

Mystery of a Dilated Aortic Root: Sinus of Valsalva Aneurysm: Case Report

Kenny Ng, Jessica Kelman, Gemma Reemst, Monique Doran, Logan Kanagaratnam, Matthew Eather

INTRODUCTION

Sinus of Valsalva aneurysm (SOVA) is a rare acquired or congenital condition affecting 0.09% of the population. SOVA disproportionately affects males of Asian descent and most commonly occurs in the right coronary sinus followed by the non-coronary sinus. Patients may present asymptomatic; however, symptoms may include chest pain, syncope, and heart failure. Associated lesions include ventricular septal defects, right ventricular outflow tract obstruction, aortic regurgitation and myocardial ischaemia or infarction due to compression of the coronary ostia.

PROCEDURAL FINDINGS

An asymptomatic 69-year-old female with history of Takotsubo cardiomyopathy, depression and absent seizures was referred for a transthoracic echocardiogram (TTE). The TTE showed an incidental finding of a dilated aortic root (5.8cm) in the parasternal long axis (**Image 1**) with a sinus of Valsalva aneurysm occurring at the non-coronary sinus in the parasternal short axis view. (**Image 2**)

Her physical examination was unremarkable with no features consistent with a connective tissue disorder. A subsequent CT aortogram showed aortic root (mid sinus to mid sinus) calibre of 5.3cm (**Image 3**)

CLINICAL COURSE

The patient was offered a cardiothoracic surgical consultation where the calculation of aortic height index (aortic calibre + height) returned a value of 3.2, placing her at a 12% yearly risk of aortic catastrophe. After detailed discussion about the benefits and risks of surgery, the patient agreed to have surgical repair. She underwent successful surgery where the aneurysm was excluded with a Dacron patch and had tissue aortic valve replacement. She did not have any complications and made good recovery.

LEARNING POINTS

- TTE is the key first-line imaging modality for the assessment of SOVAs. However, other imaging modalities, such as TEE, CT, and CMRI, may prove useful in offering additional diagnostic insights. (**Figure 1**)
- Presentation symptoms can be non-specific, and we need to ensure we think outside the box for patients who present with SOVA symptoms.
- Although sensitivity, specificity and accuracy for diagnosing SOVAs on TTE were high (93.9%, 99.9%, 99.8% respectively). Majority of missed SOVAs diagnoses were a result of small SOVAs extending into the right ventricle.
- The most prevalent cardiac defect in association with SOVA is a VSD, with RVOT obstruction also being common. It is crucial to consider the various aortic sinuses affected by SOVAs and anticipate the potential growth or rupture path into adjacent cardiac chambers and structures. (**Figure 2**)

- The most prevalent cardiac defect in association with SOVA is a VSD, with RVOT obstruction also being common. It is crucial to consider the various aortic sinuses affected by SOVAs and anticipate the potential growth or rupture path into adjacent cardiac chambers and structures. (**Figure 2**)
- Ruptured SOVAs require urgent surgical intervention with >90% mortality at 1 year if left untreated. The management of unruptured SOVAs remains controversial; however, for patients with symptoms, rapidly expanding unruptured SOVAs, and unruptured SOVAs containing intraluminal thrombi, surgery should be considered.
- Surgical repair remains the preferred treatment for unruptured SOVA to prevent complications like rupture or thrombus formation. Surgical outcomes are generally positive, with a favourable prognosis and minimal recurrence.

CONCLUSION

SOVA is a rare cardiac lesion that may progress to further complications including significant aortic regurgitation and rupture. Accurate and regular surveillance by TTE will assist in risk stratification and timing of surgical intervention.

