

# Rupture of Aortic Sinus Aneurysm Caused by Trauma

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## Case Report

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# Abstract

**Background:** Sinus of Valsalva aneurysm is just an uncommon cardiac anomaly, a congenital or acquired cardiac defect that is present in roughly 0.09% of the general population. With an incidence of less than 1% of opening heart surgery cases.

**Case Presentation:** A sinus of Valsalva aneurysm is just an uncommon cardiac anomaly. The aneurysm usually ruptures into the cardiac cavity. The most frequent complication of SVA is rupture into the right atrium or right ventricle. We reviewed 2 cases of rupturing sinus aortic aneurysm.

**Conclusion:** Echocardiography examination needs to monitor the diameter of the aortic sinus, aortic root and aortic valve, especially in the army.

## Background

Aneurysms of the sinuses of Valsalva are defined as dilatation of the aortic root region between the aortic annulus and the sinotubular junction. They may be congenital, especially secondary to connective tissue disorders or in conjunction with congenital cardiac defects, or acquired such as secondary to infections or trauma[1]. Sinus of Valsalva aneurysm is just an uncommon cardiac anomaly, a congenital or acquired cardiac defect that is present in roughly 0.09% of the general population. With an incidence of less than 1% of opening heart surgery cases. The gold standard treatment for Sinus of Valsalva aneurysm consists of complete replacement of the aortic root and valve[2, 3]. Aortic sinus aneurysm is a rare and usually asymptomatic lesion. Rupture leads to chest tightness and dyspnea, suggesting left or right heart failure. Rupture of Valsalva sinus remains a very rare and deadly complication of Valsalva sinus aneurysm with a high mortality rate. Surgery is the primary treatment[4, 5].

## Case Presentations

### Case 1:

A 40-year-old woman. The car accident caused chest tightness. Echocardiography showed rupture of sinus aortic aneurysm. In the short axis view of the aorta, there was a tubular echo 4.2mm wide and 7.2mm long at the right coronary valve below the septal tricuspid valve. It communicates with the right ventricle. The blood flow signal was chaotic and colorful. The frequency spectrum was biphasic and bidirectional continuous turbulent flow. The blood flow velocity was 4.7 m/s and PG87 mmHg. No ventricular septal defect was found. Severe aortic regurgitation. Ultrasonographic impression: ruptured right coronary sinus aneurysm to the right ventricle was examined. The above viewpoint was confirmed by operation and aortic valve repair was performed (Fig. 1).

### Case 2:

A 62-year-old woman, also car accident. Along with the cardiac cycle, membranous oval echo was found in the right atrium and right ventricle, with the size of 21x20 mm. It was linked to the noncoronoid valve, and its internal blood flow was colorful, which had been ruptured. The operation confirmed that the aortic sinus aneurysm noncoronoid valve ruptured to the right heart system (Fig. 2).

## Conclusions

Aortic sinus aneurysm often does not have symptoms and sign. Rupture of an aortic sinus aneurysm and permeableness part of ventricular septal defect are difficult to distinguish, and often complicated with ventricular septal defect, trauma and other factors. Ventricular septal defect may be present in approximately 50%-60% of patients with Valsalva sinus aneurysm [6]. The blood flow of ventricular septal defect is systolic blood flow. The blood flow of ruptured aneurysm is continuous.

Aneurysm of the sinus of Valsalva is a rare congenital cardiac anomaly. It forms an outpouring that progresses like a windsock, and it may rupture producing aortic regurgitation, cardiac tamponade, congestive heart failure, conduction abnormalities, and stroke [7]. Which has been potential for spontaneous rupture into other cardiac chambers or the pericardial space. A ruptured SVA is placed under a very poor prognosis. The development of a shunt between the sinus of Valsalva and right-sided cardiac chambers results in a continuous murmur on examination [8]. Rupture is a catastrophic complication with high mortality without urgent surgical intervention [9].

Study [10], surgical intervention is the main treatment for a ruptured congenital sinus of Valsalva aneurysm (SVA). The SVAs originated from the right coronary sinus (79.7%), the non-coronary sinus (19.6%) and the left coronary sinus (0.7%) but ruptured into the right ventricle (58.4%) and the right atrium (41.3%). The most commonly associated deformities were a ventricular septal defect (46.3%), aortic valve regurgitation (33.2%) and tricuspid regurgitation (20.3%).

Sinus of Valsalva aneurysm results from dilation of an aortic sinus, can be life-threatening if it ruptures. Sudden aneurysm rupture can trigger rapidly progressive heart failure. Ruptured sinus of Valsalva aneurysm repair and valve replacement are usually required for treatment. Transcatheter closure has emerged as an effective alternative to surgical management. Transcatheter closure of ruptured sinus of Valsalva aneurysm is a safe and effective strategy and associated with a good long-term outcome. [11, 12, 13, 14]

A formal echocardiographic approach in a general intensive care unit requires a 24-hour availability of an expert in echocardiography, who could not be easily found [15]. In the real world, it does. Attention is usually focussed on organ rupture in traffic accidents. Unexplained dyspnea, chest tightness, palpitations, do echocardiography are useful.

