Percutaneous Closure of ASDs with Relatively Deficient Rims – Tips and Tricks

Krishna Kumar

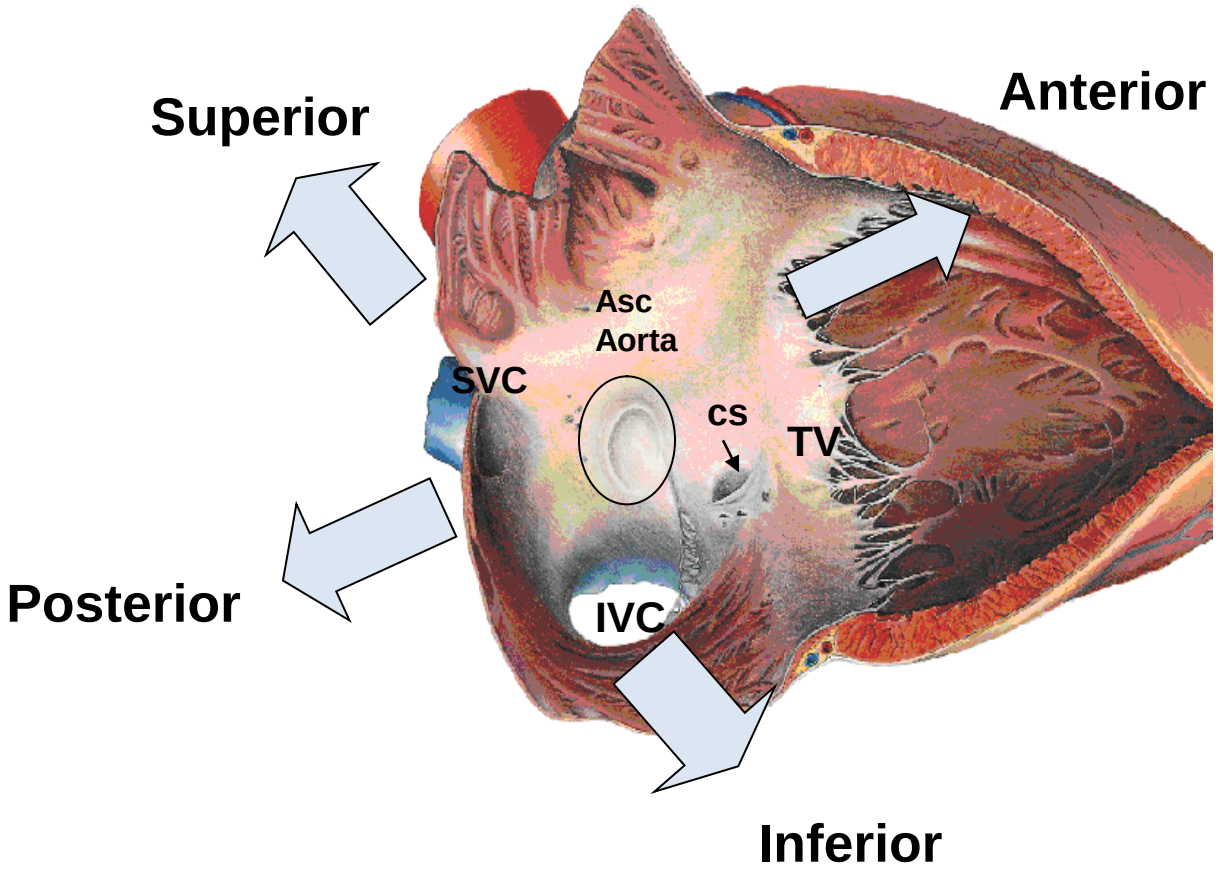
AIMS

Cochin

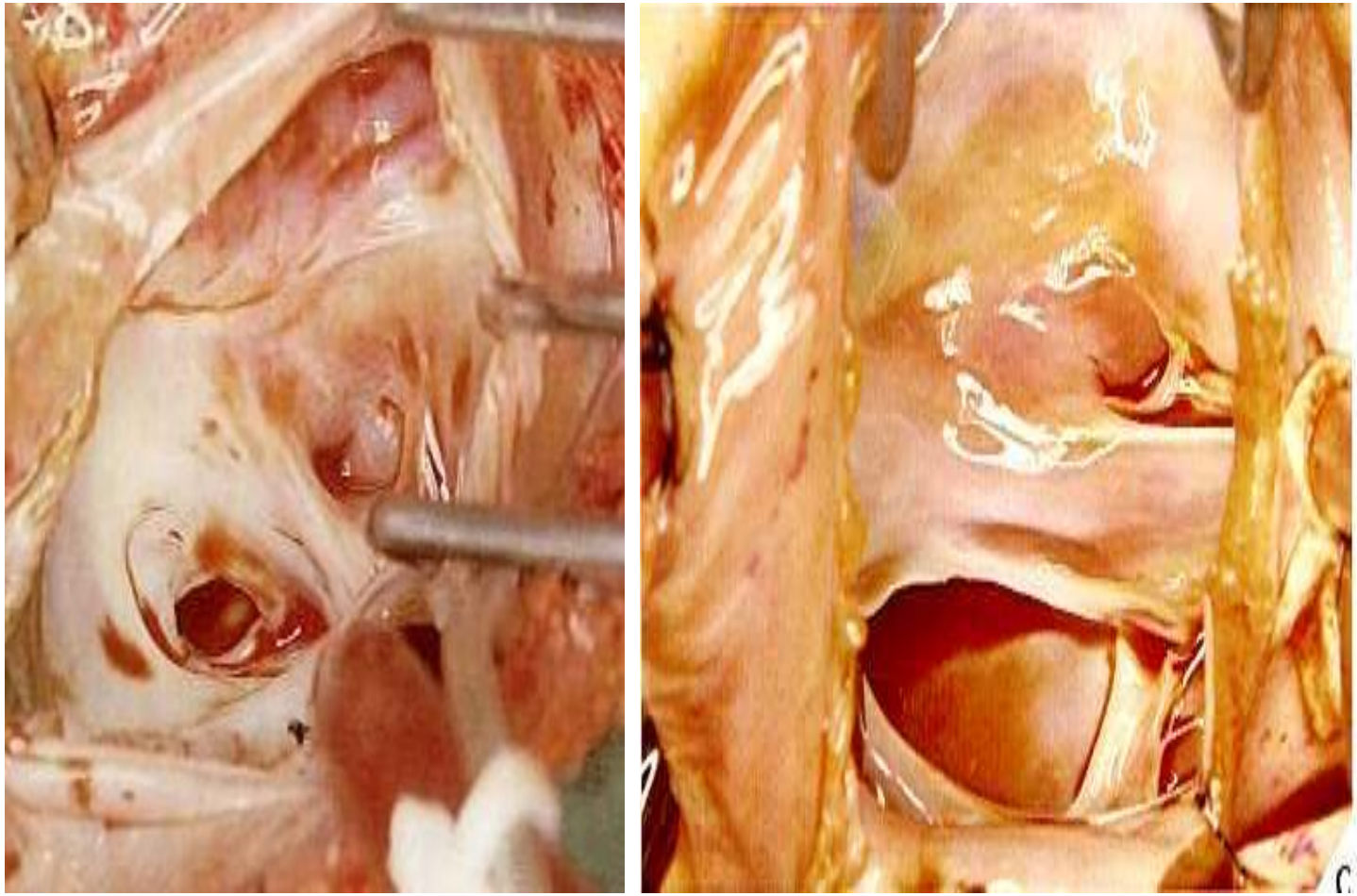
Key Questions?

