



**5th Asia Pacific Congenital & Structural Heart  
Intervention Symposium 2014**

10 – 12 October 2014, Hong Kong Convention and Exhibition Centre  
Organizer: Hong Kong Society of Congenital & Structural Heart Disease

# **Transcatheter Atrial Septal Defect Closure with Right Aortic Arch**

Is it really difficult ?

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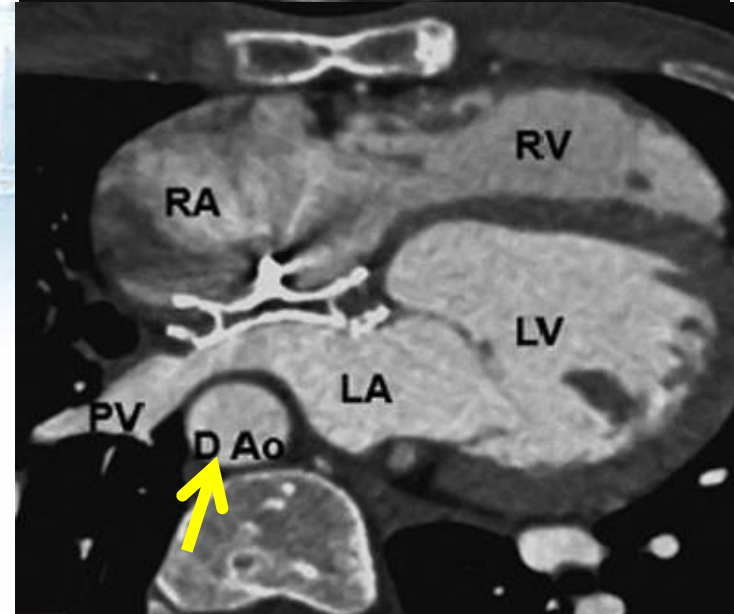
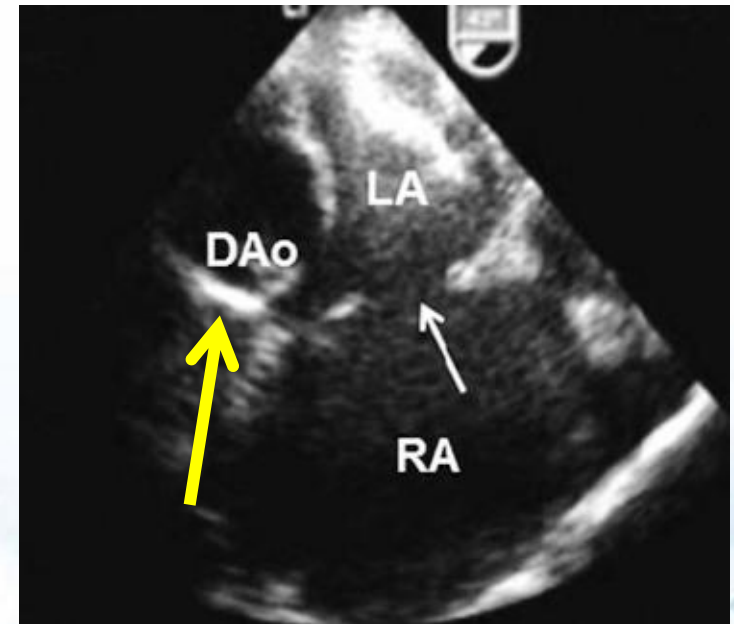
# 【 Background】

Atrial septal defect (ASD) is a common congenital heart defect with left to right shunt, which needs closure by transcatheter method or surgery. On the other hands, right aortic arch (RAA) is usually associated with certain congenital heart defects such as Tetralogy of Fallot, pulmonary atresia with ventricular septal defect, truncus arteriosus and, rarely, with isolated ventricular septal defect. Isolated ASD associated with RAA is very rare.

**There is one recent report which describes technical difficulties encountered during transcatheter ASD closure associated with RAA.**

# 【 *A case from Ann Pediatr Cardiol. 2012* 】

- This is a case of 30 years old male.
- The impingement of right descending aorta in **RAA** caused malposition of the device in the left atrium, which made the deployment of the device very difficult.
- Right upper pulmonary vein technique worked successfully to close the defect with 26mm device.



# 【 Case 】

- 34 years old female
- Mild palpitation on effort
- Pointed out heart murmur when 19 years old, but observed until symptom appeared
- ASD was diagnosed and referred to our hospital for percutaneous ASD closure