References

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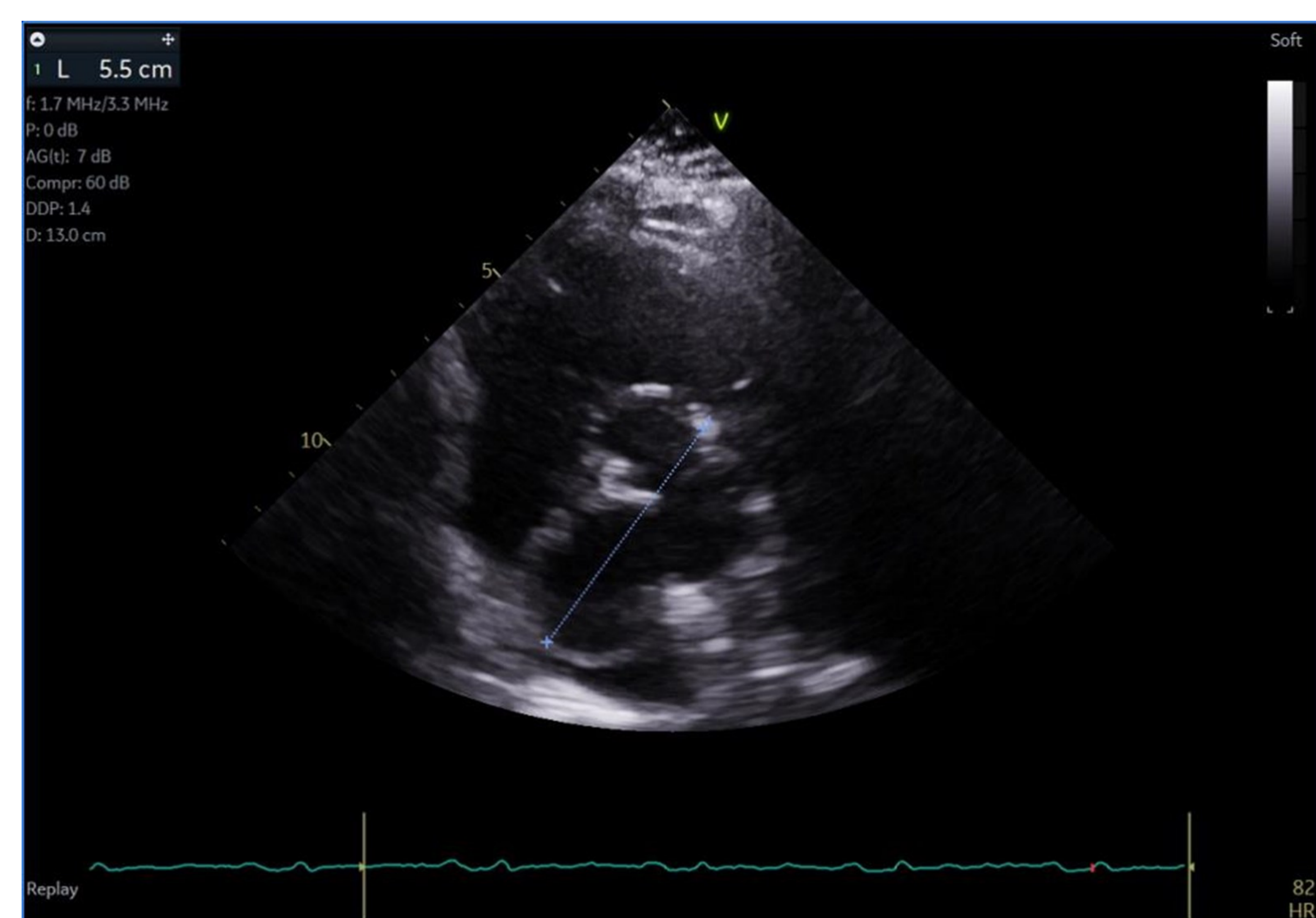