- Is percutaneous closure possible?
- Device size?
- Closure technique?

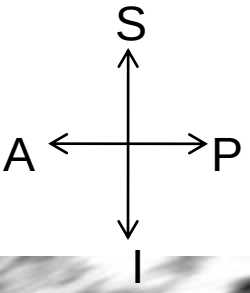
Definition and Terminology

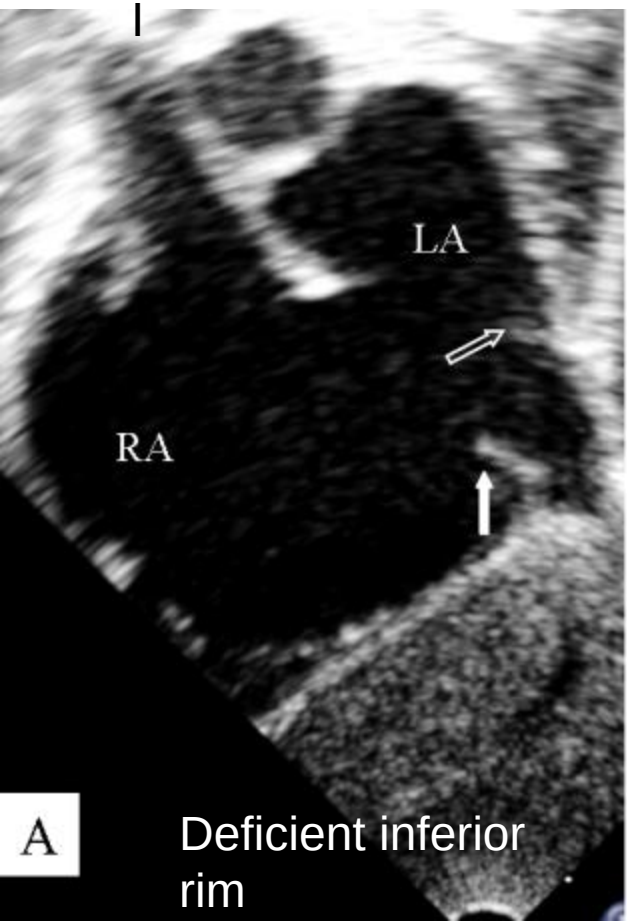


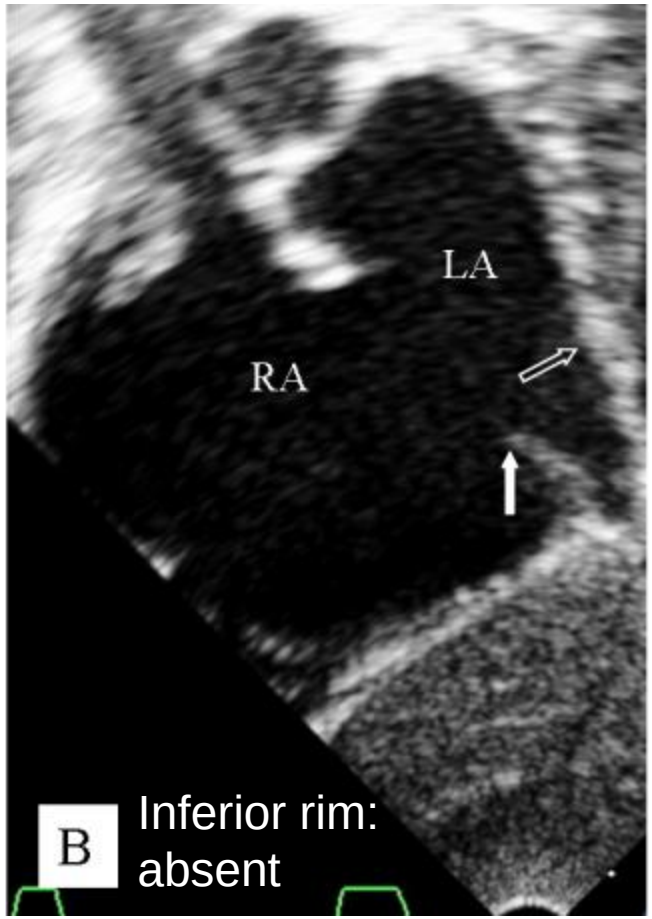
ASDs with adequate and minimal margins