# 【Physical exams】

Height 169 cm, BW 55kg

BP 128/92 mmHg, PR 83 bpm, regular

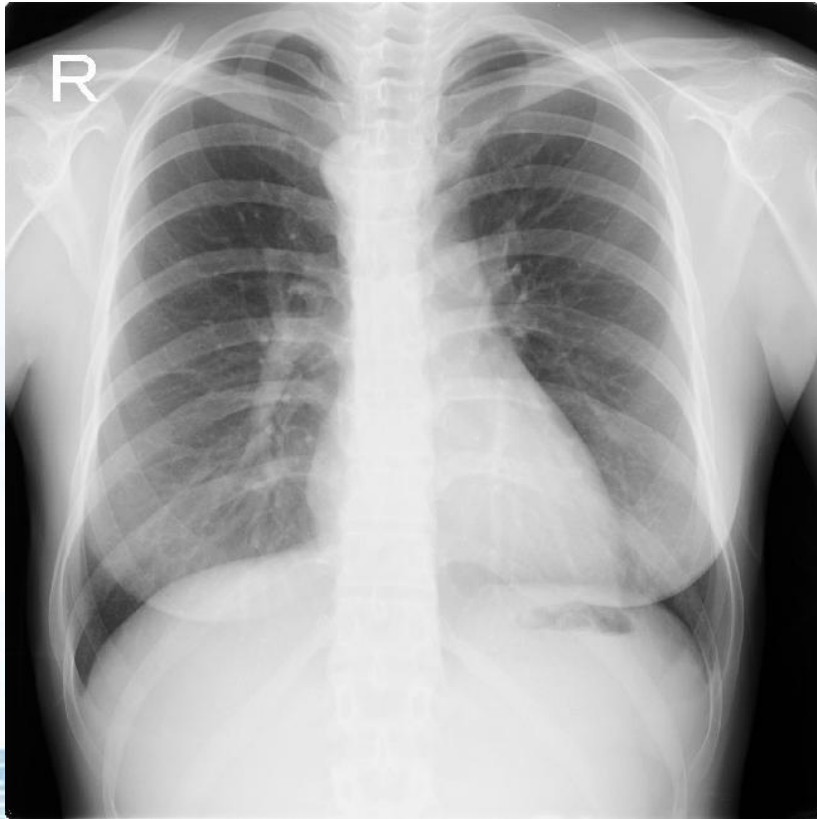
Systolic ejection murmur 1/6 at 2LSB,

Accelerated & split second heart sound,

No leg edema



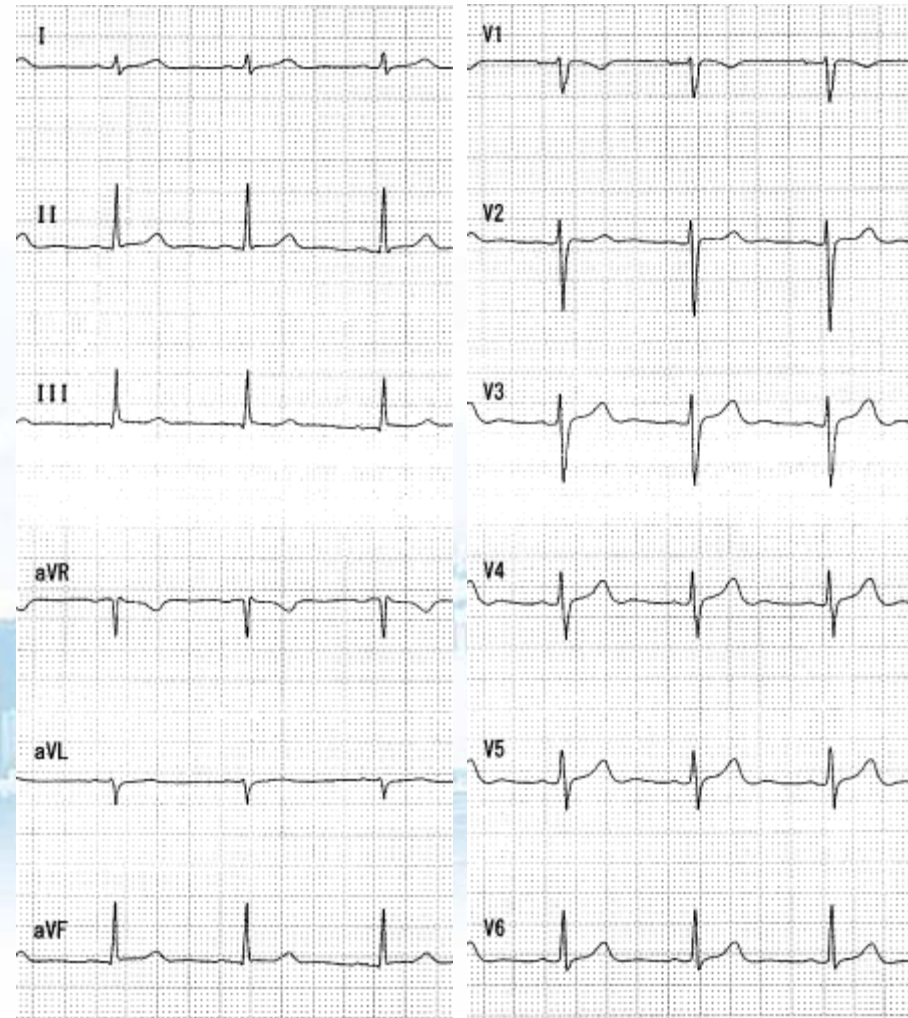
# Chest X-ray



CTR48%

Right aortic arch

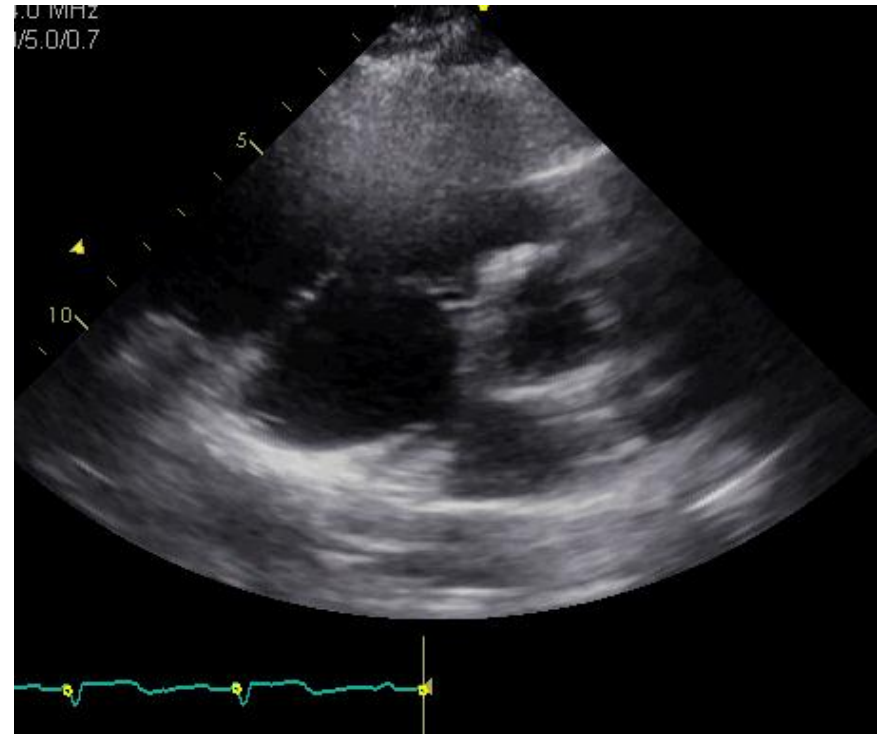
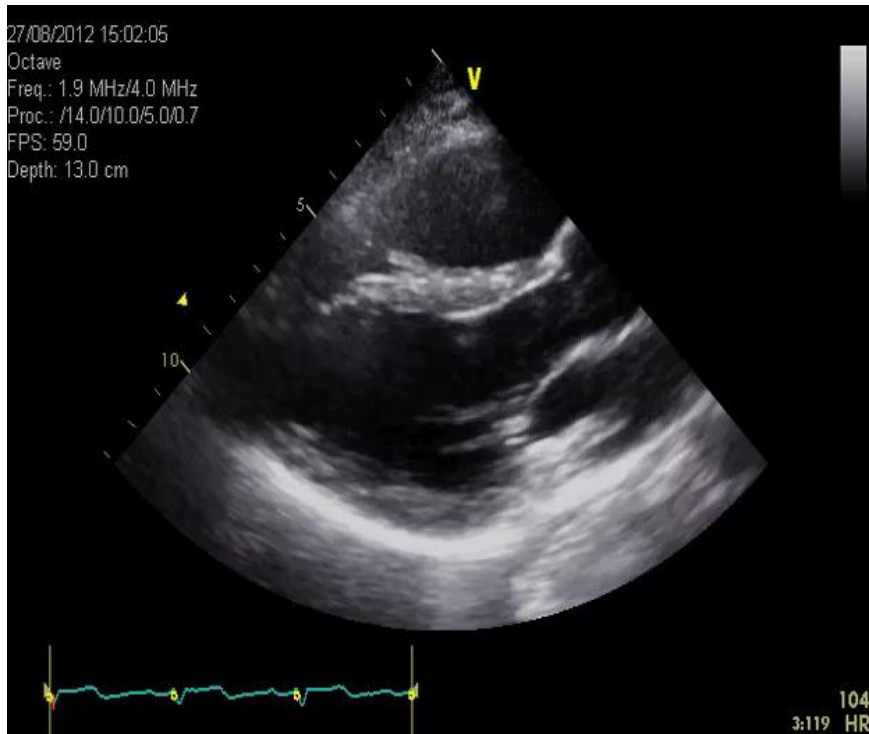
# Electrocardiogram



