

Ruptured Sinus of Valsalva Aneurysm Presenting as Complete Heart Block - A Rare Presentation

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Authors' contributions

This work was carried out in collaboration among all authors. Author GS designed the manuscript, provided the clinical finding, the laboratory findings and images for the study and wrote the first draft of the study. Authors MB and AG managed the literature searches. Author NOB revised the manuscript. All authors read and approved the final manuscript.

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Case Report

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ABSTRACT

The dissection of the sinus of Valsalva aneurysm into the interventricular septum leading to complete heart block is a rare complication with only few cases reported in the literature. We report a case of young farm laborer, who presented with multiple episodes of syncope. Upon clinical evaluation, we found third-degree atrioventricular block due the rupture of right sinus of Valsalva into the interventricular septum.

Keywords: Sinus of Valsalva aneurysm; ruptured aneurysm; complete heart block; atrioventricular block.

ABBREVIATIONS

CHB : Complete heart block;
AV : Atrioventricular

1. INTRODUCTION

Aneurysm of sinus of Valsalva accounts for 1 percent of congenital anomalies of the heart and

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circulation [1]. The incidence varies from 0.14 to 0.35 percent [2]. About 75% of the patients are male. The prevalence is more in the Asian population compared to the Western world. Two-thirds of the aneurysms are located in the right aortic sinus, one-fourth in the non-coronary sinus and the rest in the left aortic sinus [3]. The aneurysms tend to be single although exceptionally more than one sinus is involved. The aneurysm can rupture, leading to symptoms or it can give rise to symptoms due to the compression of adjacent structures. The aneurysms may be isolated, or in 30% - 50% may be associated with ventricular septal defects, especially defects of the outlet septum. Coarctation of the aorta, atrial septal defect, tetralogy of Fallot and patent ductus arteriosus also may be associated with these aneurysms [4]. We report a case of young farm laborer, who presented with multiple episodes of syncope. On evaluation found to have third-degree atrioventricular block due the rupture of right sinus of Valsalva into the interventricular septum.

2. CASE REPORT

A thirty-five-year-old male, farm laborer by occupation was admitted to our hospital with multiple episodes of syncope over the last one week. He gives the history of lifting heavy weights during the recent harvesting season. On examination, pulse was 40 per minute, blood pressure was 124/74 mmHg. The respiratory system was normal. The electrocardiogram showed a third-degree atrioventricular block. Routine blood investigation was normal. Echocardiography revealed hypoechoic space in

the interventricular space communicating with the right coronary sinus. The aortic valve and aortic root were normal. Cardiac CT confirmed the diagnosis of rupture of sinus of Valsalva into the interventricular septum. The patient was scheduled for surgical repair of the aneurysm. Aortic root angiogram was done as advised by our cardiothoracic surgeon to look for any communication between the ruptured aneurysm and cardiac chambers. Aortic root angiogram in right anterior oblique and left anterior oblique view showed no evidence of communication between ruptured aneurysm and cardiac chambers. The patient underwent patch repair of the aneurysm through midline sternotomy. The patient was observed for improvement in atrioventricular block. A permanent pacemaker was implanted after 2 weeks. The patient was discharged after 5 days of pacemaker implantation. The patient is asymptomatic on subsequent follow-ups.

3. DISCUSSION

Aneurysm of sinus of Valsalva may be asymptomatic and diagnosed only incidentally during imaging for other lesions. Sinus of Valsalva aneurysms come to attention because of rupture and acute development of large shunt, the gradual development of a small perforation or because of compression of adjacent structures by un-ruptured aneurysm. If a huge shunt develops rapidly, the symptoms of congestive heart failure appear almost immediately, but with smaller fistulas, it may take several months for heart failure to develop [3]. Rupture often, but not necessarily develop after physical exertion.