Image 1: Parasternal Long Axis Showing the aortic root dimension of 5.8cm

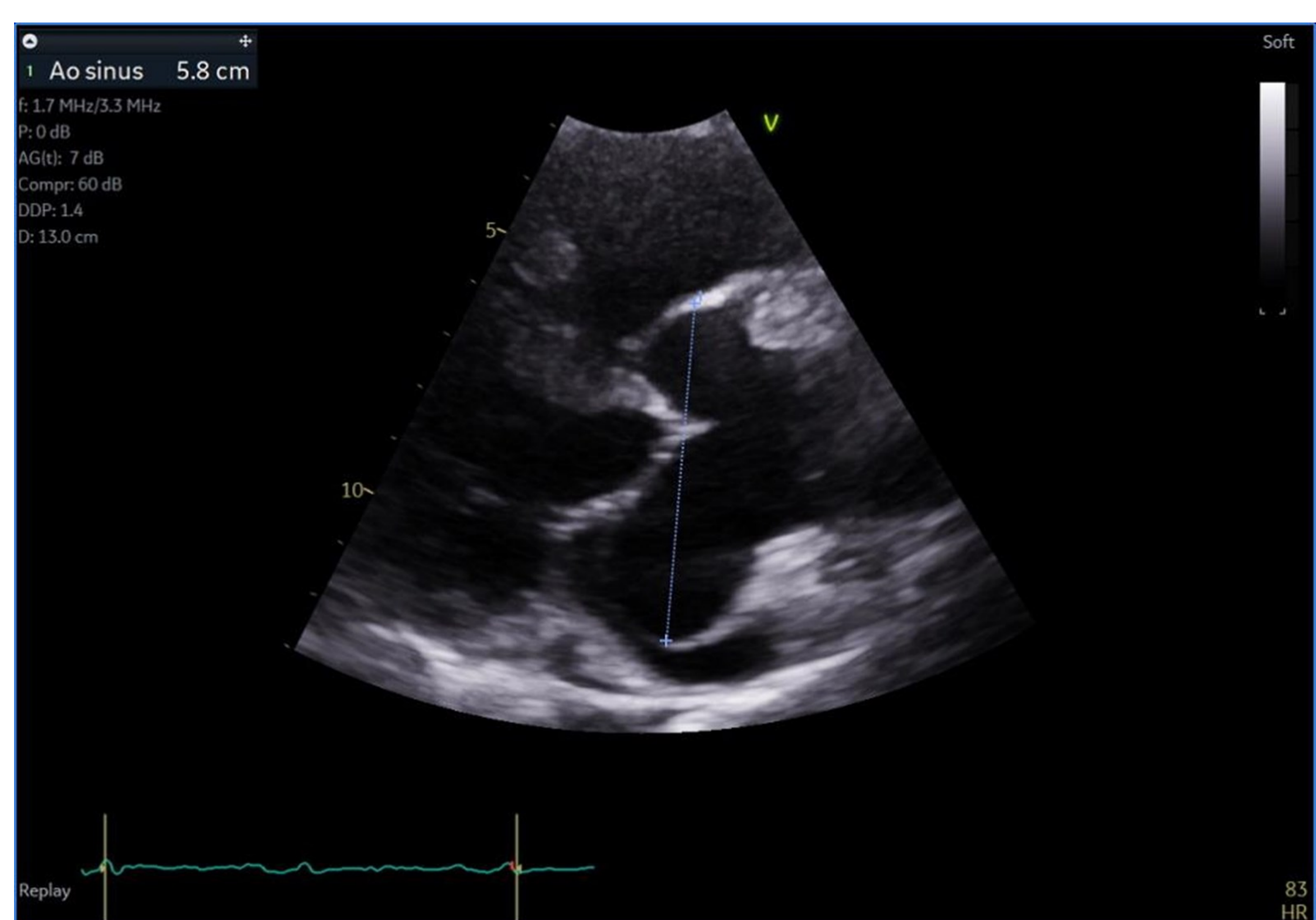


Image 2: Parasternal short Axis showing SOVA affecting the non-coronary sinus

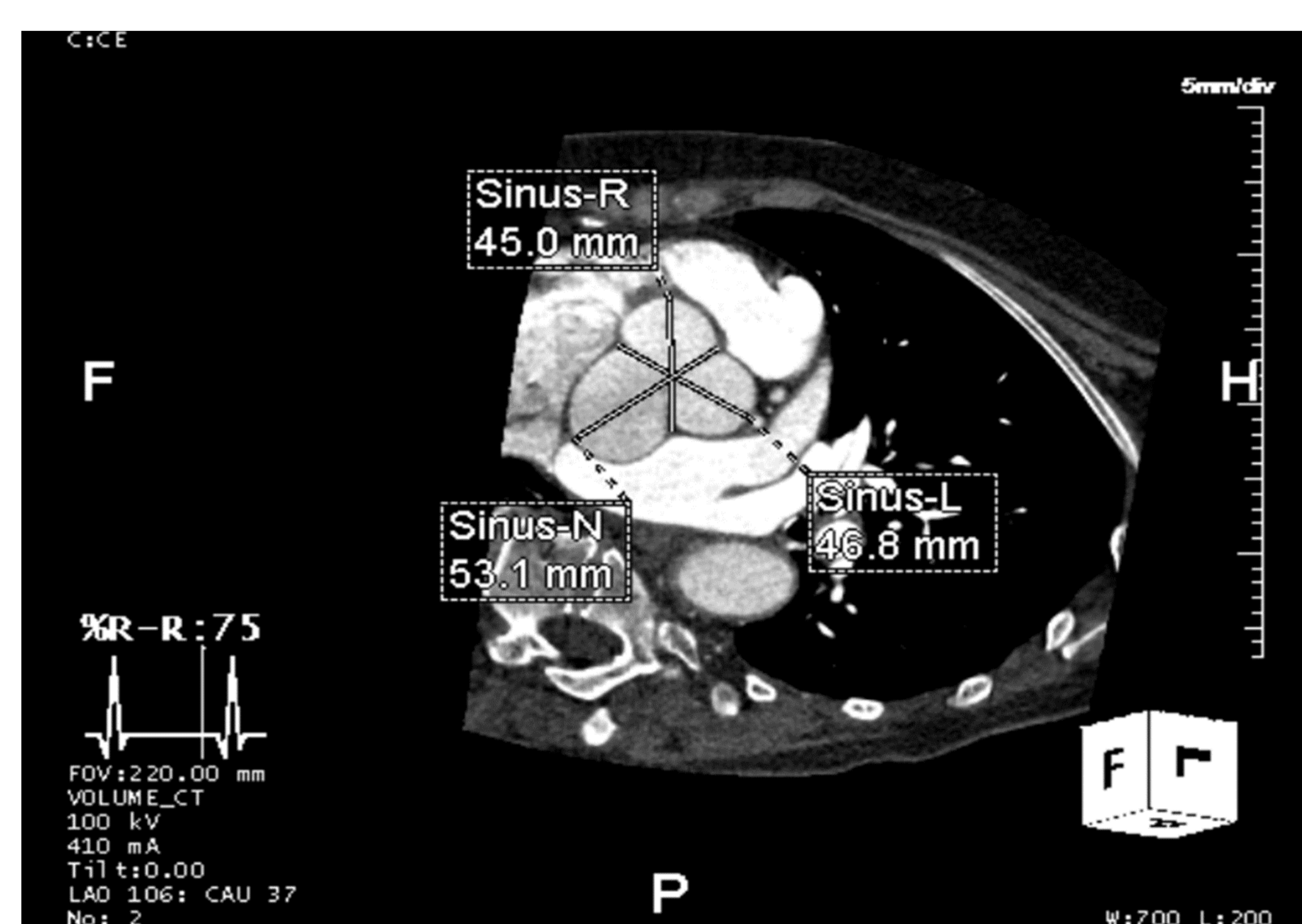


Image 3: CT Aortogram of the aortic root (mid sinus to mid sinus) calibre of 5.3cm

Suspected Sinus of Valsalva Aneurysm

TTE (First line imaging modality)

- Initial Assessment and diagnosis (aortic root dimensions, aortic valve morphology, degree of aortic regurgitation).
- Assessment of associated congenital heart disease
- Assessment of complications of SVA
- Assessment of ventricular function
- Serial monitoring if SVA can be adequately imaged

TEE

- When TTE is not diagnostic or equivocal for SVA
- Assessment of SVA morphology and complications (sinus of origin, chamber of rupture)
- Assessment of associated congenital heart disease
- Periprocedural imaging and guidance

MDCT

- Assessment of entire thoracoabdominal aorta
- Assessment of SVA morphology and complications (sinus of origin, chamber of rupture)
- Assessment of cardiac and non-cardiac anatomy prior to interventions (e.g. coronary artery origin and anatomy)
- Serial monitoring of SVA dimensions

CMR

- Assessment of entire thoracoabdominal aorta (particularly when radiation exposure is an issue)
- Functional and quantitative assessment of aortic regurgitation
- Quantification of intracardiac shunt
- Assessment of SVA morphology and complications (sinus of origin, chamber of rupture)
- Serial monitoring of SVA dimensions (particularly when radiation exposure is an issue)