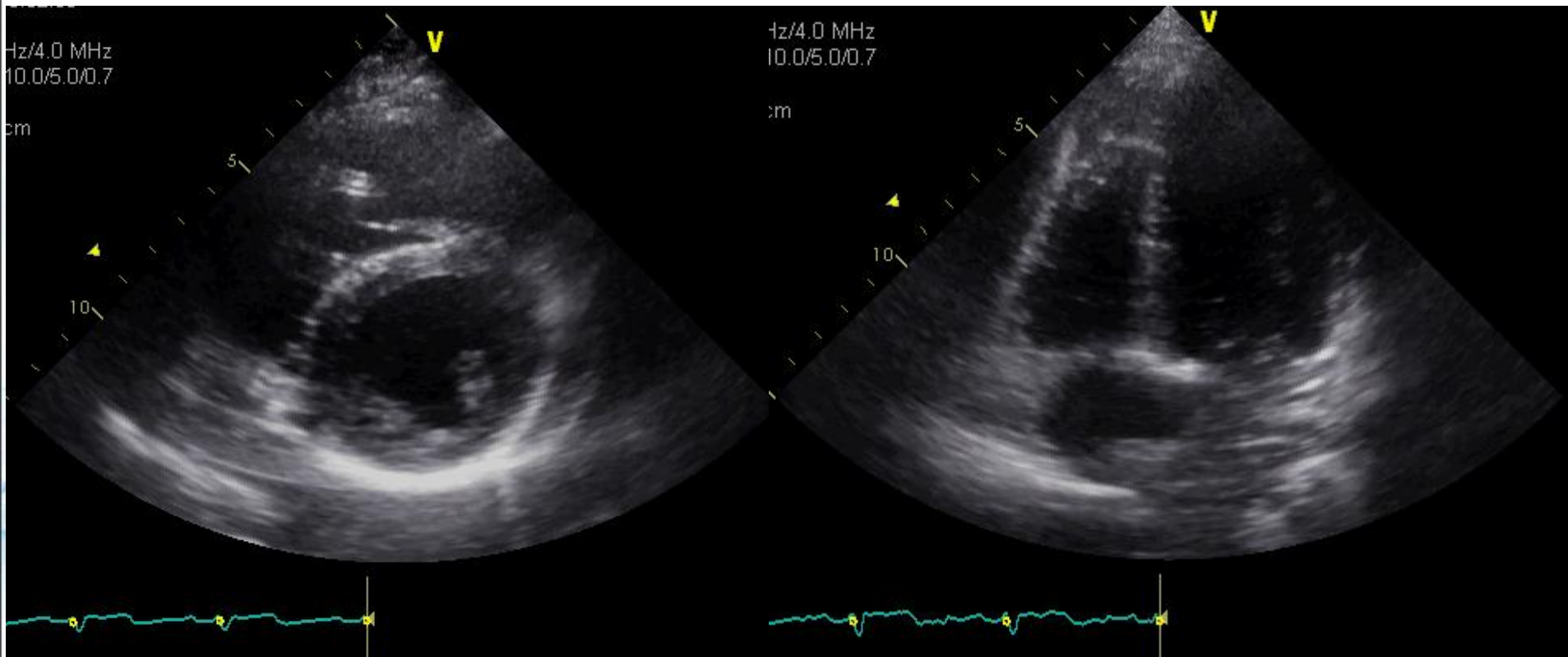
Normal sinus rhythm

# TTE findings 1

LVDd 43, LVDs 28, EF 66%  
LAD 29, IVST 8, PWT 9

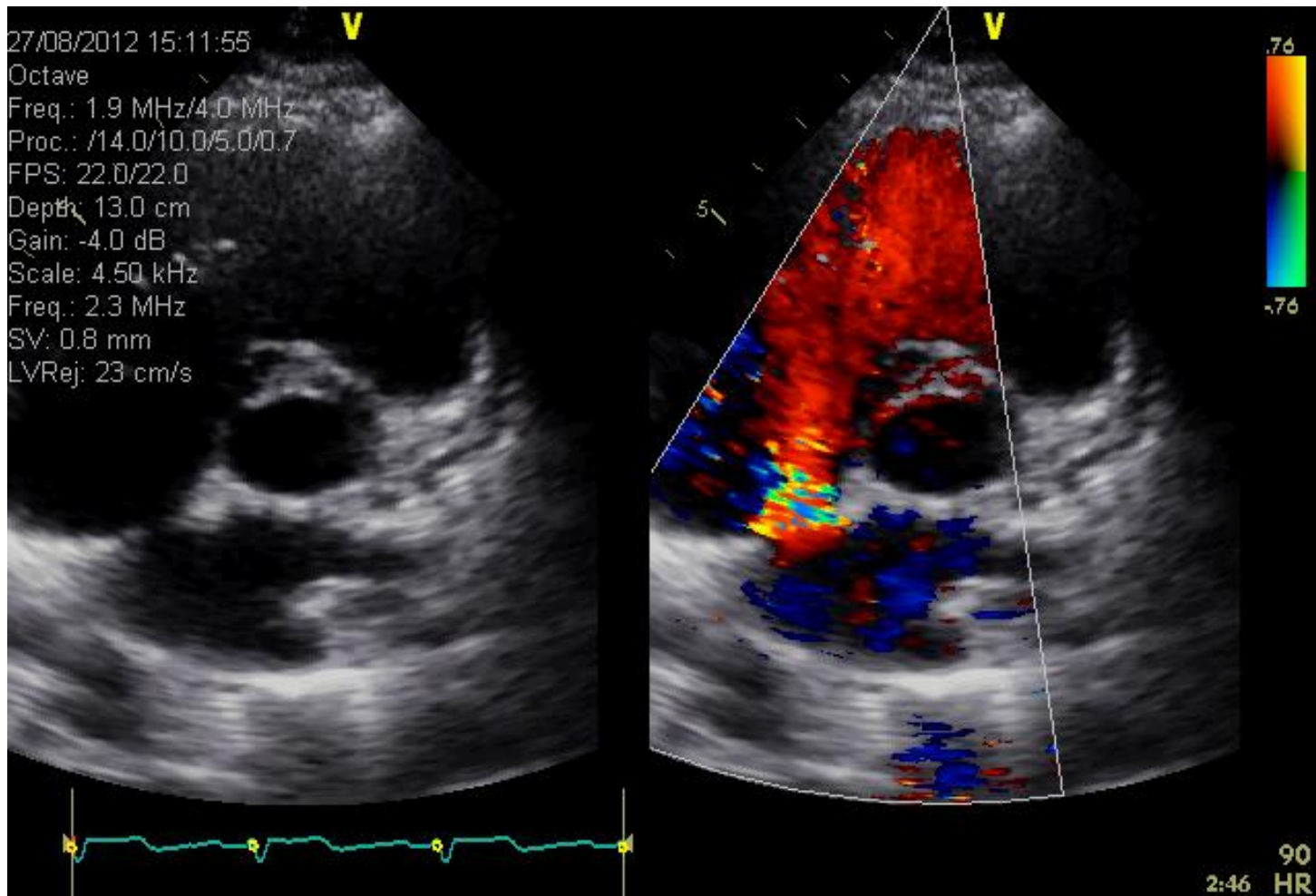


# TTE findings 2



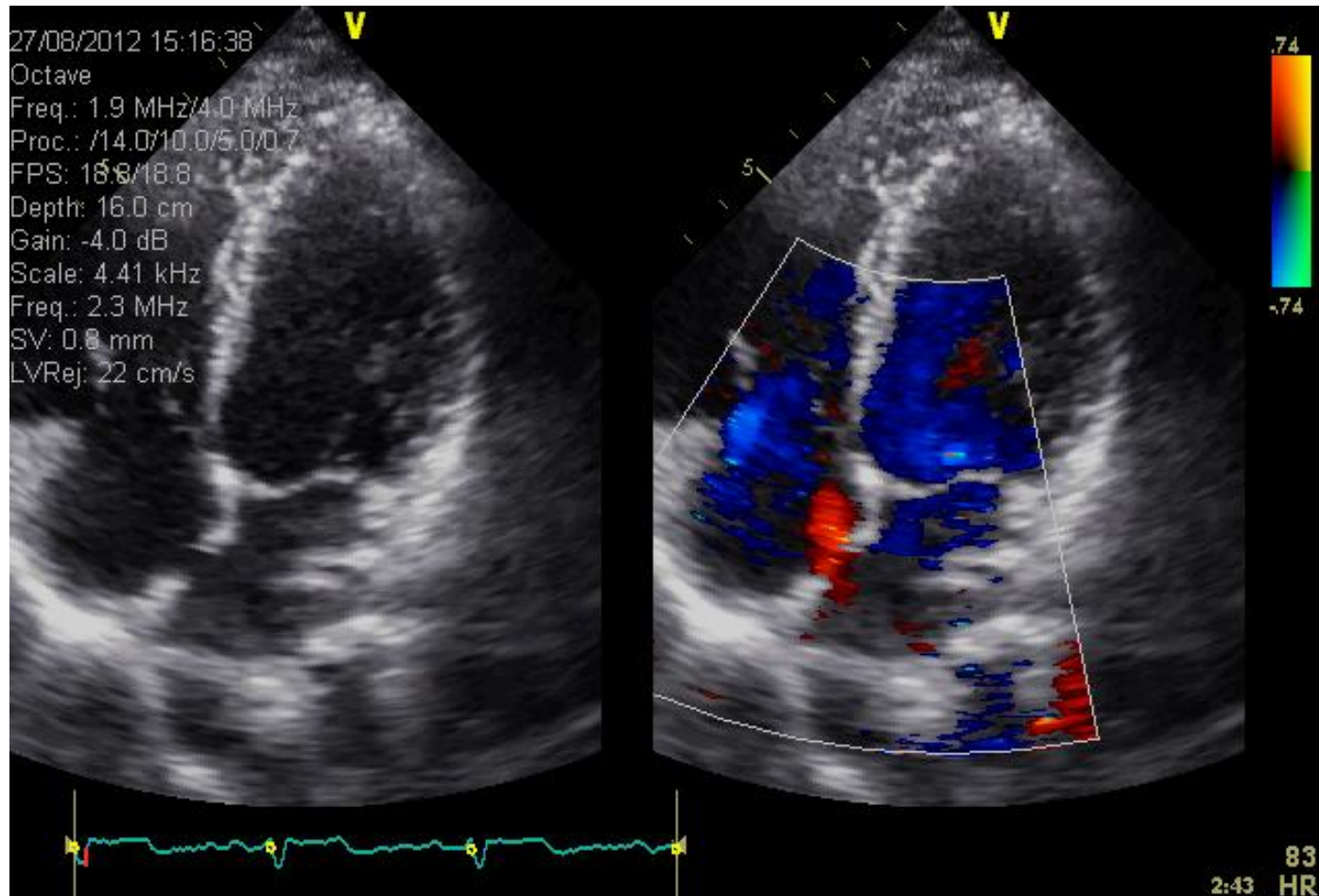


# TTE findings 3

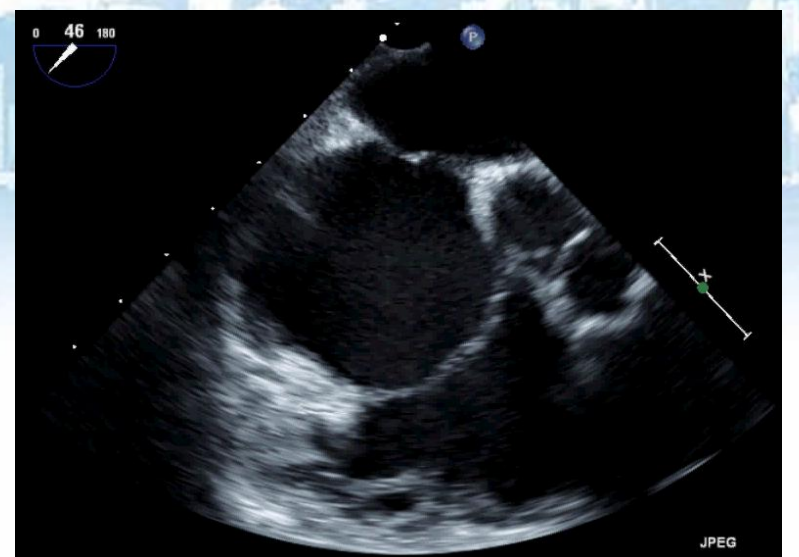
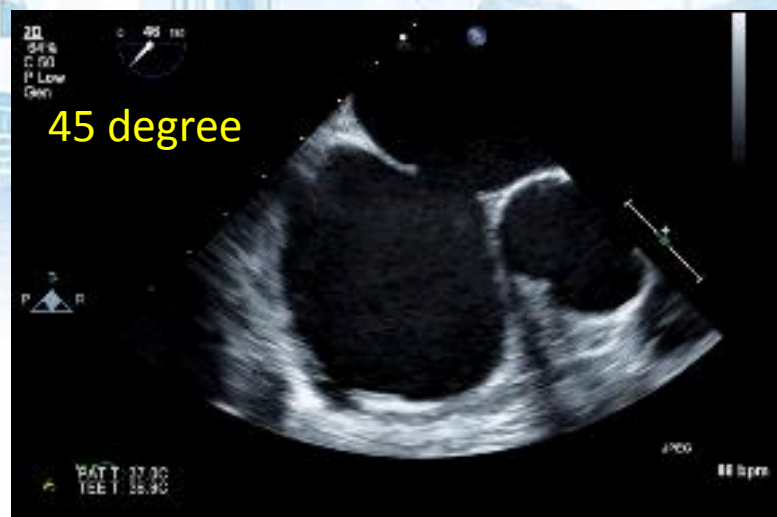