Systematic review and meta-analysis suggests that e-FAST (extended focused abdominal sonography for trauma) is used as a bedside tool for ruling in pneumothorax, pericardial effusion, and intra-abdominal

free fluid in the trauma setting[16].But professional echocardiography is mandatory.Whether eFAST + echo is better.

Aortic root sizes are influenced by hypertensive status, age and gender[17].In primary hospitals, the diameter of aortic sinus, aortic root and aortic valve were not measured by Echocardiography.Echocardiography examination needs to monitor the diameter of the aortic sinus, aortic root and aortic valve,especially in the army.

There are at most two doctors in the first-class hospital on the battlefield.The training of military health personnel must include ultrasound examination. It is recommended that they can use not only the abdominal probe, but also the cardiac probe to examine the abdomen.If necessary, ultrasound-guided pericardial effusion puncture can also be used.Portable equipment can detect the key points of the wounded in time.

## **Declarations**

### **Ethical Approval and Consent to participate**

The research conforms to the provisions of the Declaration of Helsinki in 1995 (as revised in Brazil 2013).All participants gave informed consent for the research, and that their anonymity was preserved.Deleted the patient's name, gender and age in the picture.

### **Consent for publication**

All authors approve the content of the manuscript.

### **Availability of data and materials**

All authors approve.

### **Competing interests**

The authors declare that they have no competing interests.

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### **Authors' contributions**

Fenglin Jiang participated in the writing of the article.Ling Xu provided the clinical data and participated in the writing of the article. Both authors read and approved the final manuscript.