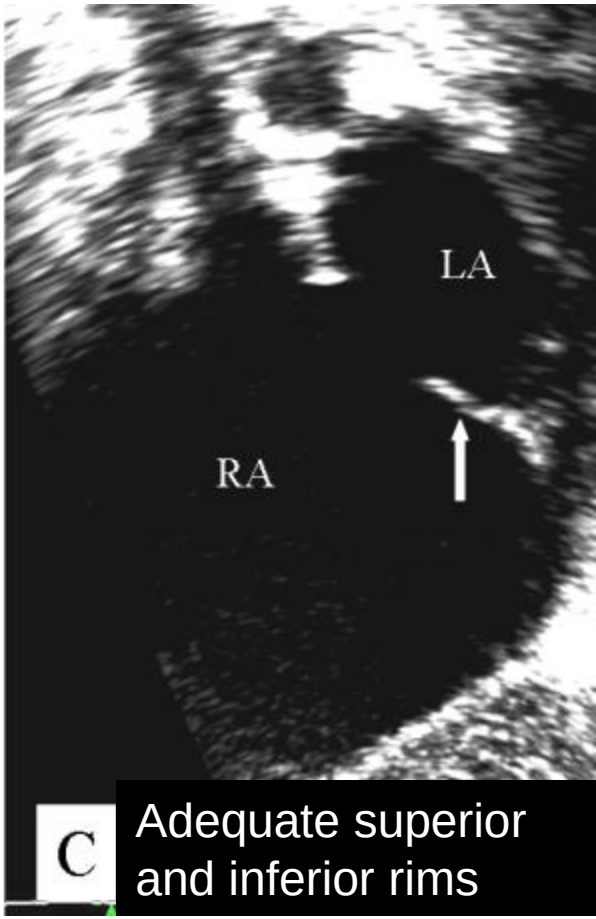


Atrial Septal Evaluation: TTE

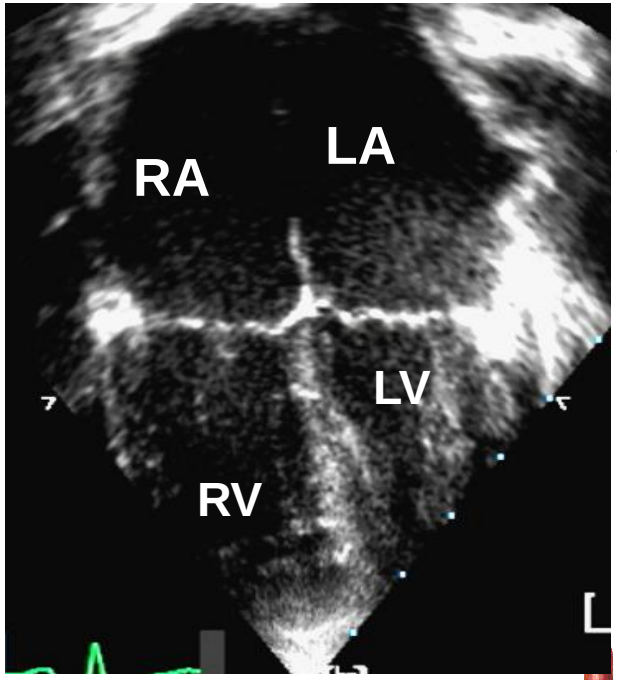




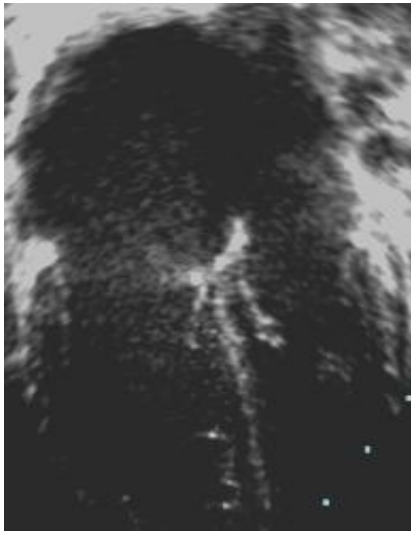




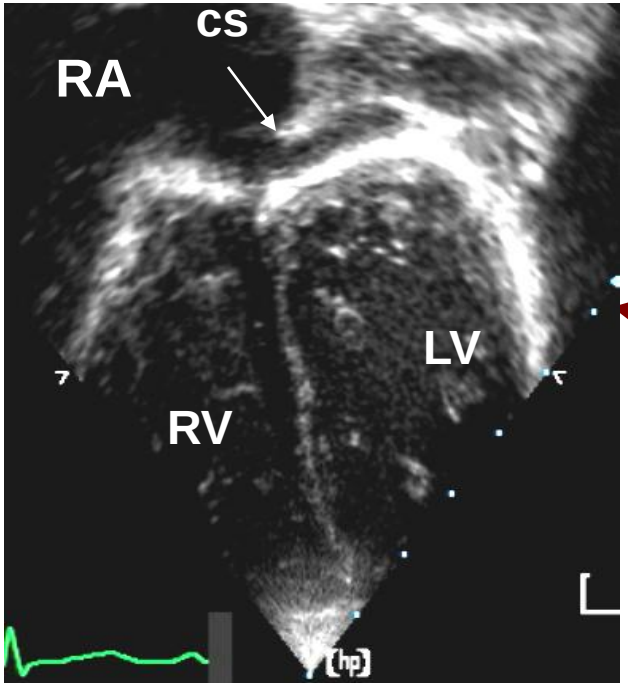
The Apical Views

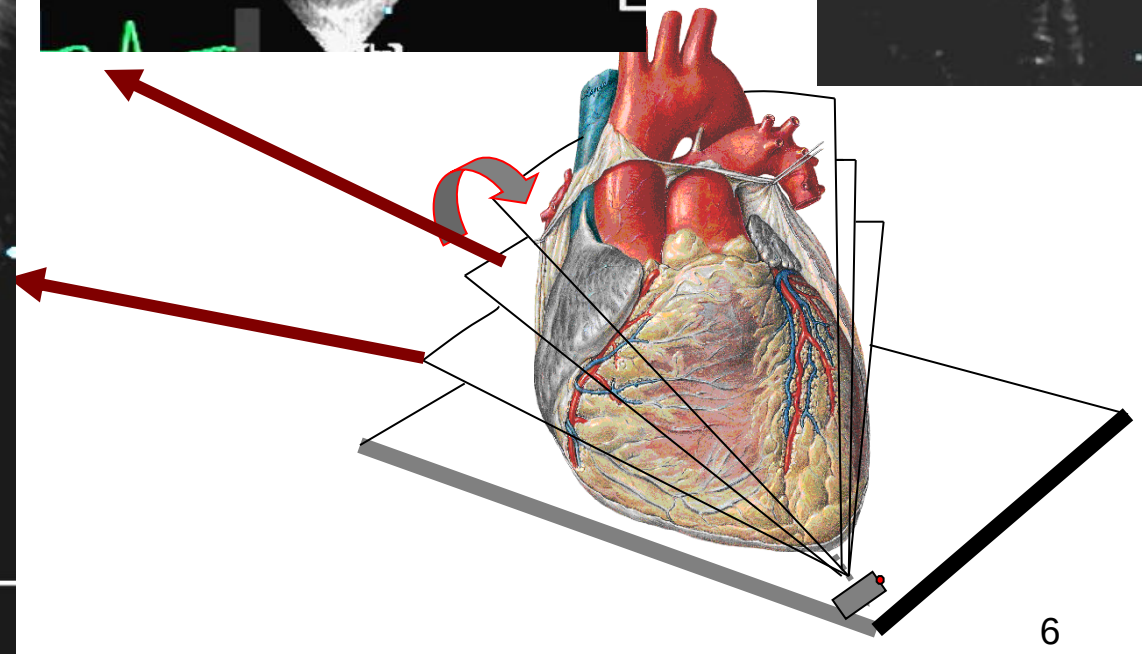