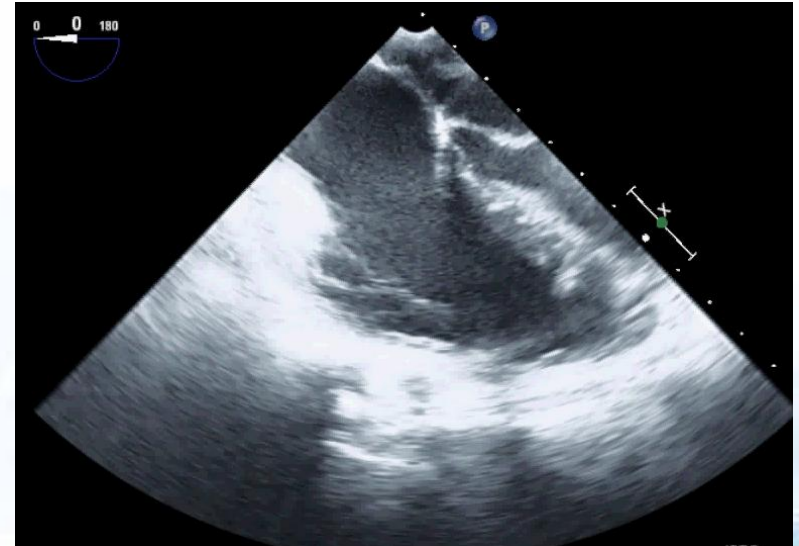


Secundum ASD with L-R shunt

# TTE findings 4

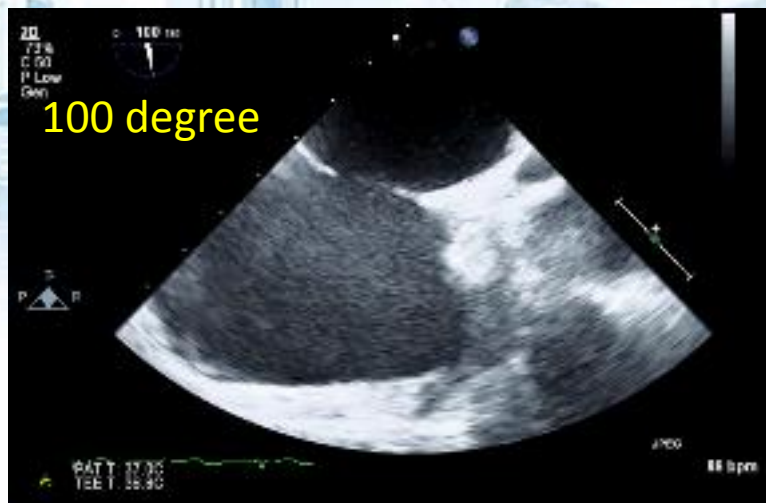
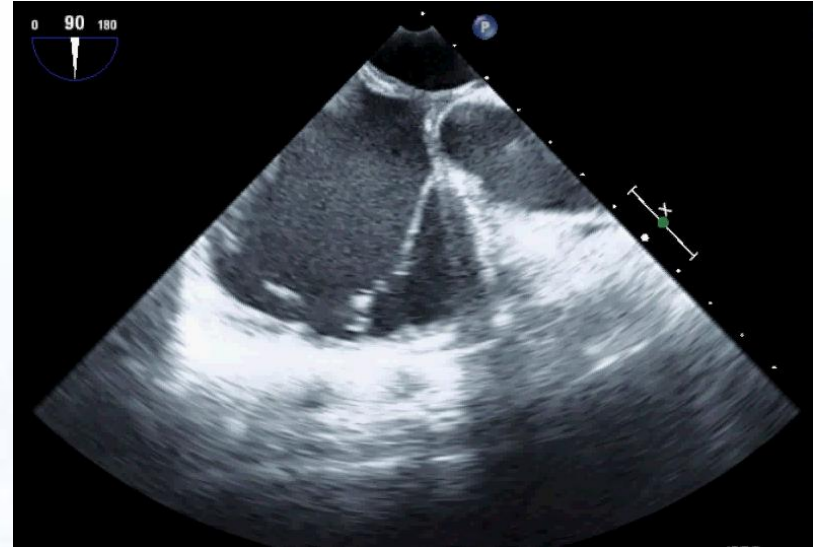
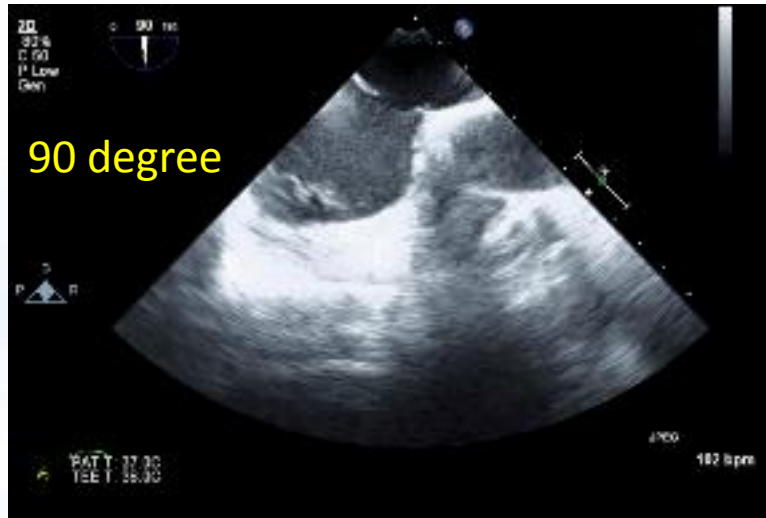


# TEE findings 1

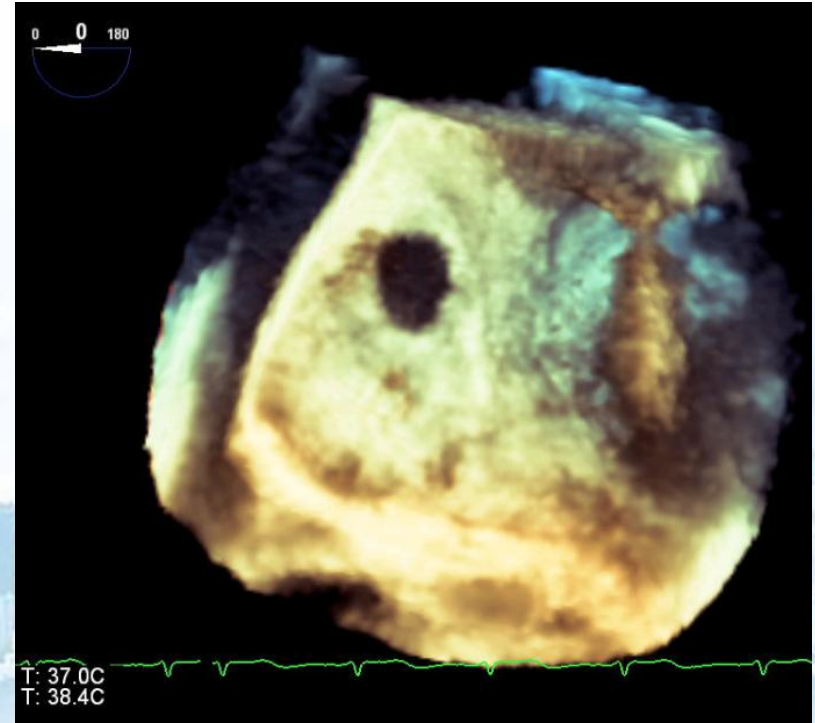
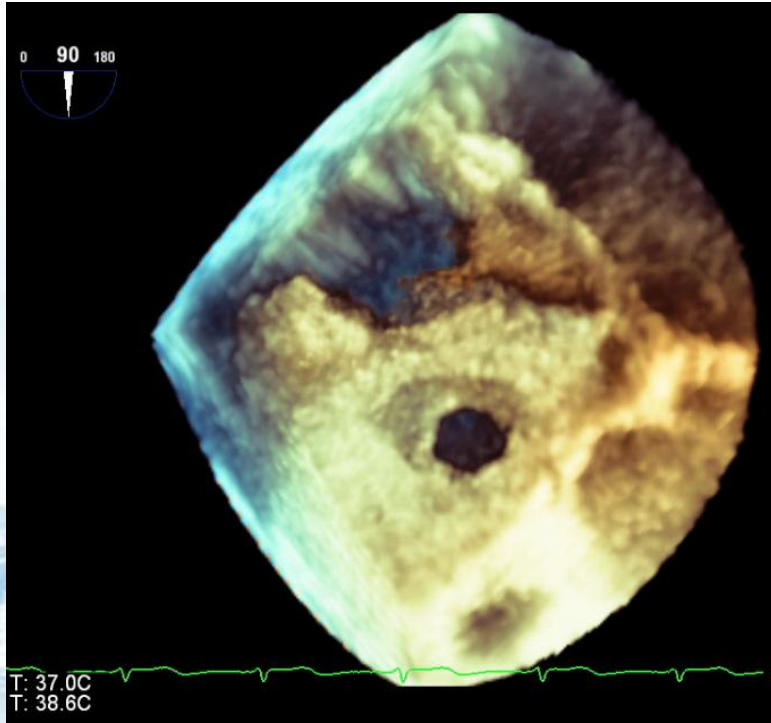