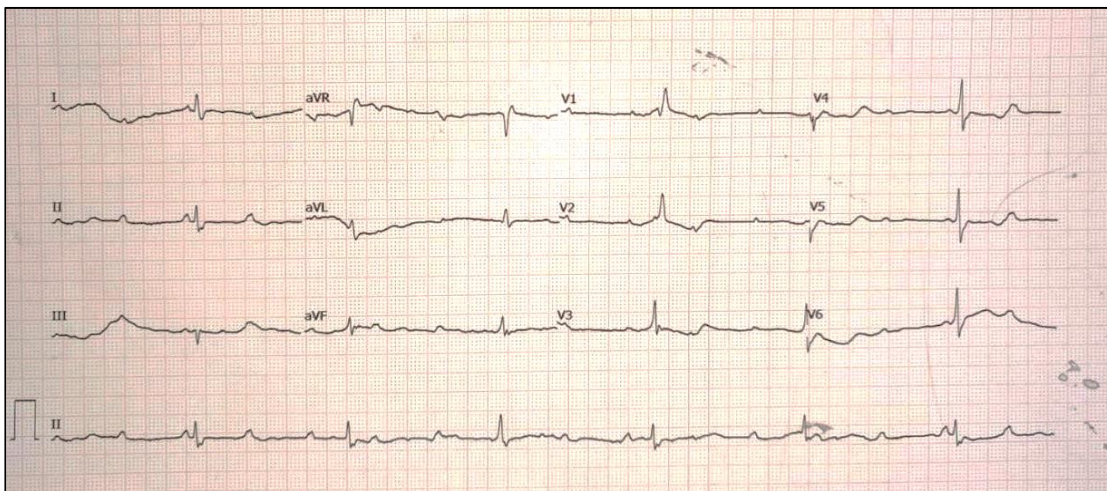


Fig. 1. ECG of the patient on admission showing 3rd-degree atrioventricular block (complete heart block)

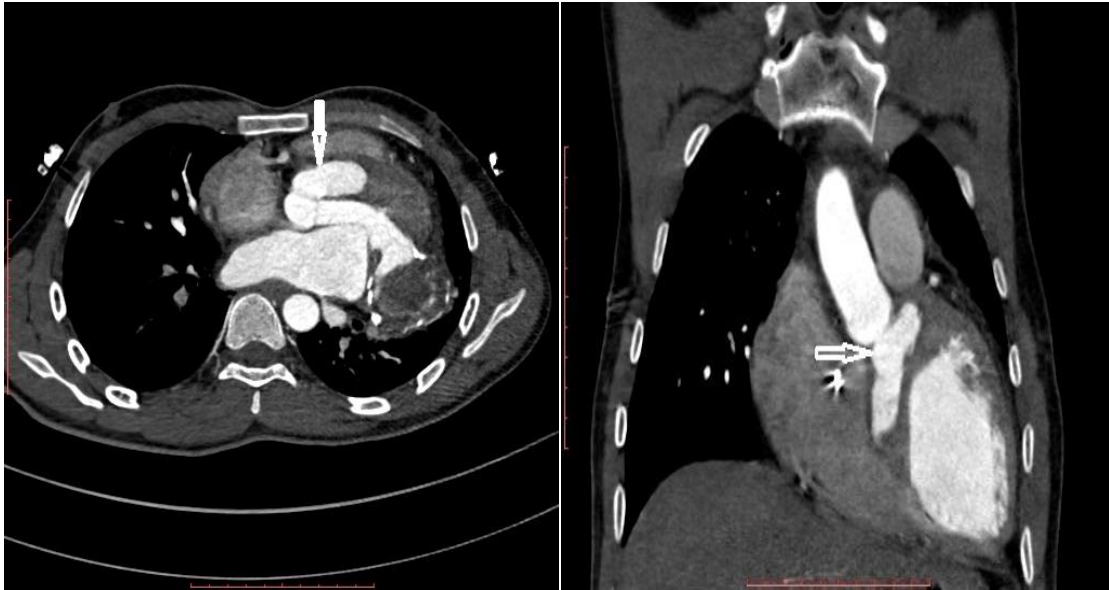


Fig. 2A, 2B. Contrast cardiac CT showing the aneurysm in the axial and coronal view (marked by an arrow)

Rupture may be accompanied by a tearing pain in the chest or upper abdomen. The mean age for the onset of symptoms owing to the sudden rupture of the aneurysms was 31 years in one series [3] and 34 years in another series [5]. Those that arise in the non-coronary sinus almost always rupture into the right atrium, and those that arise in the right coronary sinus rupture into the right ventricle or occasionally into

the right atrium. Rarely the aneurysm may rupture into the pulmonary artery, left ventricle, left atrium, or pericardial space [5]. The fundamental histologic fault responsible for a coronary sinus aneurysm is discontinuity of the elastic layer in the aortic media at the juncture between the ascending aorta and aortic valve annulus, which sets the stage for avulsion and aneurysm formation.