The apical 4 chamber view

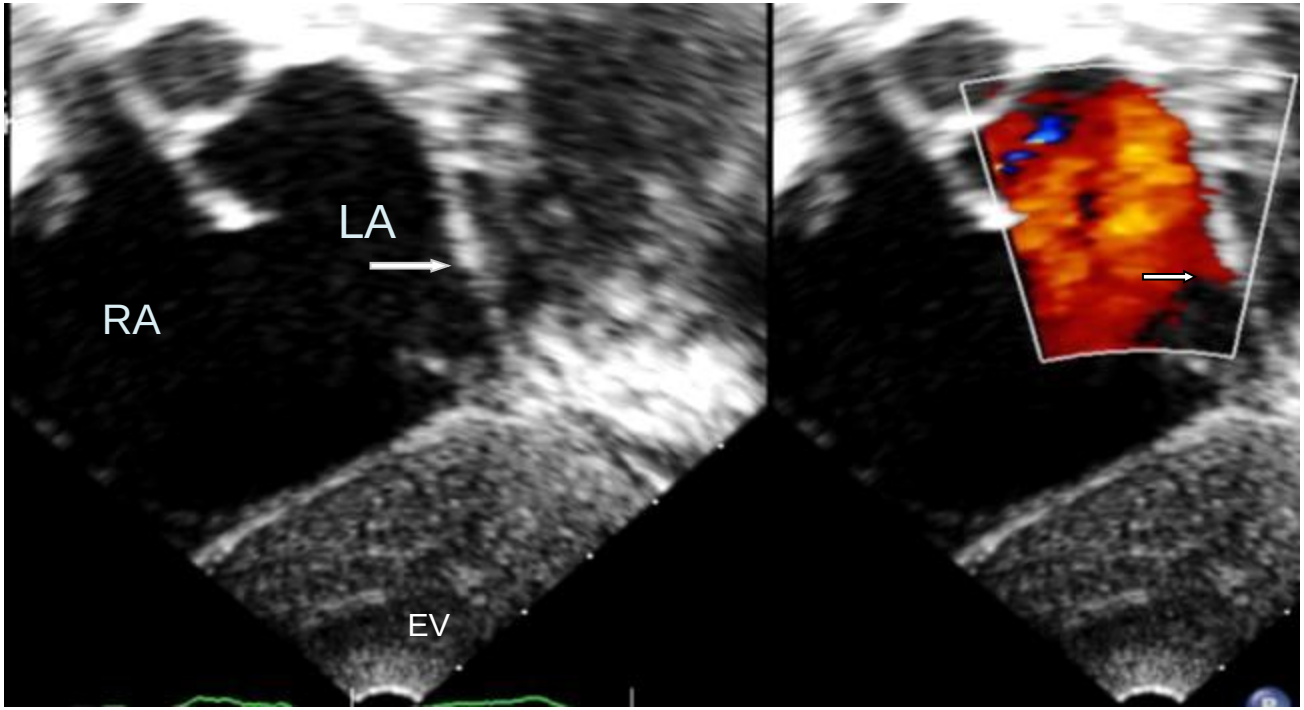


Inferior sweeps reveal posterior structures

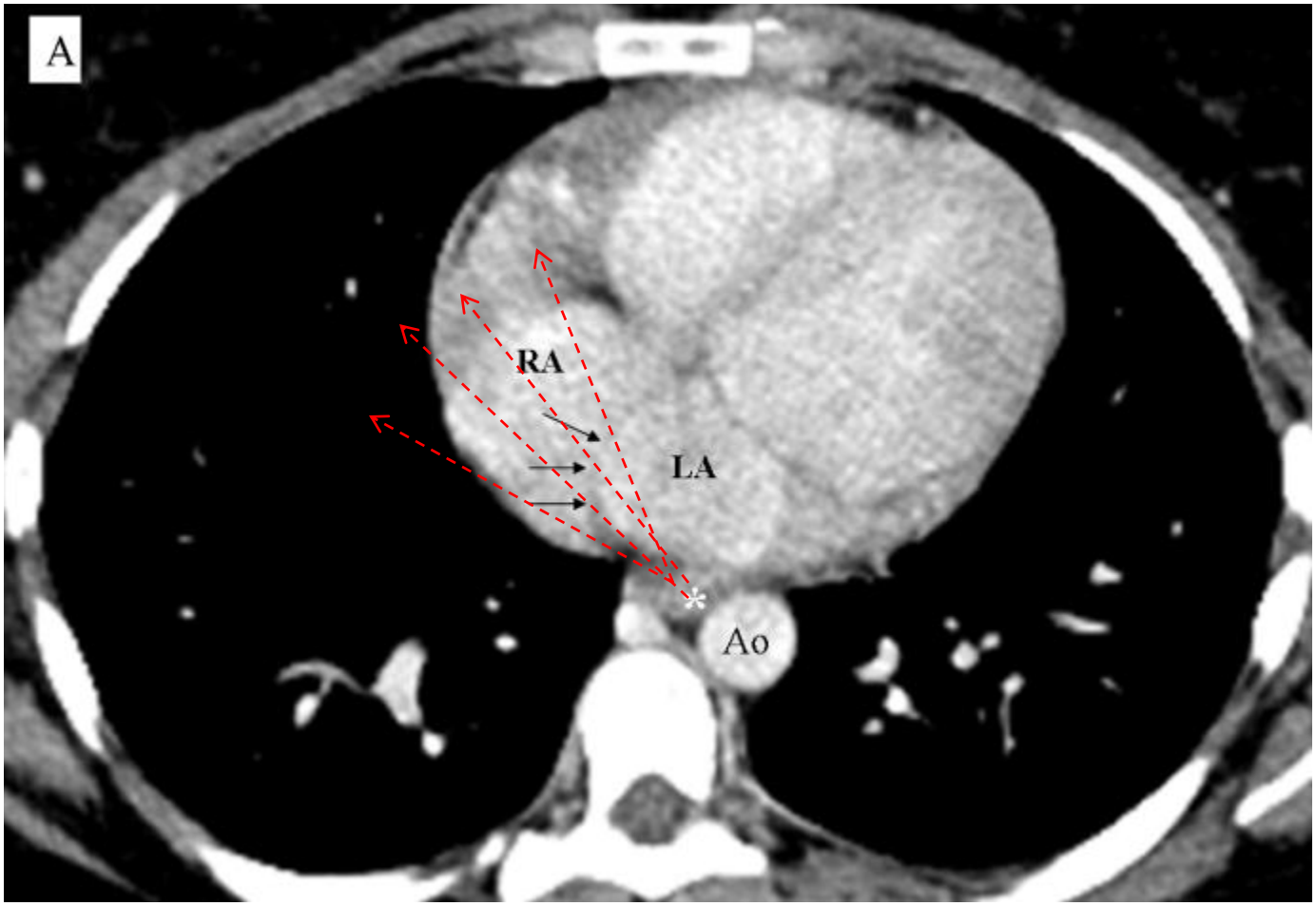




Imaging the IVC Margin



Imaging the IVC Margin through conventional TEE: Why is it difficult?