Retroaortic rim is almost deficient

# TEE findings 2



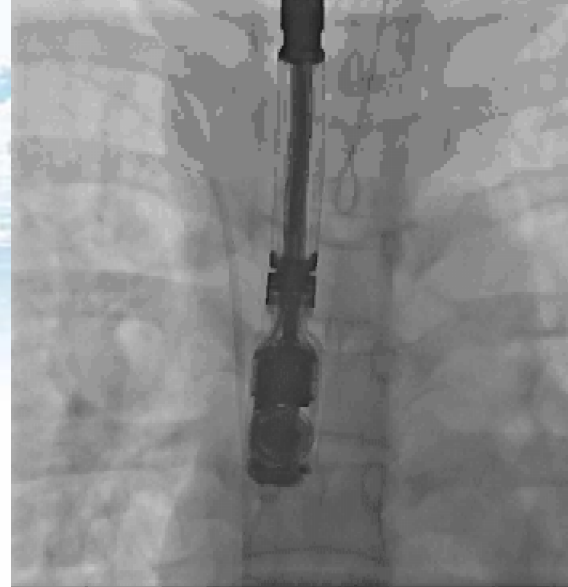
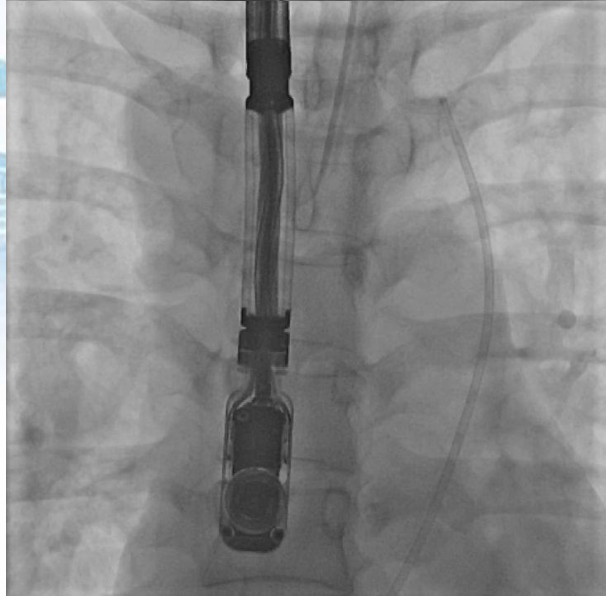
# TEE findings 3



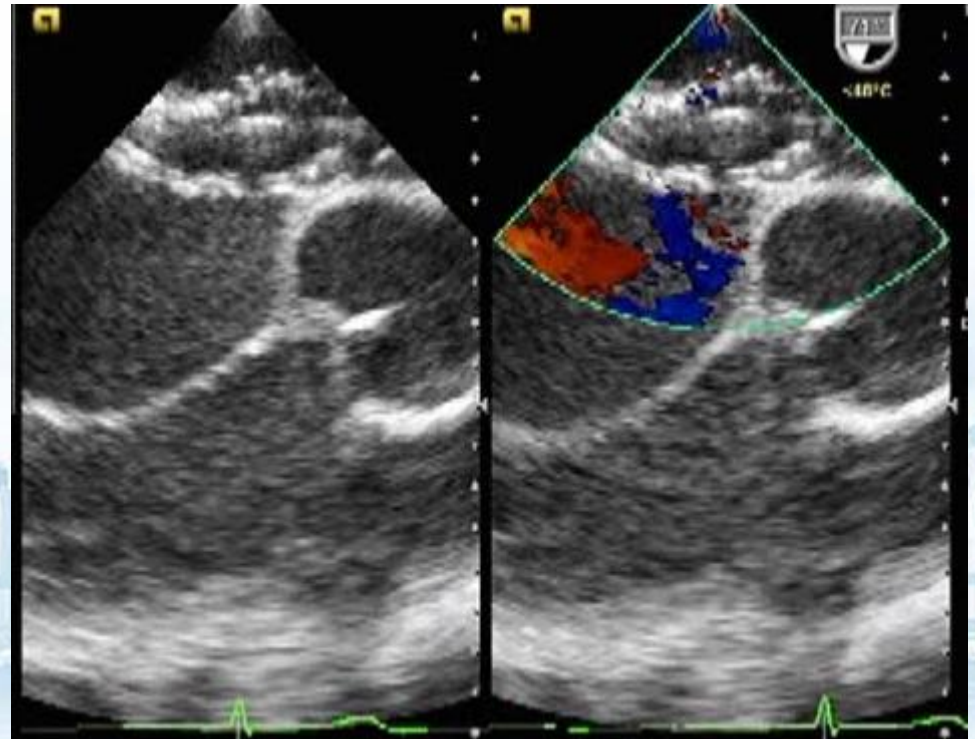
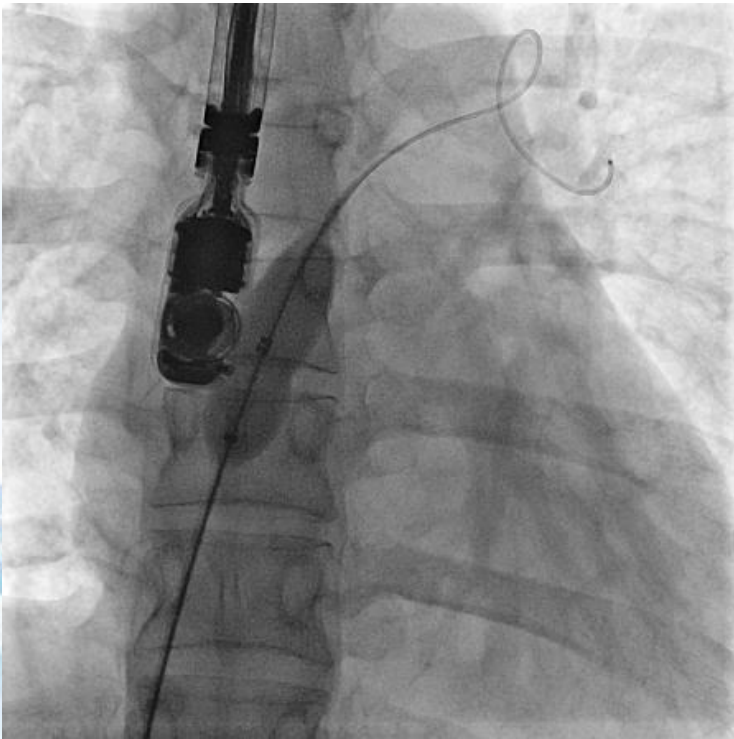
Defect was 10x9mm  
It seems easy to deploy the device.

