

Surgical repair of Unruptured Pseudoaneurysm of Sinus of Valsalva in Aortic Stenosis

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ABSTRACT

Isolated pseudoaneurysm of a sinus of Valsalva is an uncommon sequelae of infective endocarditis. It is very uncommon in native aortic valve stenosis as compared to aortic regurgitation. We present a case of a 46 year old gentleman with a severely stenotic aortic valve with infective endocarditis, and a pseudoaneurysm of the non coronary sinus of Valsalva. The pseudoaneurysm was repaired with a prosthetic patch and the aortic valve was replaced by a mechanical prosthesis. Transthoracic echocardiography and computed tomography aortogram are an ideal diagnostic tools in suspected cases. Surgery can be curative with excellent results.

Key words: Aortic Stenosis; Transthoracic echocardiography

Running Title : Sinus of Valsalva Pseudoaneurysm

Introduction

Pseudoaneurysm of the native aortic sinus of Valsalva is an uncommon condition which occurs spontaneously or secondary to infection, trauma [1]. Infective endocarditis can lead to many complications like abscess formation, pseudoaneurysms and aortocavitary fistula formation with lethal effects. These complications can occur in a preexisting diseased or normal valve. It can form aortocavitary fistulae with adjacent cardiac chambers [2]. We report a case of a severely stenotic aortic valve with infective endocarditis and pseudoaneurysm of the non coronary sinus of Valsalva (NCSOV) with a successful surgical cure.

Case report:

A 46 year old gentleman presented with worsening angina and dyspnea on exertion for one year. He also had history of fever one month back for which he had received intravenous cefepime for 2 weeks. A fortnight later he came to our institute. Clinical examination showed a normal hemodynamic status with a pulse rate of 82/min, blood pressure of 108/60 mm of Hg and a grade III/VI ejection systolic murmur over right sternal border. Blood cultures were negative and other hematological,

biochemical and radiological investigations were satisfactory. Transthoracic echocardiography (TTE) revealed thickened aortic leaflets with multiple echogenic nodules, suggestive of healed vegetations and echo free space posterior to NCSOV (**Figure 1A**) with a normal ejection fraction. A computed tomography (CT) aortogram confirmed the diagnosis of an unruptured pseudoaneurysm of NCSOV (**Figure 1B**).

Through a median sternotomy standard cardiopulmonary bypass was established. At moderate hypothermia diastolic arrest of the heart was achieved after aortic cross clamping with cold blood cardioplegia. The defect was accessed via oblique aortotomy. The opening in the NCSOV was seen extending from the aortic annulus to the sinotubular junction. The Aortic valve was tricuspid, severely stenotic with thickened leaflets and healed vegetations. The aortic valve and infected tissues were excised. The margins of the mouth of the aneurysm were cleaned, trimmed and repaired with a prosthetic patch using polypropylene sutures (**Figure 1C**). Aortic valve was replaced with a mechanical aortic valve prosthesis (ST. JUDE MEDICAL Inc., Minnesota, USA). Postoperative recovery was uneventful. One year postoperatively, the patient is doing well clinically with normal CT aortogram (**Figure 1D**) and has good mechanical valve function.

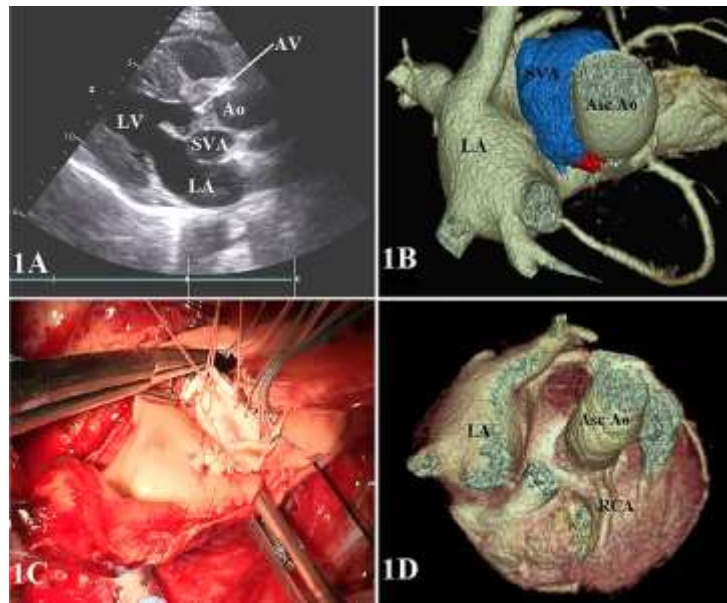


Figure legend (Ao: Aorta; AV: Aortic valve; LA: Left atrium; LV: Left ventricle; SVA: Sinus of Valsalva aneurysm; Asc Ao: Ascending aorta; SVA: Sinus of Valsalva aneurysm)

Figure 1A: Pre-operative trans thoracic echocardiography showing echo free space posterior to NCC with thickened calcific aortic valve.
Figure 1B : Pre-operative reconstructed 3D CT aortogram image showing un-ruptured non coronary sinus of Valsalva aneurysm.
Figure 1C : Defect repaired with prosthetic patch.
Figure 1D : Post-operative reconstructed 3D CT aortogram image showing normal aortic root.