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## Figures

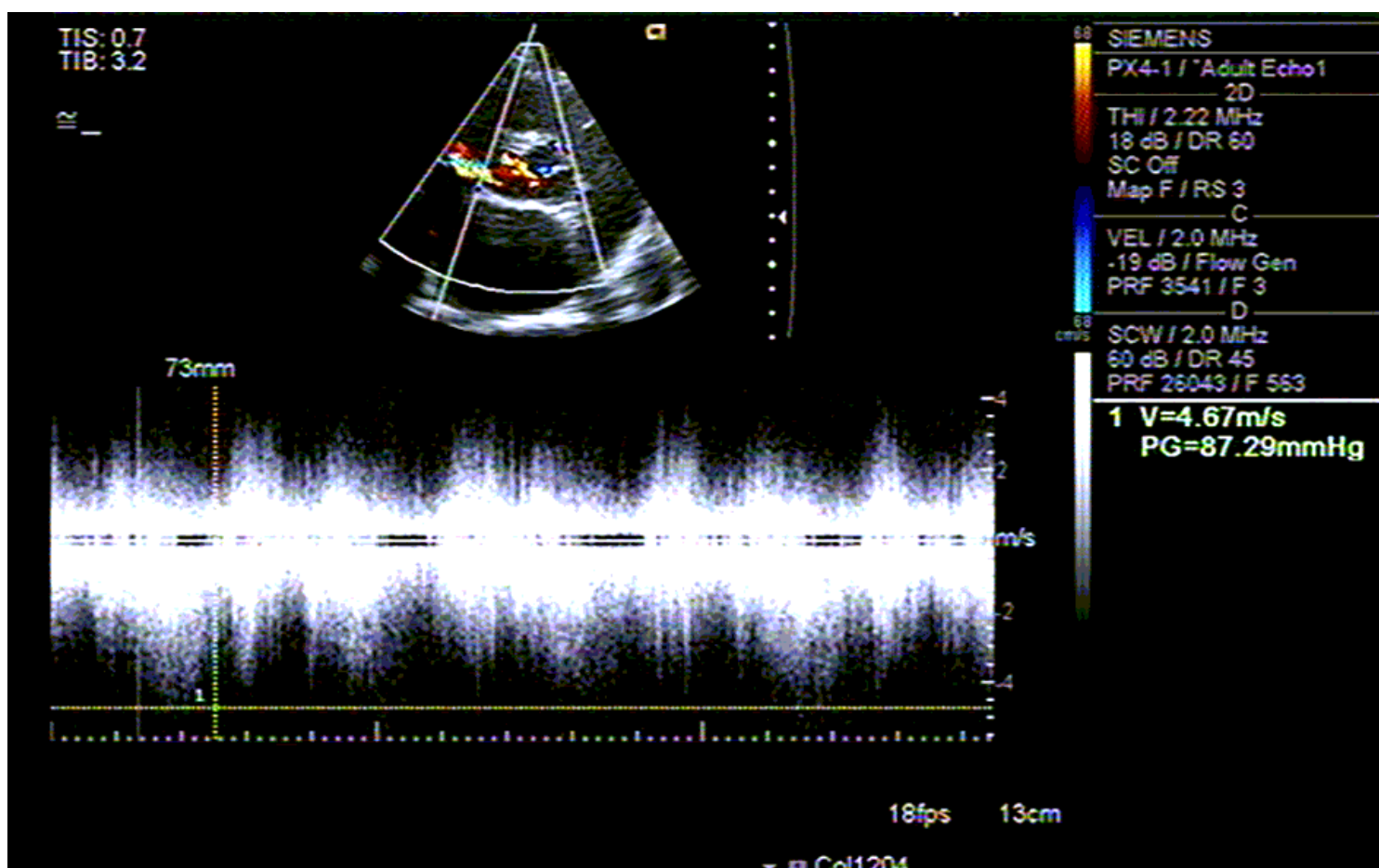
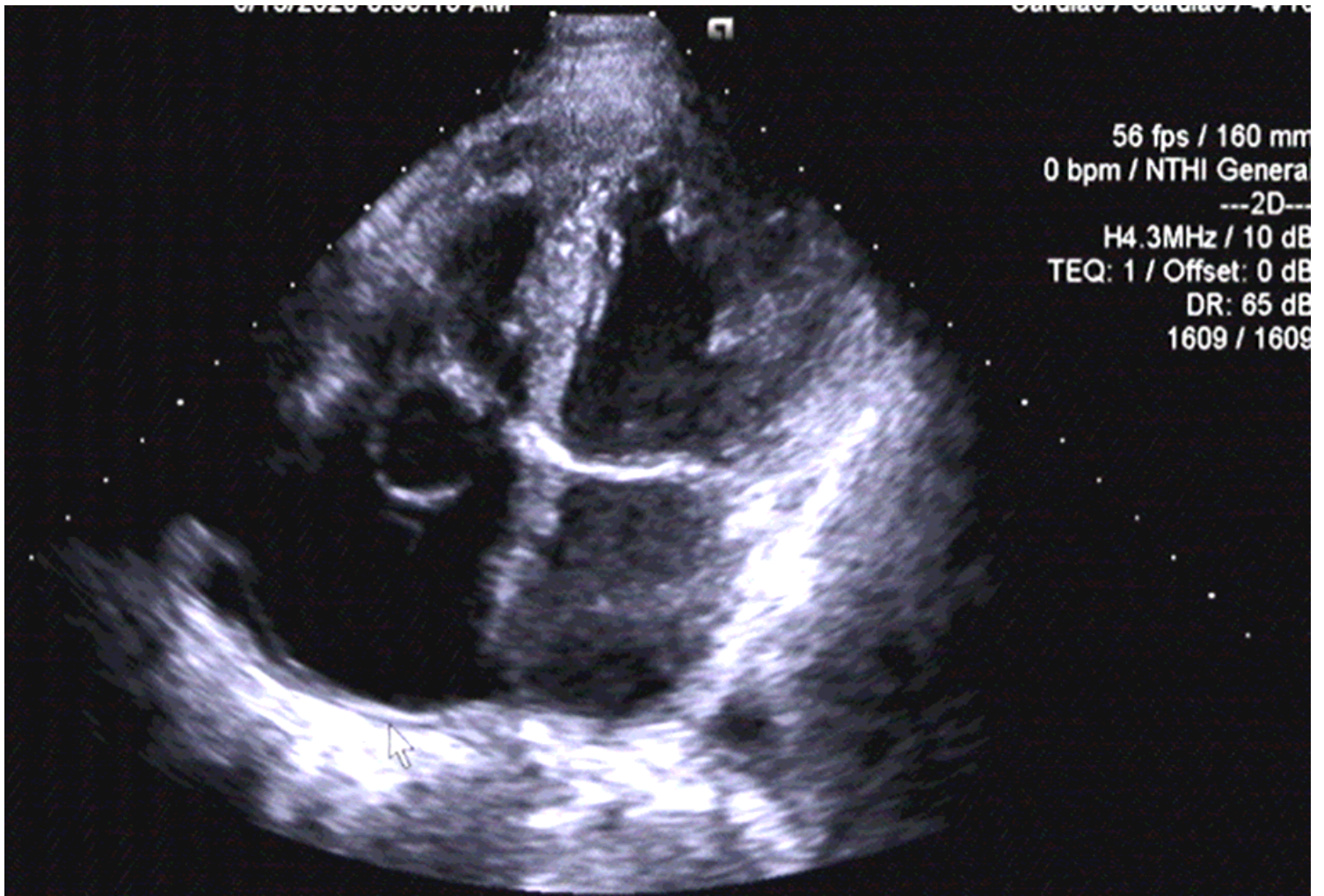


Figure 1

There was continuous blood flow signal from left to right in the periventricular septum.



**Figure 2**

Membranous echo can be seen in the right atrium, which is the echo of ruptured aortic sinus aneurysm.