# Implantation

We found PLSVC

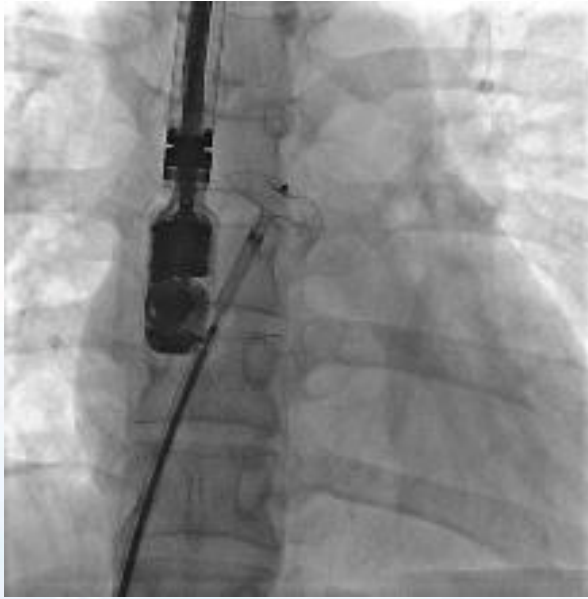


# Balloon sizing

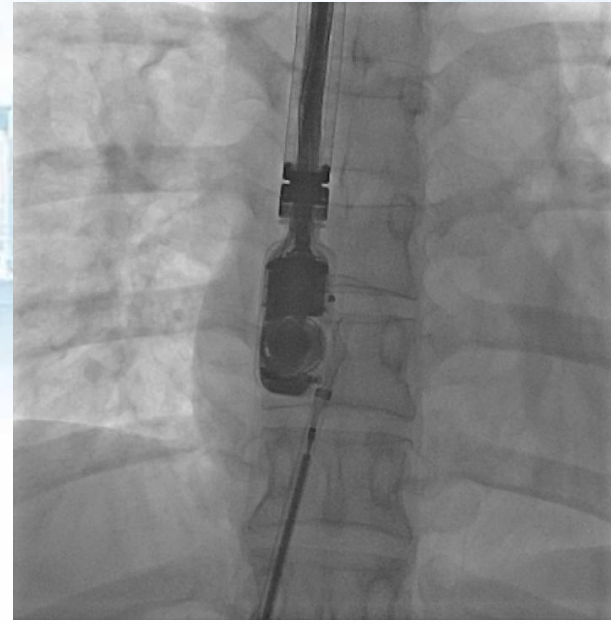
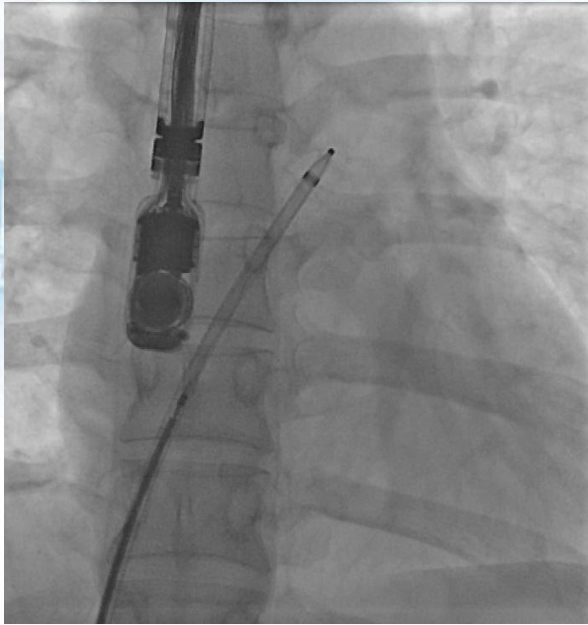
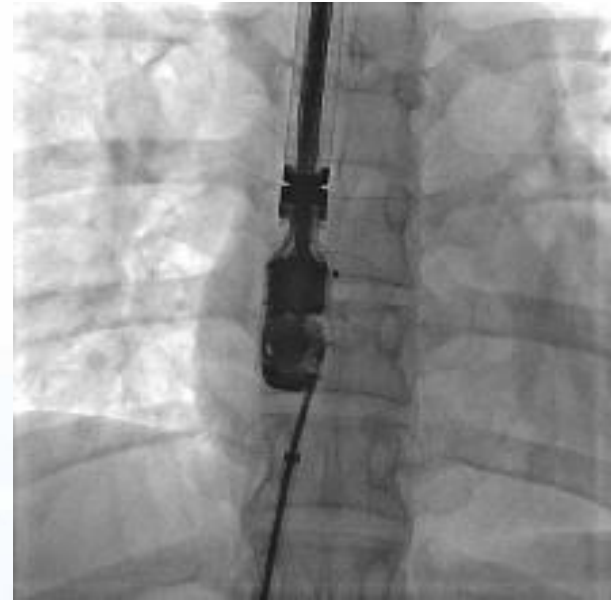