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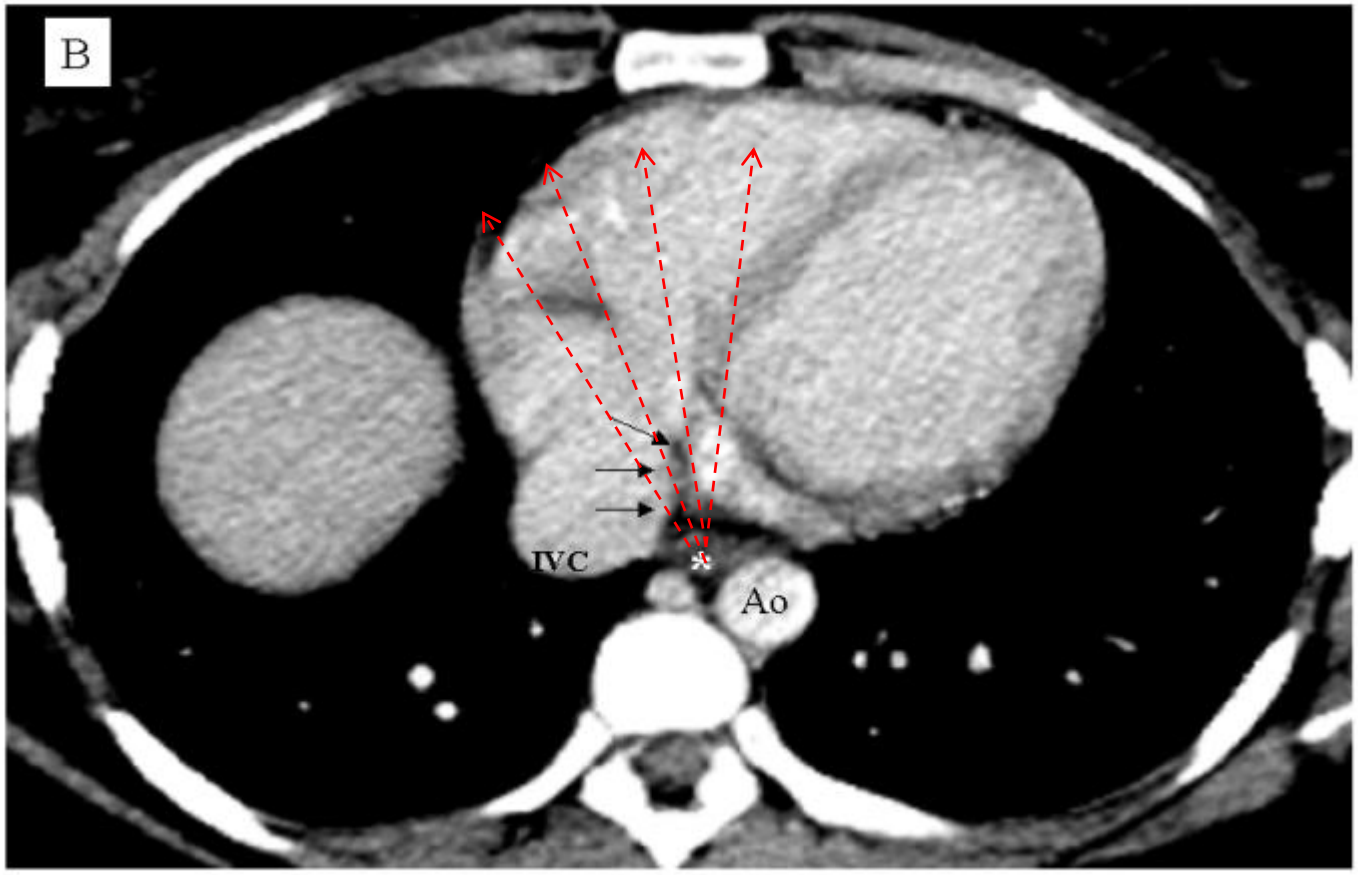