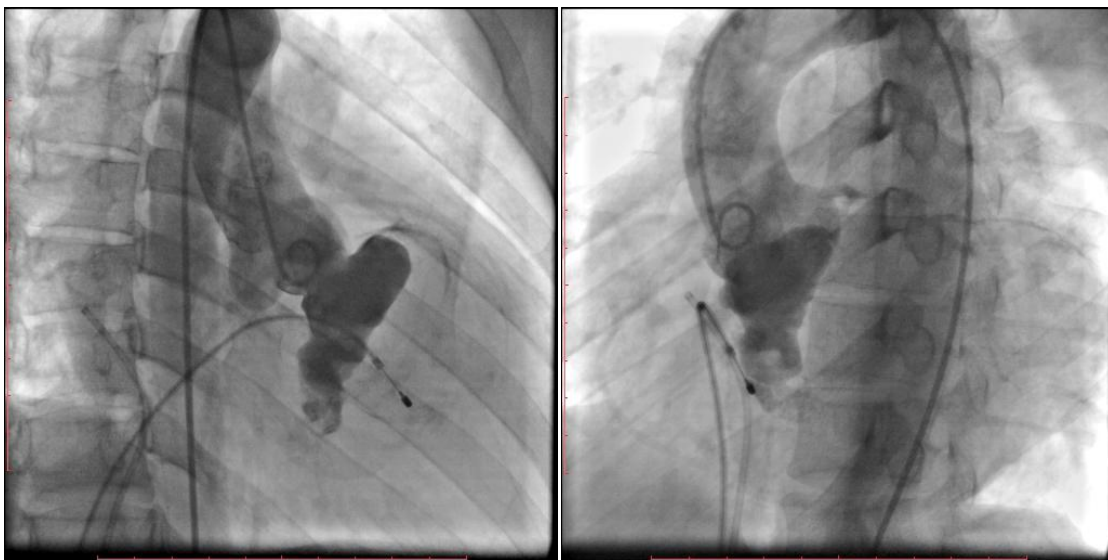


Fig. 3A, 3B. Aortic root angiogram showing the aneurysm arising from the right coronary sinus; there is no communication between the aneurysm and any of the cardiac chambers (3A- right anterior oblique view, 3B- left anterior oblique view)

A large unruptured aneurysm may compress a coronary artery [6,7], cause aortic regurgitation by interfering with the coaptation of aortic leaflets [8], cause right ventricular outflow tract and left ventricular outflow tract obstruction [9]. Also, rarely, a sinus aneurysm may dissect into the interventricular septum and cause complete heart block. It may remain unruptured in the interventricular septum or perforates and ruptures into the left or right ventricle [10-14]. The possible explanation for complete heart block associated with large aneurysm eroding interventricular septum is compression of bundle of His, when aneurysm of right coronary sinus grows caudally distorting or eroding into membranous part of interventricular septum. Some patients improve to sinus rhythm after successful surgical repair [15,16]. Few patients required permanent pacemaker implantation after surgery for persistent complete heart block [17,18]. Our patient also required the implantation of a permanent pacemaker.

4. CONCLUSION

Sinus of Valsalva aneurysm should be suspected in a young patient presenting with complete heart block. The diagnosis is straight forward based on echocardiography and cardiac CT. Complete heart block is a rare complication of sinus of Valsalva aneurysms. It may be reversible after early surgical repair or may persist, requiring implantation of a permanent pacemaker.

CONSENT

Written informed consent was obtained from the patient for publication of this report and any accompanying images.

ETHICAL APPROVAL

As per international standard, written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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