Figure 1: Proposed diagnostic pathway for assessment of SOVAs - Adapted from Xu et al. 2019

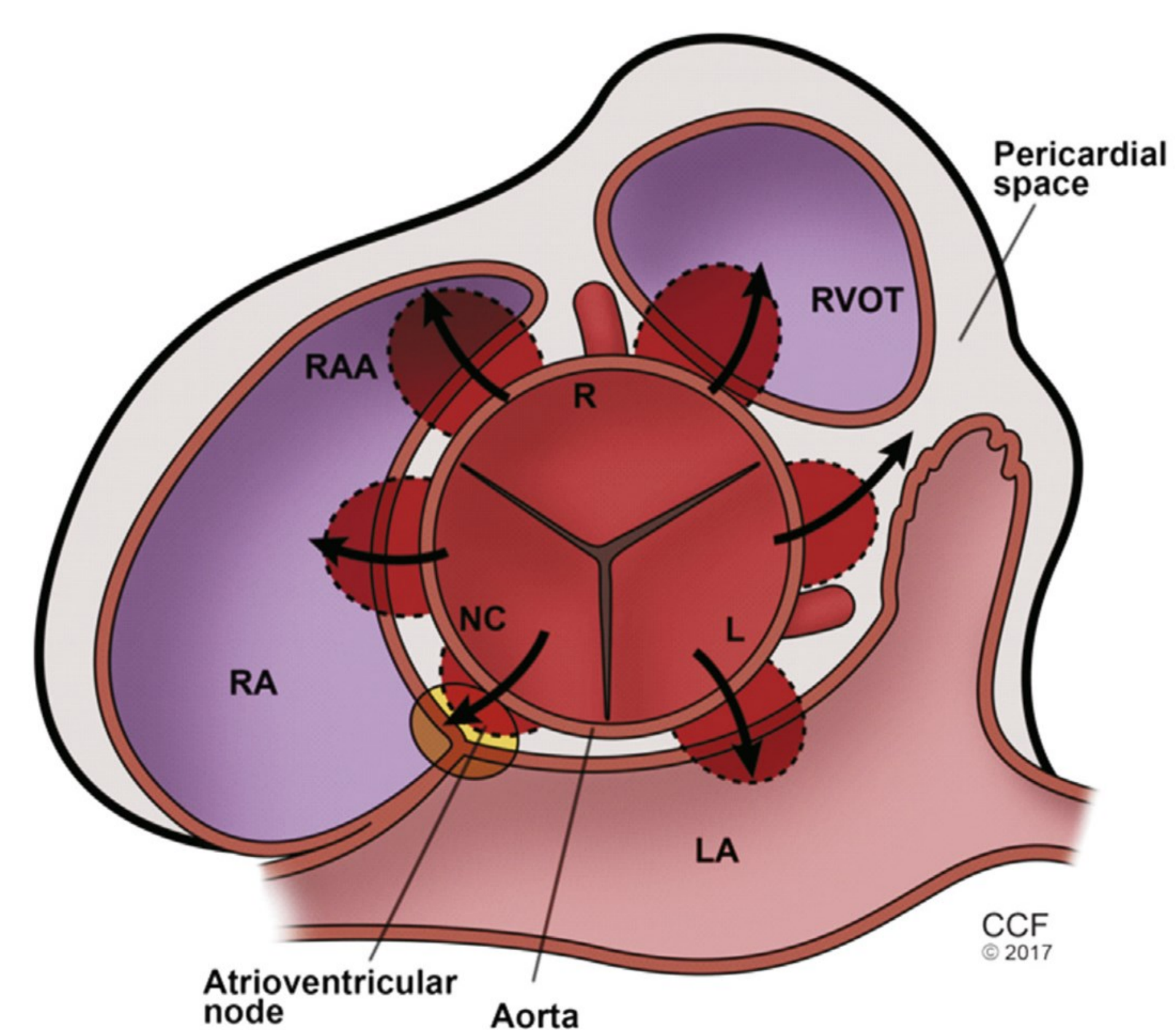


Figure 2: Demonstrating the different aortic sinuses that could be affected by SOVAs and the projected path of growth or rupture into adjacent cardiac chambers and structures - Xu et al. 2019