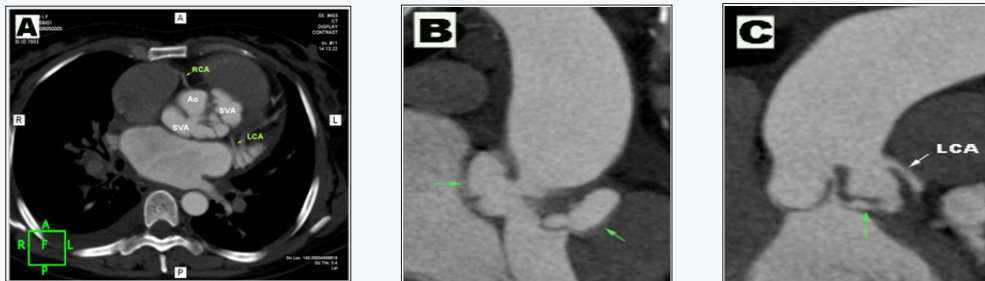


Figure 2:

A. Computed tomography (CT) confirmed a frightening view of the basis of the aorta with several bulbous or cavernous Valsalva aneurysm (SVA) structures ‘scattered’ around the deformed aorta (Ao). [LCA: Left Coronary Artery; RCA: Right Coronary Artery]
B. Computed tomography in RAO projection showing the enlarged detail of the deformed aorta. Clearly visible are multiple bulbous or cavernous Valsalva aneurysm (arrow) and the dilated ascending aorta.
C. CT in LAO projection showing a fistulous communication of a perforated SVA (arrow) and the LCA (arrow).

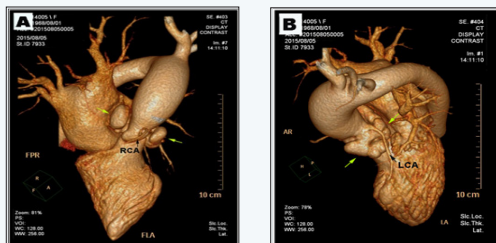


Figure 3:

A. Three-dimensional (3D) computed tomography showing the right coronary artery (RCA) and impressive bulbous structures of multiple Valsalva aneurysm surrounding the base of the aorta (arrows). The ascending aorta is dilated.
B. 3D CT showing the left coronary artery (LCA) and multi cavernous and cauliflower-shaped Valsalva aneurysm covering most of the posterior and lateral base of the aorta (arrows).

Results and Discussion

There was a clear indication for surgery due to a significant aortic stenosis and a perforated SVA. However, the patient, a farmer from the countryside in rural China, refused surgery because the family could not afford the surgical treatment. There are significant socio-economic disparities in China and a massive gap between urban and rural population groups [10]. While the wealthier share of the Chinese population has benefited from advanced health technologies and spending on health care, the poor have lost access to even the most essential services. In

terms of rural-urban disparity across provinces, life expectancy drops parallel to a rising share of rural population [11].

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