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Case Report

Giant Aneurysm of the Left Valsalva Sinus Revealed by Left Coronary Ischemia Successfully Treated with Aortic Root Remodeling

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Abstract

Background: Sinus Of Valsalva Aneurysm (SVA) is a very rare condition; its incidence is less than 1% of the open-heart surgeries and can be asymptomatic or revealed by compression symptoms of surrounding structures. Surgical treatments are various and depend on the aneurysm size, aortic tissue quality and valve function. Aortic root remodeling can be also performed in some cases.

Case Presentation: A 76-year-old female patient presenting with chest pain during exercise, presented to our emergency department. EKG (electrocardiogram) showed ischemic modifications associated to positive troponin levels. The coronary angiography showed contrast stagnation in the left Valsalva sinus and no left coronary visualization. An aortic dissection was suspected after transthoracic echocardiography because of the presence of 1 cm circumferential pericardial effusion. The Computed Tomography Angiography (CTA) revealed a 55 x 42 x 40 mm aneurysm of the Left Valsalva Sinus (LSV), with a mass effect on the Left Main Coronary Artery (LMCA).

Conclusion: SVA is a very rare condition that can be revealed by left coronary ischemia. Rapid and complete evaluation of the aneurysm itself as well as the aortic valve and the surrounding structures by echocardiography and CTA is mandatory. This will allow us to suggest the good surgical timing and the most suitable procedure. Aortic root remodeling should be considered in order to reduce cross clamping time.

Introduction

SVA is a rare condition it could be congenital or acquired, especially when connective tissue disorder is associated. Although its evolution could be silent at first it may show some severe complications due to the size and potential rupturing. It usually affects the right coronary sinus in 94% of cases [1]. In some cases, the aneurysm can become symptomatic because of its size and surrounding structures compression. It can be responsible for conduction disorders [2], myocardial ischemia [3], aortic regurgitation and even syncope [4]. Surgical treatments can be various depending on the size: from a simple closure or patch closure [5] to the complete root and valve replacement [6]. In some cases, an aortic valve sparing procedure can be realized and could be the suitable approach especially for young patients but not only [7,8].

Case Presentation

A 76-year-old female patient with no significant medical history was admitted to our emergency department, because of chest pain during exercise, neglected for the first three days until EKG showed anterior ischemic modifications and increased Troponin I blood levels. Aspirin associated to LMWH (low molecular weight heparin) was administered in order to undergo a coronary angiography: injection in the left coronary artery couldn't be obtained with contrast stagnation in the sinus, which led us to suspect an aortic dissection. The CTA revealed the presence of a 55 x 42 x 40 mm aneurysm of the LSV (Figure 1a), with a mass effect on the LMCA (Figure 1b). Echocardiography showed normal aortic valve function and 1 cm pericardial effusion.

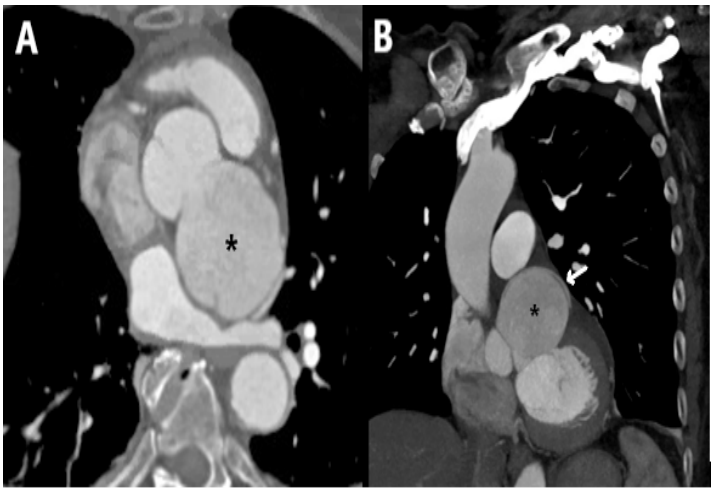

Figure 1: Computed tomography angiography. **A**: Transversal section showing the origin of the SVA (marked with asterisk) on the left sinus of Valsalva **B**: Section showing the proximity level of the SVA and the left main coronary artery (marked with white arrow). SVA = sinus of Valsalva aneurysm, Ao = aorta, LMC = left main coronary

