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## Case Reports

# Transcatheter device closure of multiple defects in ruptured sinus of Valsalva aneurysm

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## ARTICLE INFO

## Article history:

Received 16 May 2015

Accepted 16 June 2015

Available online 26 September 2015

## Keywords:

Sinus of Valsalva aneurysm

Congenital heart disease

Retrograde approach

Transcatheter closure

Echocardiogram

## ABSTRACT

Ruptured sinus of Valsalva aneurysm (SOVA) with multiple communications, ventricular septal defect, and aortic regurgitation are still best treated surgically. We report a case of 30-year-old male with right SOVA, with two communications with right ventricle. Both communications were successfully closed using antegrade and retrograde approaches, respectively.

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## 1. Introduction

Sinus of Valsalva aneurysm (SOVA) is a rare congenital cardiac anomaly. Transcatheter device closure is an alternative to surgical closure in selected patients with ruptured SOVA. Ruptured SOVA with associated ventricular septal defect (VSD) or multiple openings or aortic regurgitation (AR) is best treated surgically. We describe successful percutaneous closure of SOVA with two communications and trivial AR with Lifetech patent ductus arteriosus (PDA) occluder and Amplatzer muscular VSD II occluder through antegrade and retrograde approaches respectively.

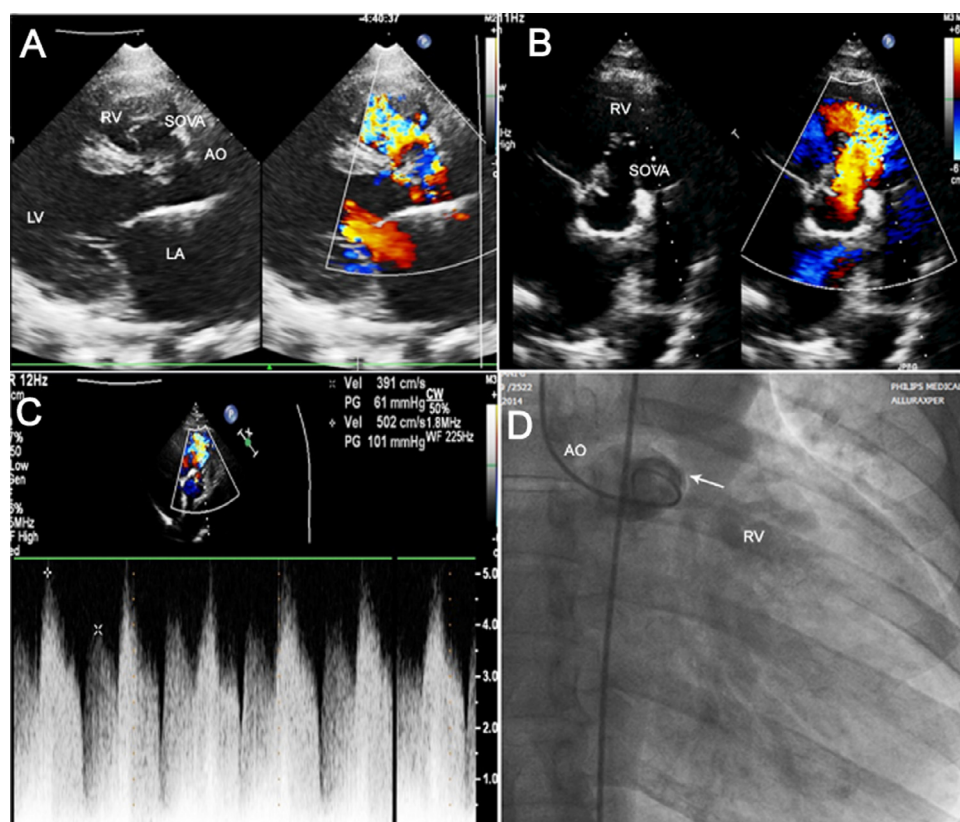
## 2. Case report

A 30-year-old male presented with progressive dyspnea of one-month duration. On examination, his pulse rate was 112 beats per minute, blood pressure was 120/60 mm Hg, and harsh continuous IV/VI murmur was heard at left parasternal area. He was afebrile and blood culture yielded no growth. Chest X-ray showed cardiomegaly. Twelve lead electrocardiogram revealed sinus tachycardia, normal axis, and left ventricular volume overload. Transthoracic echocardiogram (TTE) revealed ruptured right SOVA into right ventricular outflow tract and trivial AR (Fig. 1). All cardiac chambers were

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**Fig. 1 – (A) TTE demonstrating right SOVA communicating with right ventricle in PLAX view. (B) TTE showing wind sock of right sinus of Valsalva with defect in SAX view. (C) Continuous wave Doppler across the right SOVA demonstrating continuous Doppler signal. (D) Aortogram in right anterior oblique view showing ruptured right SOVA into right ventricle. RV, right ventricle; LV, left ventricle; AO, aorta; SOVA, sinus of Valsalva aneurysm; LA, left atrium.**

dilated; left ventricular ejection fraction was 40% and right ventricular systolic pressure was 50 mm Hg. Patient was stabilized medically. Transcatheter device closure was performed under local anesthesia. Right femoral 6F arterial access and 8F venous access were obtained. Using 6F pigtail catheter through right femoral artery, left ventricular angiogram and aortic root angiogram were performed. A communication between right aortic sinus and right ventricular outflow tract of 7.0 mm and trivial AR were visualized (Fig. 1). The defect was crossed from right femoral artery using 5F Judkins right coronary catheter (Cordis, Miami Lakes, FL) and angled hydrophilic guide wire (Terumo co-operation, Tokyo, Japan). Initial wire was replaced with exchange length 0.035 in. × 260 cm Teflon guide wire. Exchange length guide wire was manipulated into superior vena cava and snared using gooseneck snare. Exchange length wire was exteriorized through right femoral vein forming an arterio-venous loop. Over the loop from right femoral vein, 8F Cook sheath (Cook Medical, Bloomington, IN) was placed across SOVA defect. After positioning a 8/10 Lifetech PDA occluder (Lifetech Scientific Co., Ltd., Schenzen, China) across the defect, we noticed an adjacent separate defect with escape of contrast into right ventricle (Fig. 2). PDA occluder was delivered across the defect after confirming its position under fluoroscopy and absence of conduction disturbance on electrocardiogram. As the deployed device was closer to aortic cusp, we decided to

assess AR before placing another device. On the third day, transesophageal echocardiogram confirmed another defect adjacent to the initially placed device and there was no worsening of AR (Fig. 2). Aortogram on 7th day revealed an adjacent communication of 8 mm between SOVA and right ventricle. Second defect was crossed from left femoral artery access with 5F Judkins right coronary catheter and terumo guide wire. Terumo guide wire was exchanged with Amplatzer stiff wire. A 10 mm Amplatzer muscular VSD occluder II was positioned retrogradely across the defect from aortic end. Postprocedure aortogram showed successful closure of defect (Fig. 2). He was discharged with oral aspirin (150 mg), clopidogrel (75 mg), and infective endocarditis prophylaxis. At 1-year follow-up, patient had mild dyspnea (NYHA class I) and TTE revealed that both devices were in position without worsening of AR.

### 3. Discussion

Sinus of Valsalva aneurysm is more prevalent in Asian countries and in men. Congenital SOVA is due to malformation of aortic media and annulus fibrosus of aortic valve. Most frequently, right coronary sinus is involved in draining into right ventricle or right atrium. Thin-walled aneurysms typically have one or more points of rupture at its apex.

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