

PERCUTANEOUS TRANSCATHETER DEVICE CLOSURE OF RUPTURED SINUS OF VALSALVA ANEURYSM

Asif Ur Rehman^o, Muhammad Zaman^{a*}, Hafiz Abdul Mannan^o, Samra haq^o

Abstract

Ruptured Sinus of Valsalva (RSOV) aneurysm usually require surgical correction but the device closure is a reasonable alternative. Here we present a case of 28 years male who presented to OPD with shortness of breath and palpitations. He was diagnosed as a case of ruptured right sinus of valsalva into right ventricle (RV). Patient underwent percutaneous device closures and the procedure remained uncomplicated.

Key words: Sinus of Valsalva aneurysm, rupture, device closure

(J Cardiovasc Dis 2014;12(1):22-24)

INTRODUCTION:

Sinus of Valsalva (SV) is a dilatation of the aortic wall located between the aortic valve and the sinotubular junction¹. Its location is related to the coronary arteries designated as the right coronary sinus (RCS), left coronary sinus (LCS) and noncoronary sinus (NOCS). The most common complication is rupture into the right atrium or ventricle, very rarely towards the left chambers, causing left-to-right shunting or aortic valve insufficiency with congestive heart failure and the need for urgent surgical correction².

Percutaneous closure of ruptured sinus of Valsalva is another treatment option in patients who are too ill to undergo bypass, with mild or no aortic regurgitation, simple associated defects (muscular ventricular septal defects, secundum atrial septal defects and small patent ductus arteriosus) and suitable for device closure³.

CASE:

28 years old male admitted through OPD of Punjab institute of cardiology with history of shortness of breath and palpitation for the last 5 months. Physical examination revealed harsh, continuous murmur along the left lower sternal border; chest X ray (Fig-1) showed cardiomegaly, transoesophageal echocardiography (TEE Fig-2) showed a ruptured right sinus of Valsalva into RV with aneurysmal pouch, thin walls measuring 10 mm at entry point, dilated LV with good function, upper sized RV with good function and no aortic regurgitation. No pulmonary hypertension. He was managed with percutaneous transcatheter

device closure. A 14X12 mm sized PDA device was used and the procedure remained uneventful. Aortogram show no AR and subsequent TTE showed well seated device, trivial AR and no TR (Fig-3).

Figure 1: Chest X-rays PA view with enlarged cardiac size and no evidence of pulmonary oedema.



DISCUSSION:

The incidence of ruptured SVA is five times higher in Asian countries (0.46-3.5% in Eastern and 0.14-0.23% in Western areas)^{4,5}. Of the group, 65-80% are males (male/female ratio 4:1)¹. Diagnosis can occur at any age (average: 39 years, range: 2-74 years)⁶. SVA affect the right sinus in 65-86% of cases, noncoronary sinus in 10-30% and the left sinus in 2-5%⁶. They are associated with other heart defects, VSD in 30-60% of cases, aortic valve abnormalities such as aortic insufficiency in 20-30% of cases, bicuspid valve (10%),

^o Punjab Institute of Cardiology,
Lahore-Pakistan

* Corresponding author:

Email: drmuhammadzamanfayyaz@yahoo.com

Figure 2: TEE (Long axis view still image) showing ruptured sinus of valsalva aneurysm into RV.

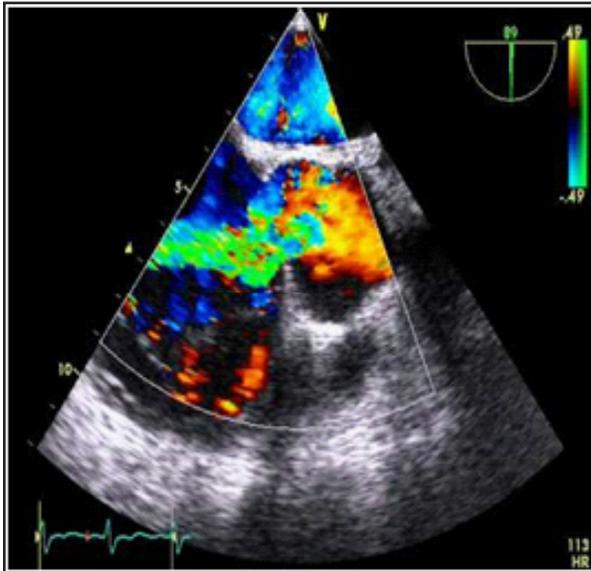


Figure 3: TTE apical four chamber view showing device well incorporated at RSOV (Ruptured Sinus of valsalva)