Discussion:

Acquired pseudoaneurysm of the sinus of Valsalva involves the right coronary sinus (80%), followed by the noncoronary sinus (16%), and the left coronary sinus (4%) [1]. These pseudoaneurysms are mostly

associated with aortic regurgitation (AR) either due to primary cuspal involvement or secondary to annular dilatation. A literature search was carried out for pseudoaneurysm secondary to infective endocarditis (Table 1).

Table 1:

Author	year	Aortic valve lesion	Age/Sex	Sinus involved	Ruptured/ Unruptured	Treatment
Kyung-Hwan Kim [4]	2004	----	42/M	NCS	Unruptured	Aortic root repair with sinus repair with autologous pericardium
Cayla[5]	2005	BAV with AR	25/M	RCS	Unruptured	AVR with sinus repair with pericardial patch
Yuji Katayama[6]	2005	AR	55/F	NCS	Unruptured	Resection and hemashed woven-velour fabric patch repair of NCS
Michael W. Fong[7]	2007	AR	74/F	NCS	Ruptured	Aortic root replacement
Chin C Lee[2]	2016	AR	44/M	RCS	Unruptured	Aortic Valve Repair and Sinus repair with pericardial patch
Hyun Oh Park[8]	2018	AR	44/M	LCS	Ruptured	AVR with sinus repair
Our case	2019	AS	46/M	NCS	Unruptured	Debridement of aortic sinus wall and repair with prosthetic patch and AVR

Table legend: AVR: aortic valve replacement, RCC: Right coronary cusp, LCC: Left coronary cusp, NCC: Non coronary cusp, BAV: Bicuspid aortic valve

Our case is the only case to be reported in association with aortic stenosis (AS). A high degree of suspicion should be harboured when dealing with cases of aortic stenosis with infective endocarditis. Paravalvular abscesses and pseudoaneurysms involving the sinus of Valsalva rupture

occur in 1.6% of cases, to form aortocavitary fistulae with the adjacent cardiac chamber (atrium or ventricle) or intrapericardially which can be fatal [2]. Aneurysms from the noncoronary sinus usually originate from its anterior portion and project into the right atrium, whereas aneurysms

arising from the posterior portion of the noncoronary sinus may rupture into the pericardium [3]. These sequelae can occur subacutely, even after completion of intravenous antibiotic therapy as seen in our case. It is important that these sequelae are diagnosed early and treated urgently.

We postulate that the venturi effect of the blood column being ejected at high velocity strikes the aortic wall with enough force to slowly erode the aortic wall. Also with the onset of an infection on the aortic valve, the infective debris could flow with the blood column, seed the damaged tissue and establish a colony on the damaged aortic wall. This colony can enlarge and eventually lead to penetration and rupture of the aortic media and endothelium forming a pseudoaneurysm. Pericardial rupture of these pseudoaneurysms are almost always unsalvageable as they present in very pre-terminal stage. Although transthoracic, transesophageal echocardiography and color flow Doppler mapping are basic non-invasive tests for evaluation, perivalvular pseudoaneurysms can sometimes be challenging to define due to limited soft tissue resolution, thus necessitating a CT aortogram or a cardiac MRI [4-6]. Follow-up evaluations are mandatory for the early detection and treatment in such patients. The pre-operative diagnosis of an infected pseudoaneurysm has important therapeutic implications. Surgical correction can vary from aortic sinus repair to a more extensive intervention like aortic root replacement [4-8]. Our case was successfully managed by thorough debridement excluding the pseudoaneurysm with a prosthetic patch and aortic valve replacement (AVR) with bileaflet mechanical valve prosthesis for aortic stenosis.

Conclusion:

Surgery for pseudoaneurysm post infective endocarditis when appropriately timed, applied and executed; yields good results.

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References:

1. Chu SH, Hung CR, How SS, Chang H, Wang SS, Tsai CH, et al. Ruptured aneurysms of the sinus of Valsalva in Oriental patients. *J Thorac Cardiovasc Surg* 1990;99(2):288-988.
2. Lee CC, Siegel RJ. Sinus of Valsalva Pseudoaneurysm as a Sequela to Infective Endocarditis. *Tex Heart Inst J* 2016;43(1):46-48
3. Brabham KR, Roberts WC. Fatal intrapericardial rupture of sinus of Valsalva aneurysm. *Am Heart J* 1990;120:1455
4. Kim KH, Han KN. Aortic paraannular abscess with pseudoaneurysm of noncoronary sinus of Valsalva. *Eur J Cardiothorac Surg* 2004; 26: 828.
5. Cayla G, Macia JC, Pasquié JL. Images in cardiology. Infective pseudoaneurysm of a ruptured sinus of Valsalva as an unusual cause of myocardial infarction by compression of the right coronary artery. *Heart* 2006; 92: 831.
6. Katayama Y, Minato N, Sakaguchi M, et al. Surgical treatment of pseudoaneurysm of the sinus of Valsalva after aortic valve replacement for active infective endocarditis. *Ann Thorac Cardiovasc Surg* 2005; 11: 419-423.
7. Michael W F, Peter K, John H S, et al. Endocarditis with aortic root pseudoaneurysm rupture. *Cardiol J* 2007; 14: 202-204
8. Park et al. A case report of pseudoaneurysm of left sinus of Valsalva invaded into the left
9. ventricle with severe aortic regurgitation. *Journal of Cardiothoracic Surgery* (2018) 13:63



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