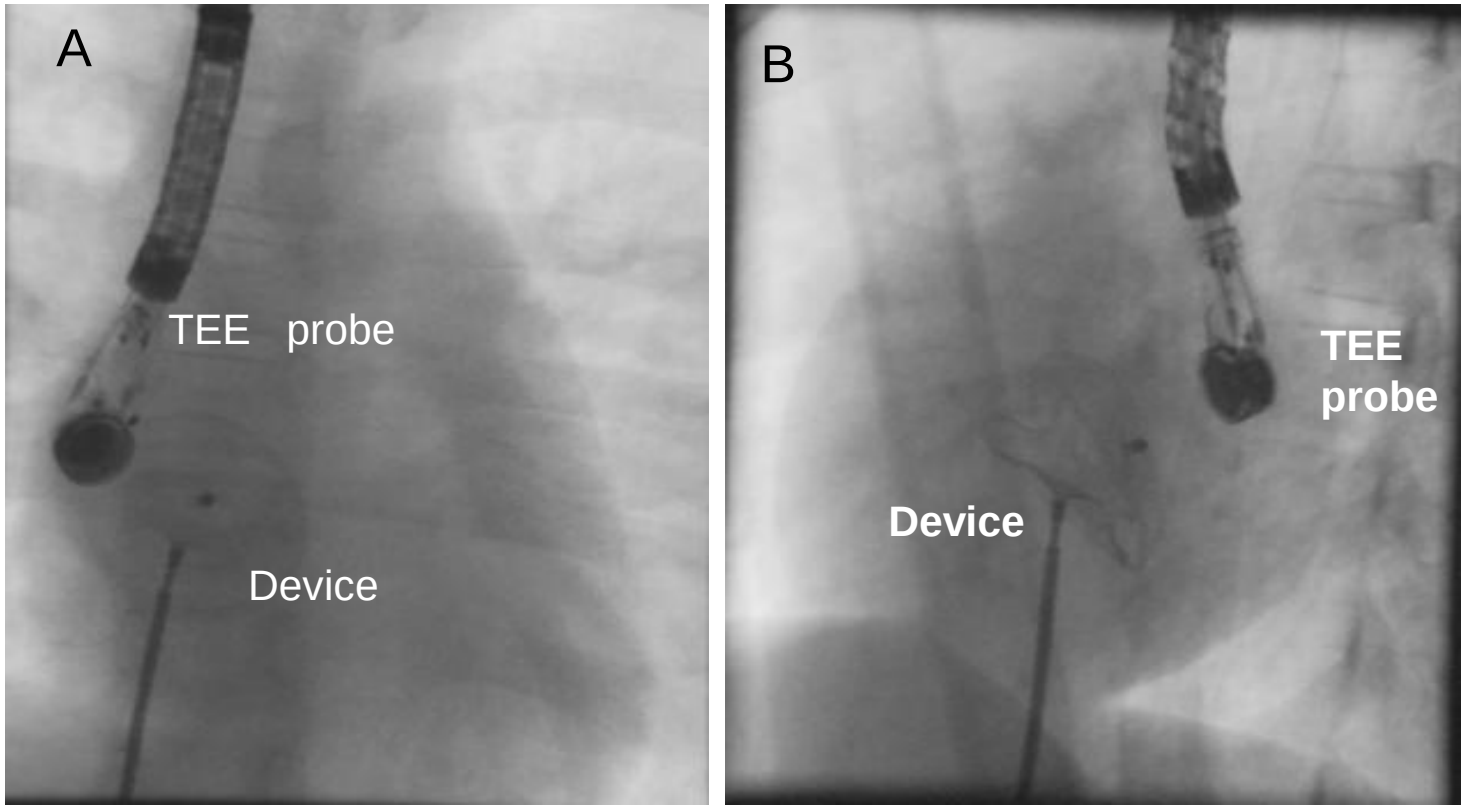
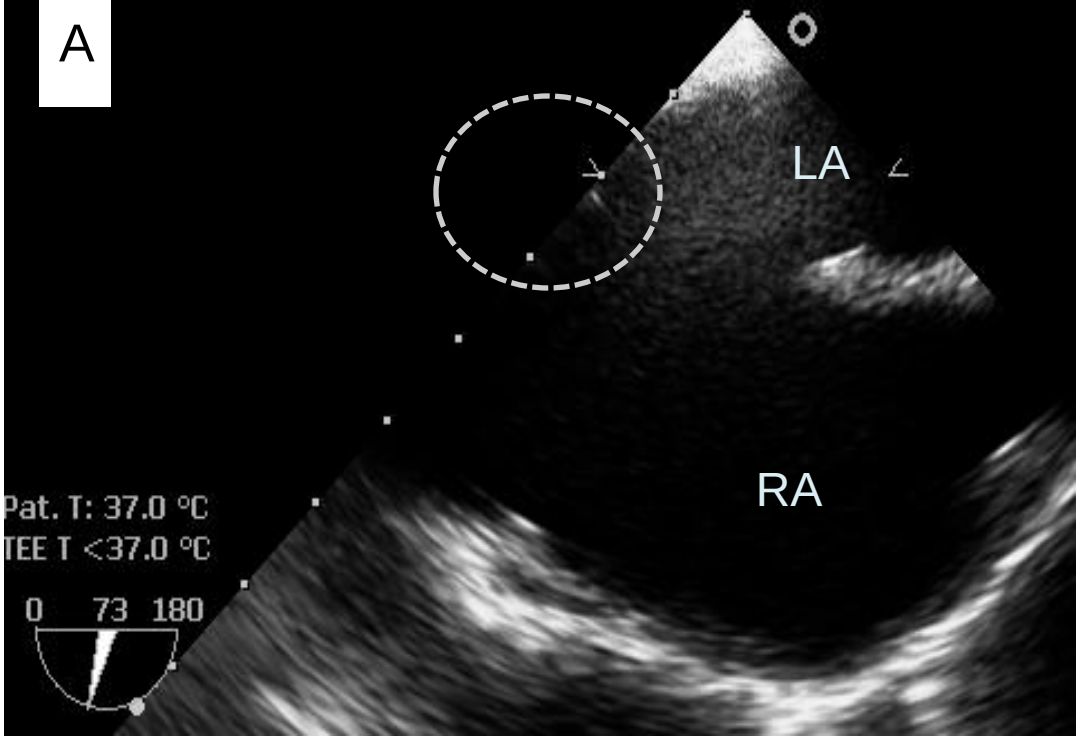