Diameter: 11-13mm

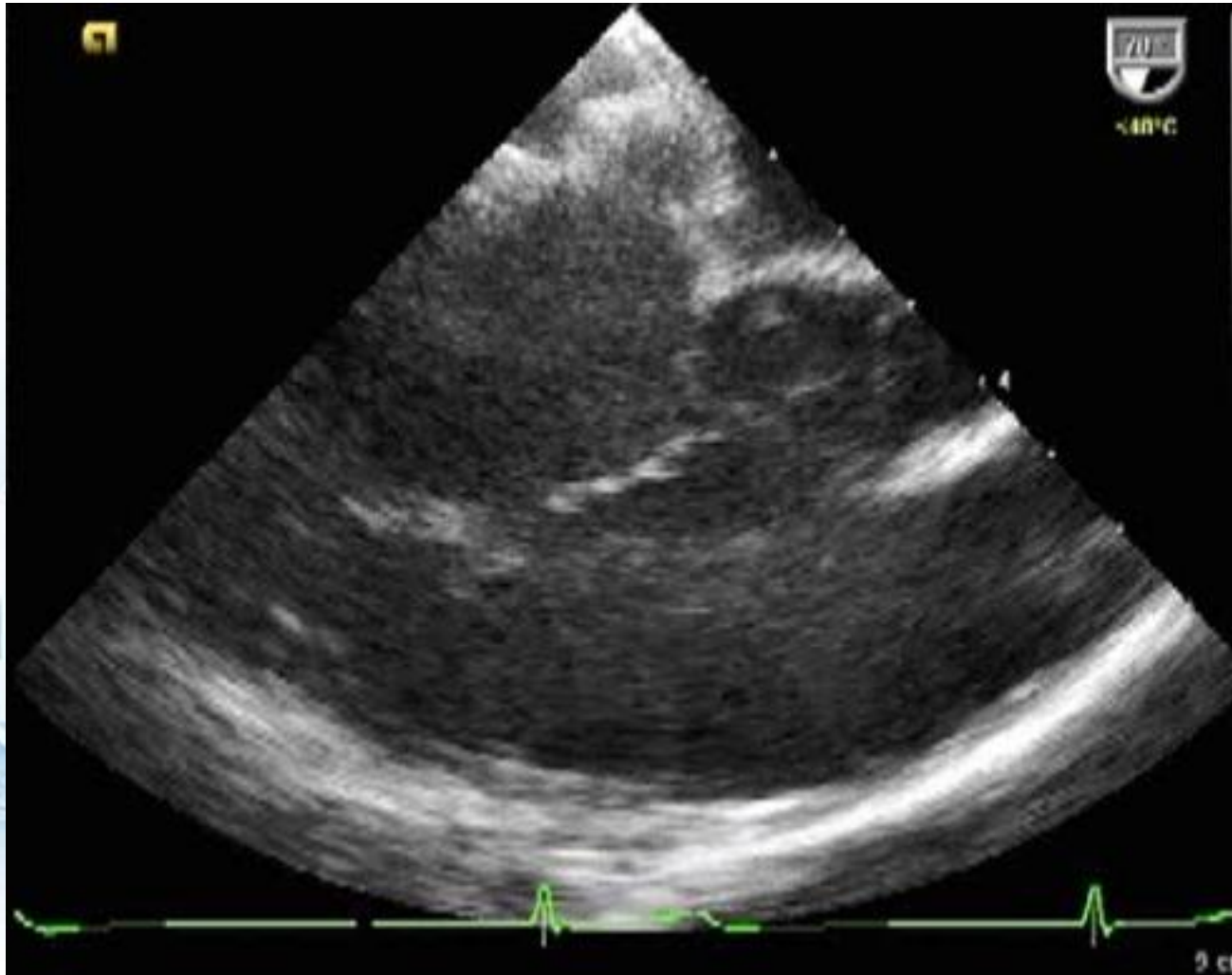
left disc open



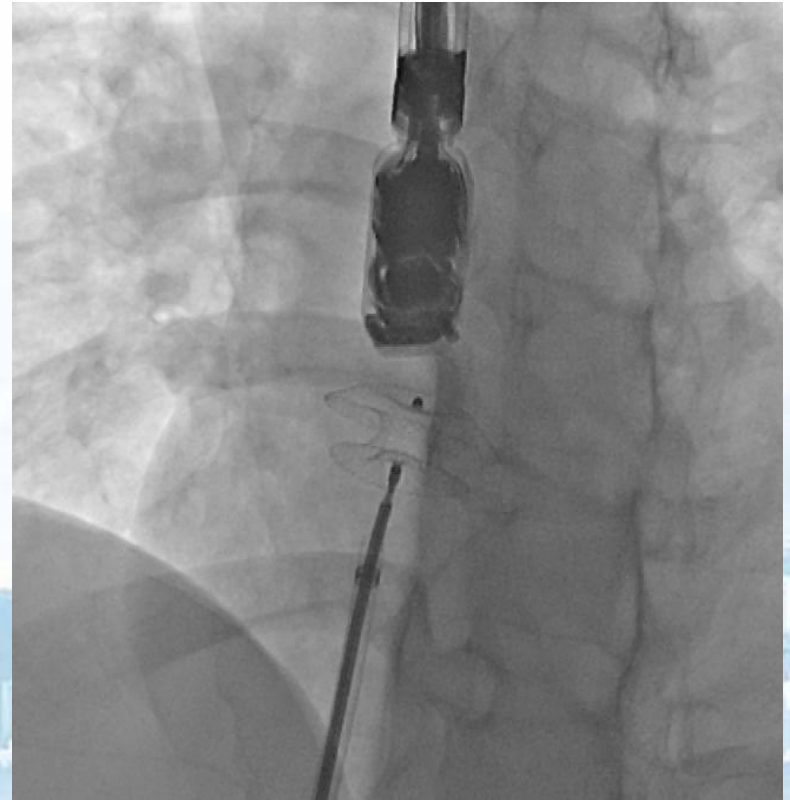
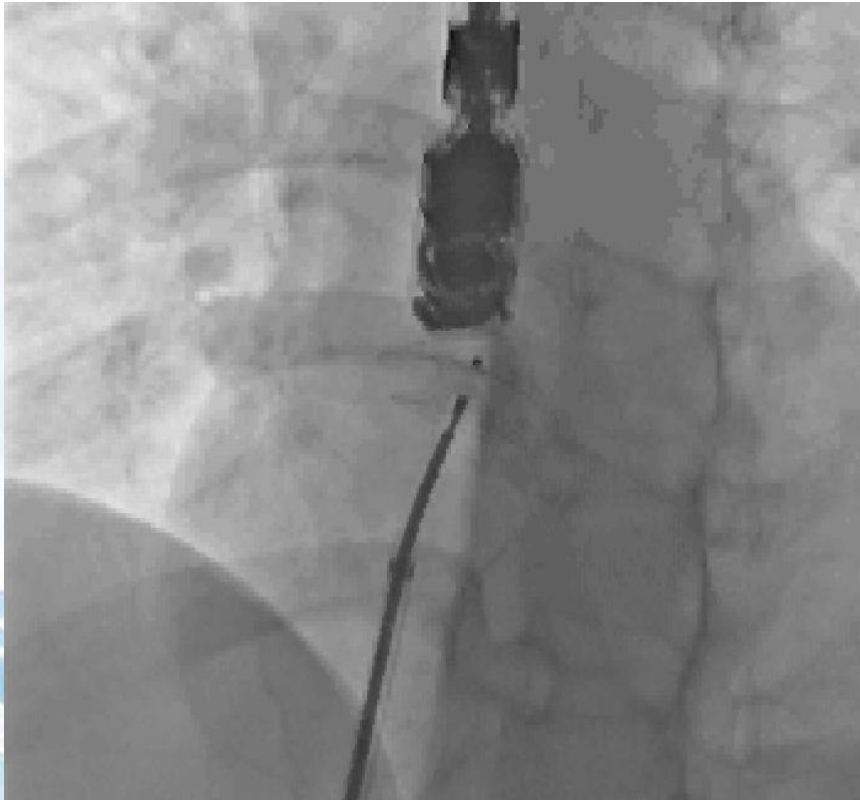
right disc open