Intervention

Due to the findings and patient's symptoms immediate surgery was decided. After general anesthesia and right axillary artery canulation, a median sternotomy was performed, and the pericardium opened revealing a serous effusion. The right atrium was cannulated, and the cardiopulmonary bypass was started. After aortic cross-clamping, myocardial protection was obtained by cold cardioplegia injection. A left discharge was placed into the right pulmonary vein. A transverse aortotomy was performed and revealed a giant aneurysm of the left Valsalva sinus responsible for LMCA ostium compression. The aortic valve was intact with no calcifications or any pathological tissue, it was then decided to spare the valve. The aneurysm was dissected, and excess tissue was removed, the LMCA was dissected and excluded from the aneurysm with its coronary button. The aortic root was remodeled using a 32 mm Gelweave valsalva graft by hemi-Yacoub technique [9] the lowest part of the graft was fixed with pledgeted separated stitches near the aortic annulus because of frail aortic tissue at this level. Then, and from each part, a running suture with 4/0 Prolene was realized up to the sino-tubular junction level and continued anteriorly to reconstitute the sino-tubular junction. Then the LMCA button was implanted with 7/0 Prolene after realizing a hole in the graft by electrocautery. The cardiopulmonary by-pass time was 163 min and cross-clamping time was 106 min. Intra-operative transesophageal echocardiography showed normal aortic valve function with no regurgitation (Figures 2,3).

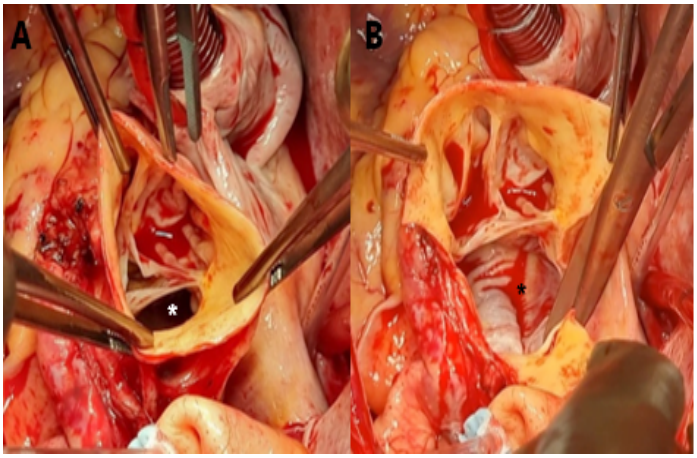

Figure 2: Intraoperative images. **A**: Image with a clear view of the orifice of the SVA (marked with white asterisk). **B**: Image after incision of the aortic root at the orifice of the SVA revealing its size (marked with black asterisk), which helped finding the left main coronary artery.

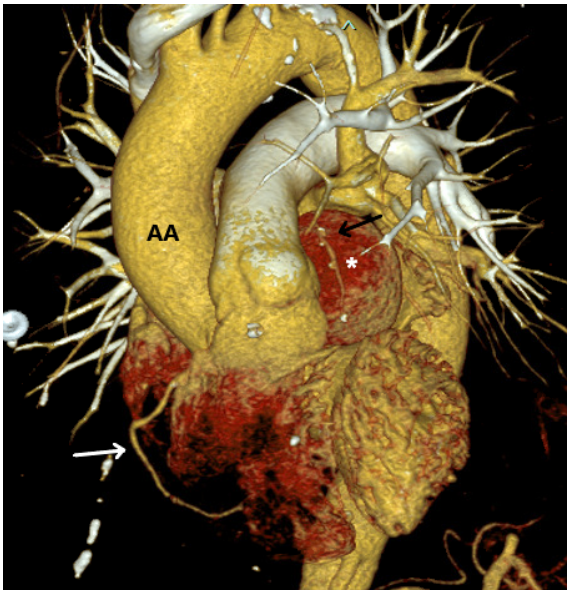

Figure 3: 3D reconstruction of CTA images showing the SVA (marked with white asterisk) and the origin of the LMCA (marked with black arrow) from the roof of the aneurysm. We can also see the right coronary artery (marked with white arrow). AA = Ascending Aorta.

Discussion

SVA is a rare condition and could be related to weakness in the aortic muscular tissue as it could be encountered in people suffering from hereditary connective tissue disorder such as Marfan or Ehlers-Danlos syndrome [10, 11]. SVA is more frequently encountered on the right Valsalva sinus [7] and can be revealed by coronary ischemia justifying immediate surgery. A complete aortic root and valve replacement is recommended in case of a SVA associated to severe aortic regurgitation or stenosis. When the aortic valve is functionally normal, an aortic root remodeling or a valve sparing procedure can be considered. In this specific case, characterized by ischemic myocardial suffering with no clear left coronary artery angiographic evaluation, the feasibility of remodeling with hemi-Yacoub technique and LMCA reimplantation allowed to reduce cross clamping time in comparison to an aortic root replacement or Tirone David procedure. Anatomopathological results revealed significant idiopathic cystic degenerative lesions of the media with the lack of any specific element.

Conclusion

This case report shows a successful management of a rare giant SVA revealed by left coronary ischemia by an aortic root remodeling and LMCA re-implantation. Moreover, it shows the major role of echocardiography in acute coronary syndrome in decision making for good surgery timing. With this case we would encourage surgeons to consider aortic root remodeling when achievable in such a situation despite frail aortic tissue very near to the annulus in order to reduce cross clamping time.

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