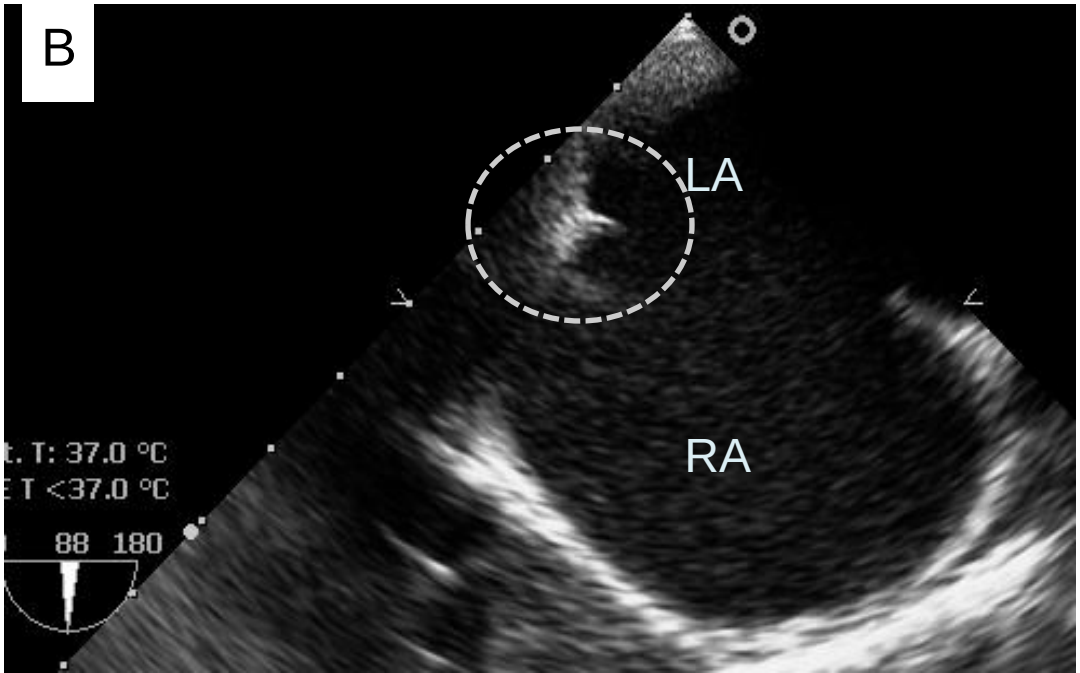
Remadevi KS, Francis E, Kumar RK, Catheter closure of atrial septal defects with deficient inferior vena cava rim under transesophageal echo guidance, Cathet Cardiovasc. Interven. 2009, 73:90-96