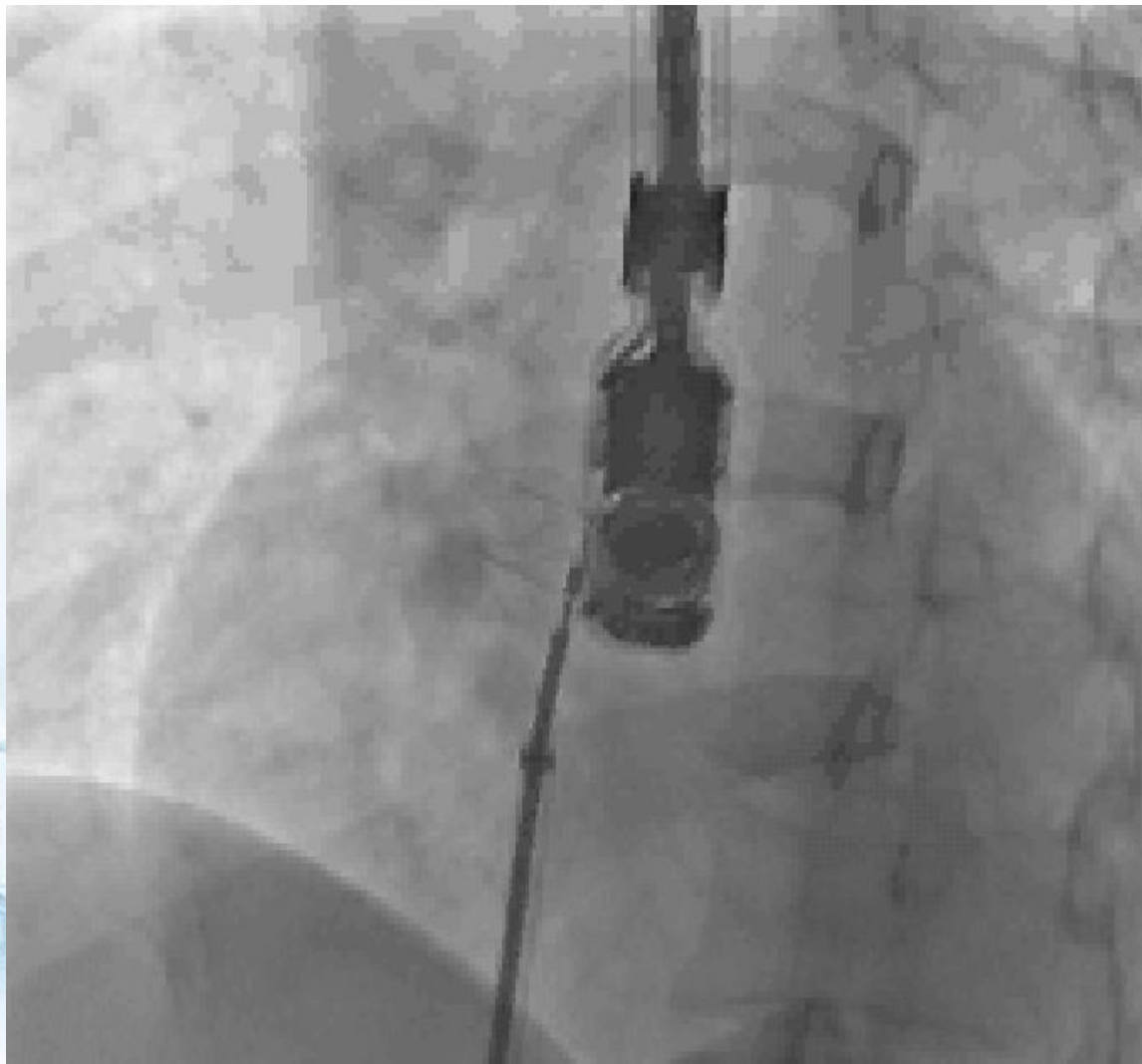




Deployment



No problem for Minnesota wiggle

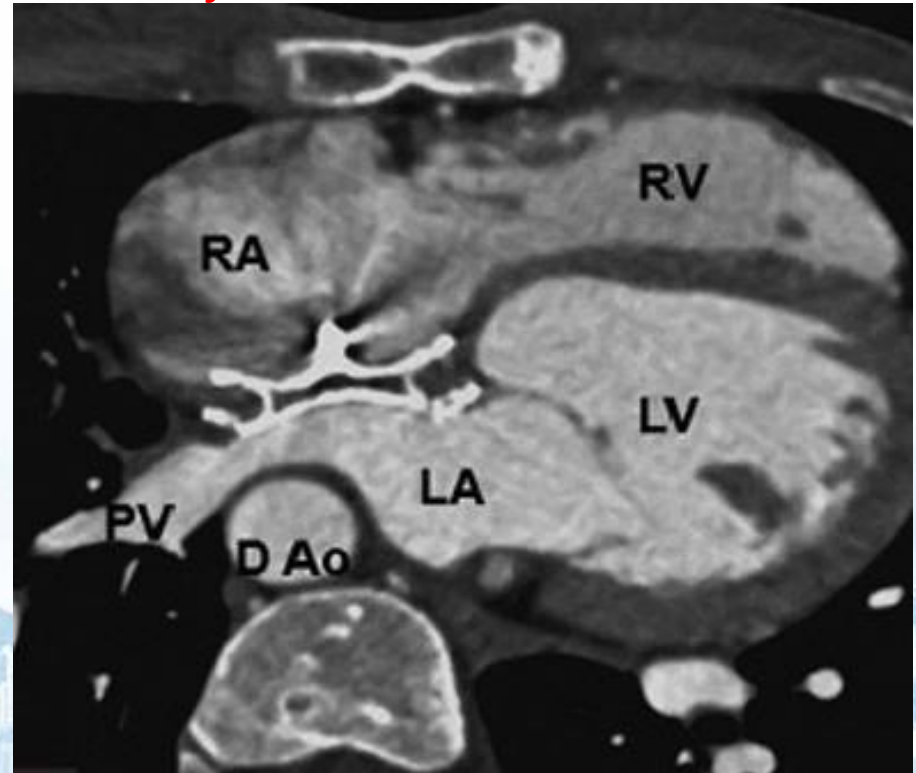


**Why our case was so easier ?**

Device size: 12mm ASO

# Clue #1 is CT scan

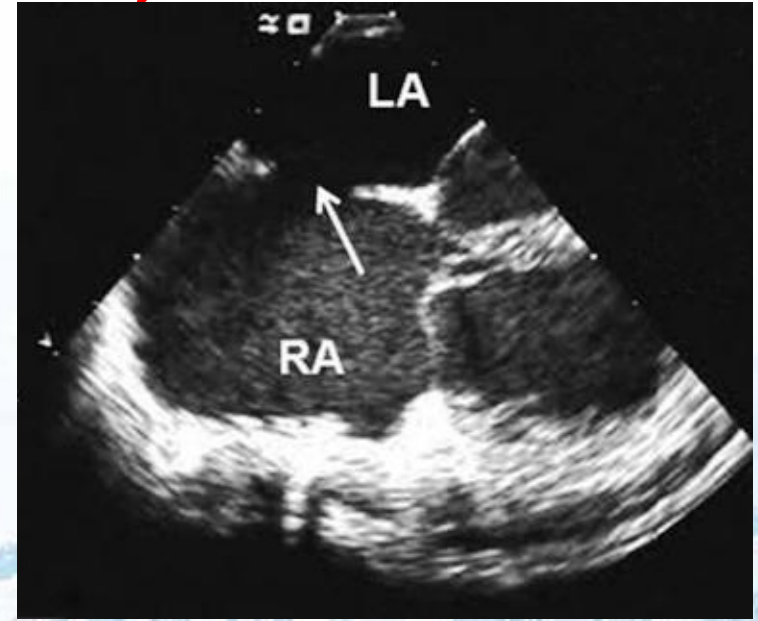
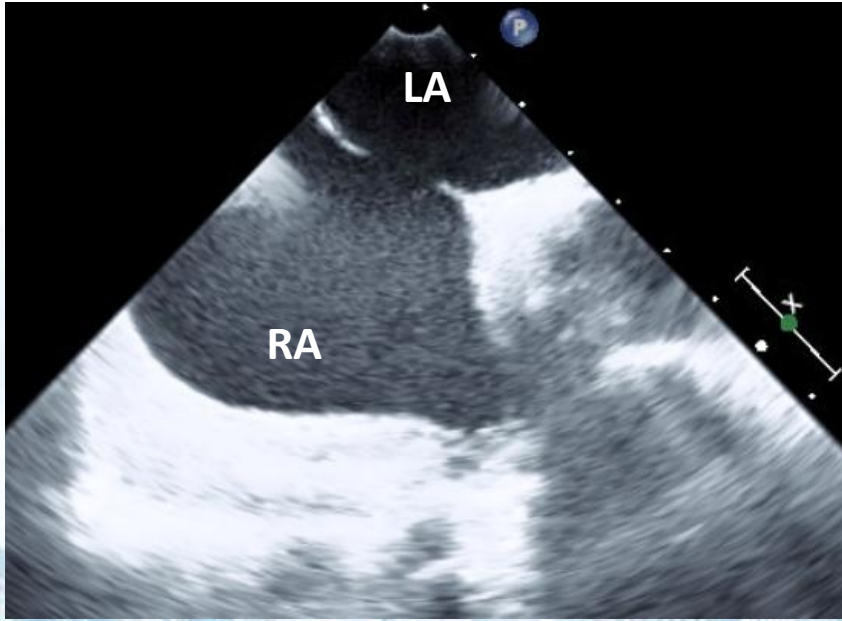
【 A case from *Ann Pediatr Cardiol.* 2012】



- ✓ Descending aorta (DAo) of the left picture in our case did not compress LA too much, more room in LA !
- ✓ The heart itself in right picture was compressed between sternum and DAo, that was like a *funnel chest* !

# Clue #2 is size of defect

【 A case from *Ann Pediatr Cardiol.* 2012】



- ✓ Both defects looked similar, but we chose *12mm ASO* for the left panel.
- ✓ They used *26mm* device for the right panel.

# Discussion

- ✓ Right sided aortic arch (RAA) is an uncommon congenital anomaly with a frequency of approximately **0.1%** among general population.
- ✓ RAA combined with isolated ASD is very rare condition estimated as **0.0001 %** among general population.
- ✓ LA compression by descending aorta might cause difficulty for the transcatheter ASD closure.
- ✓ More important thing to consider is the balance between the LA size compressed by the aorta and the device size, that will determine the difficulty of this procedure.

**Circulation**  
JOURNAL OF THE AMERICAN HEART ASSOCIATION

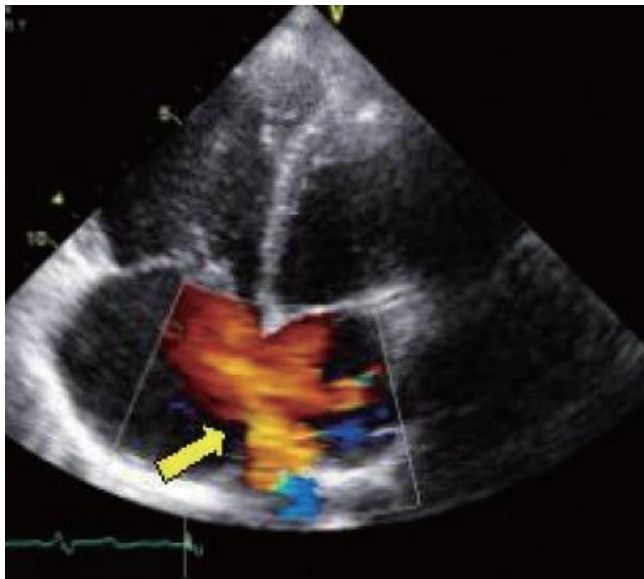


**Right Aortic Arch : Types and Associated Cardiac Anomalies**  
LAURA KNIGHT and JESSE E. EDWARDS

# A CASE OF RIGHT SIDED AORTIC ARCH COMBINED WITH ATRIAL SEPTAL DEFECT

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# Discussion

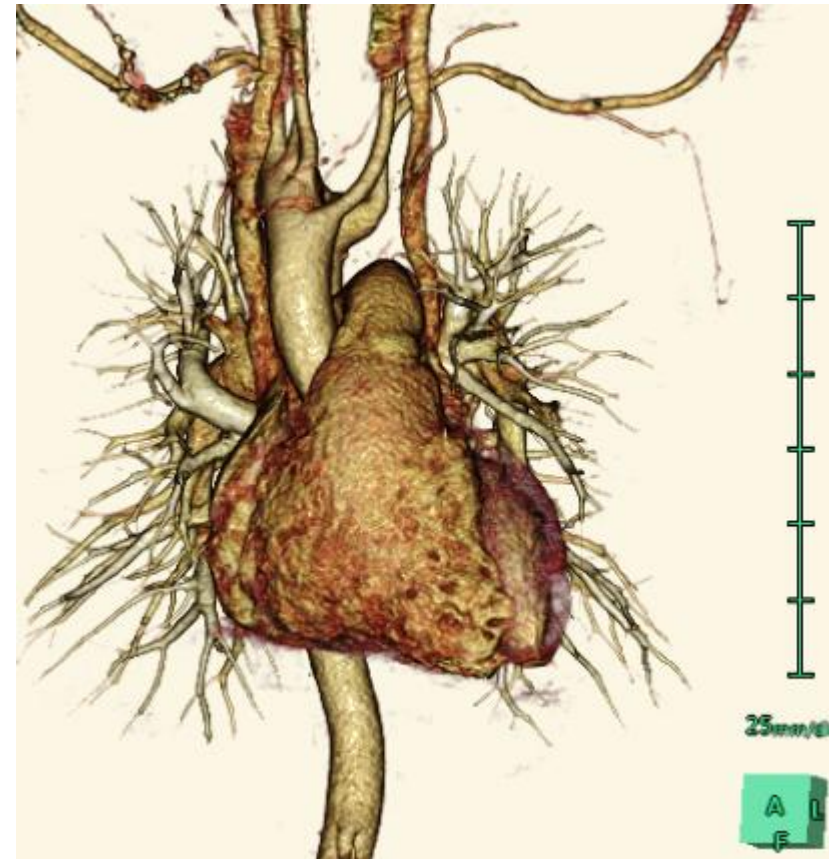
✓ LA size is smaller

- relatively large shunt with smaller left atrium
- Other structures compress
  - TEE probe
  - Funnel chest
  - Descending aorta like this case
  - Or anything

***CT images are very useful for predicting the difficulties of the case***

# Conclusions

- ✓ We experienced a very rare ASD complicated with RAA.
- ✓ This transcatheter ASD closure was easier than expected.
- ✓ Key issue is *the imaging* before and during procedure that will tell us the difficulty of the ASD closure.





**Thank you for your attention!**