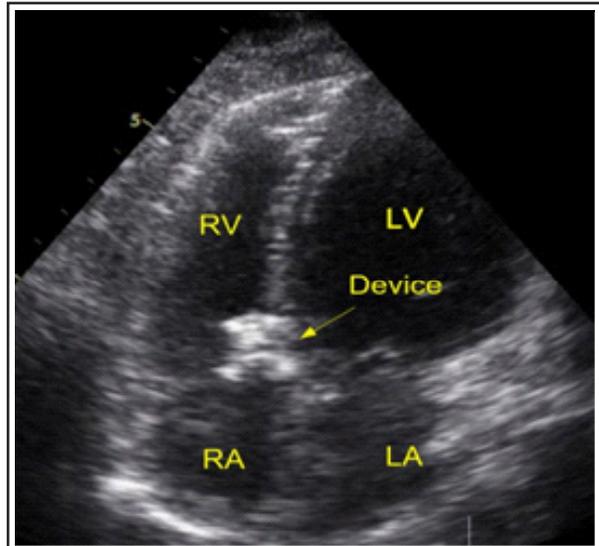


Table 1 Classification systems for RSVA

Type	Sakakibara classification	Modified Sakakibara classification
I	Originating from left part of right coronary sinus; protruding into conus of right ventricle, just beneath commissure of right and left pulmonary valves	Protrusion and rupture into right ventricle just beneath pulmonary valve
II	Originating from central part of right coronary sinus; protruding into right ventricle; penetrating crista supraventricularis	Penetration and rupture into or just beneath crista supraventricularis of right ventricle
IIIv	Originating from posterior part of right coronary sinus; protruding into right ventricle, just beneath septal leaflet of tricuspid valve; penetrating membranous septum	Penetration and rupture into right ventricle adjacent to or at tricuspid annulus
IIIa	Originating from posterior part of right coronary sinus; protruding into right atrium, near commissure of septal and anterior leaflets of tricuspid valve	Penetration and rupture into right atrium adjacent to or at tricuspid annulus
IV	Originating from right part of noncoronary sinus; protruding into right atrium, near septal leaflets of tricuspid valve	Protrusion and rupture into right atrium
V		Other rare conditions (eg, rupture into left atrium, pulmonary artery, left ventricle, or other structures)

RSVA, Ruptured sinus of Valsalva aneurysm.

aortic stenosis (6.5%)¹. They may also be associated with pulmonary stenosis (9.7%), coarctation of the aorta (6.5%), persistence of the ductus arteriosus (3.2%), tricuspid insufficiency (3.2%) and interatrial defect¹. Rupture of a SVA occurs principally at the RV (60%) or at the RA (29%), the LA (6%), and LV (4%) or at the pericardium (1%)¹. The only formal classification for the SVA has been proposed by Sakakibara and Konno in 1962, describing four types according to the coronary sinus affected and the area where they protrude or rupture⁷(Table-1). TTE and trans esophageal echocardiogram (TEE) have a diagnostic accuracy of 75% and 90%, respectively¹. The transcatheter technique for RSOV closure was first reported by Cullen et al., with a Rashkind umbrella device in 1994. Since then, Gianturco coils, Amplatzer duct occluders, and Amplatzer septal occluders have been used for device closures of RSOV^{8,9}. Potential complications are hemolysis secondary to residual shunting, AR, increase in TR, RVOT obstruction and device embolization .



REFERENCES

1. Galicia-Tornell MM, Marín-Solís B, Mercado-Astorga O, Espinoza-Anguiano S, Martínez-Martínez M, Villalpando-Mendoza E. Sinus of Valsalva aneurysm with rupture. Case report and literature review. *Cir Cir.* 2009 Nov-Dec;77(6):441-5.
2. Agrawal Y, Chandrashekar R, Pratt JW, Cole MD, Kamath S, Kalavakunta JK Ruptured Sinus of Valsalva Aneurysm into the Left Atrium with Multiple Fistulous Communications: A Rare Cause of Heart Failure. *Case Rep Cardiol.* 2015;2015: 1-3.
3. Kuriakose EM, Bhatla P, McElhinney DB. Comparison of reported outcomes with percutaneous versus surgical closure of ruptured sinus of Valsalva aneurysm. *Am J Cardiol.* 2015 Feb 1;115(3):392-8
4. Chu SH, Hung CR, How SS, Chang H, SS Wang, Tsai CH, et al. Ruptured aneurysms of the sinus of Valsalva in Oriental patients. *J Thorac Cardiovasc Surg* 1990; 99: 288-298.
5. Meier JH, Seward JB, Miller FA et al. Aneurysms in the left ventricular outflow tract: clinical presentation, causes, and echocardiographic features. *J AM Soc Echocardiogr* 1998; 11: 729-45.
6. Saha S, Chakraborty A. Rupture of sinus of Valsalva aneurysm presenting as chronic heart failure - two case reports. *J Evid Based Med.* 2015 Nov;2(52):8696-98
7. Xin-Jin L, Xuan L, Bo P, Hong-Wei G, Wei W, Shou-Jun L, Sheng-Shou H. Modified Sakakibara classification system for ruptured sinus of Valsalva aneurysm. *J Thorac Cardiovasc Surg.* 2013 Oct;146(4):874-8
8. Trehan VK, Mukhopadhyay S, UmaMahesh CR, Yusuf J, Arora R. Successful transcatheter closure of ruptured sinus of Valsalva Aneurysm. *Indian Heart J.* 2002;54:720-2.
9. Chang CW, Chiu SN, Wu ET, Tsai SK, Wu MH, Wang JK. Transcatheter closure of a ruptured sinus of Valsalva aneurysm. *Circ J.* 2006;70:1043-7.
10. Kerkar PG. Ruptured sinus of Valsalva aneurysm: Yet another hole to plug! *Ann Pediatr Cardiol.* 2009 Jan-Jun; 2(1): 83-84.
11. Kerkar PG, Lanjewar CP, Mishra A, Nyayadhish P, Mammen I. Transcatheter closure of ruptured sinus of Valsalva aneurysm using the Amplatzer duct occluder: immediate results and mid-term follow-up. *Eur Heart J.* 2010 Dec;31(23):2881-7.