A Rare Case of Ruptured Left Sinus of Valsalva into Main Pulmonary Artery

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ABSTRACT

Sinus of Valsalva aneurysm is a rare cardiac anomaly that may be congenital or acquired. The congenital aneurysm which is more common and is often caused by weakness at the juncture of the aortic media and the annulus fibrosus. Aneurysms may originate in the right coronary sinus (65-85%), the non-coronary sinus (10-30%), and rarely the left coronary sinus (1-5%). A 60-year-old adult who presented with congestive heart failure was found to have a ruptured aneurysm of the left sinus of Valsalva. The aneurysm was opening into the main pulmonary artery, which was demonstrated well by transthoracic and transesophageal echocardiography and confirmed by cardiac catheterization. The patient was advised aortic valve replacement but was not willing for surgery and discharged on medical therapy.

Keywords: Aortopulmonary communication, left sinus of valsalva, sinus of valsalva aneurysm

INTRODUCTION

Sinus of Valsalva aneurysm is a rare cardiac anomaly that may be congenital or acquired. The congenital aneurysm which is more common and is often caused by weakness at the juncture of the aortic media and the annulus fibrosus. The acquired aneurysm is caused by conditions affecting the aortic wall, such as infections trauma and degenerative diseases.

Aneurysms may originate in the right coronary sinus (65-85%), the non-coronary sinus (10-30%), and rarely the left coronary sinus (1-5%). Aneurysms usually remain asymptomatic unless they are complicated by rupture. Ruptured sinus of Valsalva (RSOV) aneurysms are frequently associated with ventricular septal defects; this is particularly true of aneurysms that rupture into the right ventricle. We report a rare case of ruptured left sinus of vulsalva into the pulmonary artery.

CASE REPORT

A 60-year-old labor worked in plastic factory presented with history of sudden onset dyspnea associated with palpitations since 6 months which was initially on exertion, later his symptoms progressed and patient had dyspnea during household work and daily routine activities for which he got admitted in our institution. He had no significant past medical history.

On physical examination, weight of the patient was 54 kg and height was 156 cm with body mass index of 22.19 kg/m². Patient had blood pressure of 180/60 mmHg, pulse rate of 96 beats/min, bounding and respiratory rate of 32 breaths/min with jugular veins distended. A hyperdynamic left ventricular impulse with a thrill over left sternal border and a loud, harsh, continuous grade 5/6 murmur loudest in systole was the best heard near the left sternal border in third intercostal space. His saturation by pulse oxymetry was 80% which increased to 100% on 5 L/min of oxygen with nasal cannula.

Hemoglobin was 14.7 g/dl; total white blood count was 9.7 × 10³/ul with normal differentiation and normal platelet count. Arterial blood gas analysis showed pO2 of 46.3 mmHg which increased to 83 mmHg after oxygen inhalation. Renal and liver functions were normal. A chest
radiograph showed an enlarged cardiac shadow and dilated main pulmonary artery.

Electrocardiogram showed sinus rhythm, left anterior hemi block with PR interval prolongation, left ventricular hypertrophy, and left a trial enlargement. Transthoracic two-dimensional echocardiography showed a normal left ventricular systolic function with ejection of 60% with normal left ventricular wall thickness. There was mild aortic regurgitation. At the aortic root level, there was an aortopulmonary communication with dilated pulmonary artery and color Doppler showed the blood shunting from the aorta to the pulmonary artery indicating a rupture of the left sinus of Valsalva. The parasternal short-axis view with the color Doppler technique showed shunting of blood flow from the left sinus of Valsalva through the “wind sock” into the main pulmonary artery (Figure 1, Video 1). Trans-esophageal echocardiography (TEE) confirmed the ruptured left sinus aneurysm into main pulmonary artery (Figure 2, Video 2). Cardiac computed tomography (CT) confirmed aneurysmal dilatation of the left sinus of Valsalva into the main pulmonary artery (Figure 3). CT scan was also suggestive of parenchymal lung disease primarily in the upper lobe of lungs on either side (this may be the reason for low oxygen saturation which improved on 02 inhalation). Aortic cine-angiography showed the dye passing from aorta to aneurysm of the left sinus of valsalva and shunted to the main pulmonary artery. Judkins right catheter 4 crossed with the wire from the left sinus to pulmonary artery through the ruptured aneurysm (Figure 4, Video 3). The patient was stabilized on medical therapy with diuretics, e.g. frusemide and angiotensin-converting enzyme inhibitors. The patient was advised aortic valve replacement but was not willing for surgery and discharged on medical therapy.

**DISCUSSION**

Aneurysm of sinus of Valsalva is a rare entity. Failure of fusion between the aortic media and the heart at the level of annulus fibrosus of aortic valve causes congenital variety of aneurysm of sinus of Valsalva.\(^4\) The acquired variety of sinus of Valsalva aneurysm is seen in connective tissue disorders like Marfan’s syndrome, Behcet’s disease or aortic valve endocarditis and, rarely, chest trauma. The unruptured aneurysm is usually silent but may cause symptoms due to ventricular outflow tract obstruction particularly right ventricle. Furthermore, the aneurysm can be a source of emboli.

Previously, the diagnosis of an RSOV aneurysm in a living patient was rare, with most of the reports coming from autopsy or surgery.\(^5\)
In the present case report, a patient showing features of congestive cardiac failure with continuous murmur and wide pulse pressure was diagnosed by transthoracic echocardiography. Fazio et al.\(^5\) reported a similar and rare case of a rupture of the left sinus of Valsalva aneurysm into the pulmonary artery. Complications of the sinus of Valsalva aneurysms include aortic regurgitation, coronary artery flow compromise, arrhythmias, and rupture. Most commonly, the rupture occurs from the right coronary sinus into the right ventricle or the right atrium. However, the rupture may also occur into the pericardium, the pleural space, or the left heart chambers.\(^6\)

About eight cases have been reported in the literature of the aneurysm of the right sinus had ruptured into the pulmonary artery. Heilman et al., were the first to report RSOV aneurysm into the pulmonary artery.\(^7\) Scagliotti et al., have reported left sinus of Valsalva aneurysm with aortopulmonary tunnel and stressed upon differentiating RSOV from coronary artery fistula to pulmonary artery.\(^8\)

The two-dimensional echocardiography is choice of investigation, which demonstrates the location, structure, and relations of aneurysm of Valsalva sinus and gives precise information about the magnitude of the shunt in case of ruptured aneurysm.\(^9\) TEE may be used for more detailed diagnosis of anatomy, point of rupture, and shunt blood flow. Coronary angiography is useful to detect associated coronary anomalies, level and quantification of shunt. The patient can be treated symptomatically for heart failure, but surgery remains the gold standard for the treatment of RSOV aneurysm. Unlike other chambers of the heart, rupture into the pulmonary artery requires repair of both aorta as well as pulmonary artery in view of preserving the integrity and prevention of stenosis or incompetence of pulmonary artery.\(^10\)

### REFERENCES