Imaging the IVC Margin through TEE: The modified retroflexed view

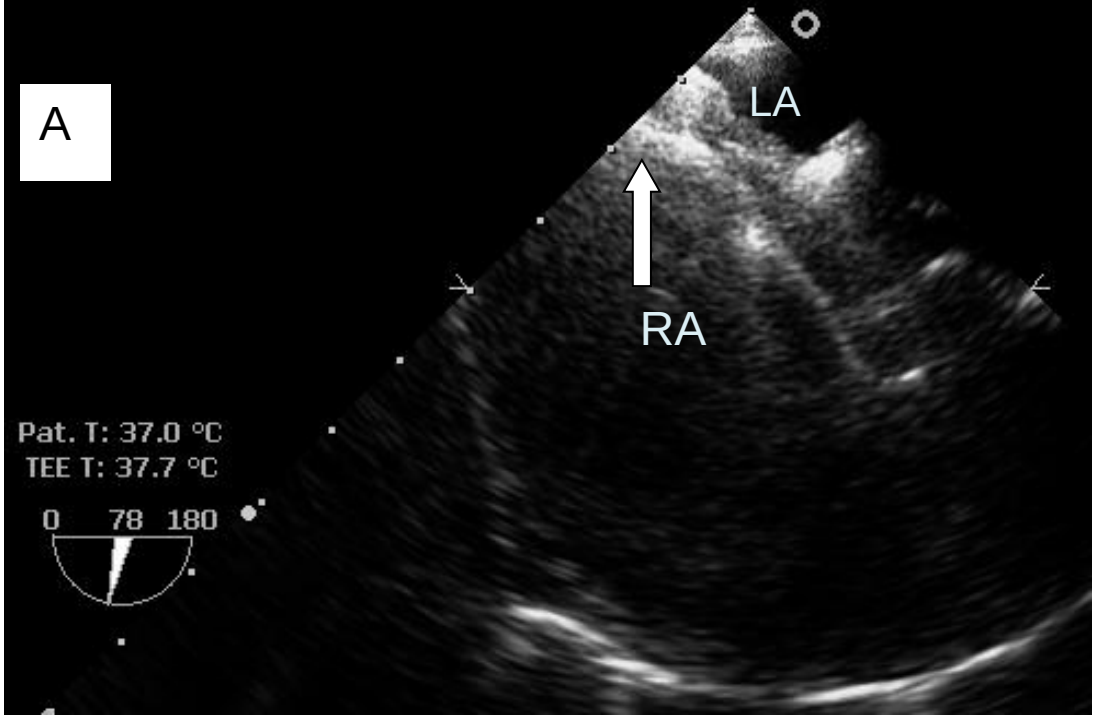




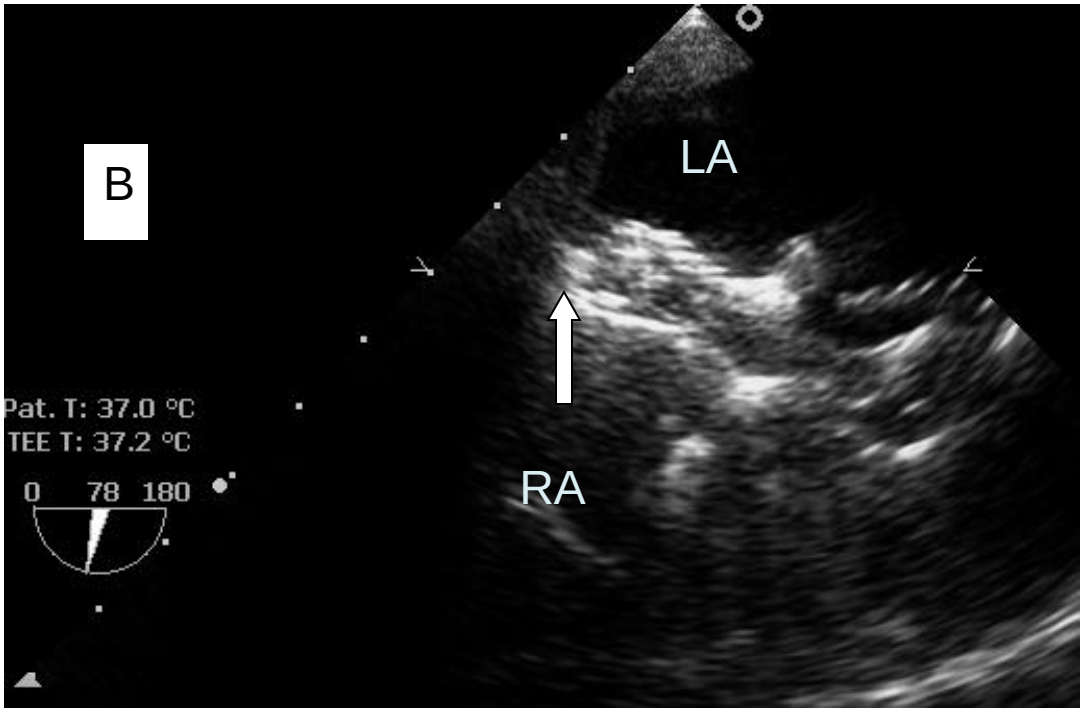
Conventional



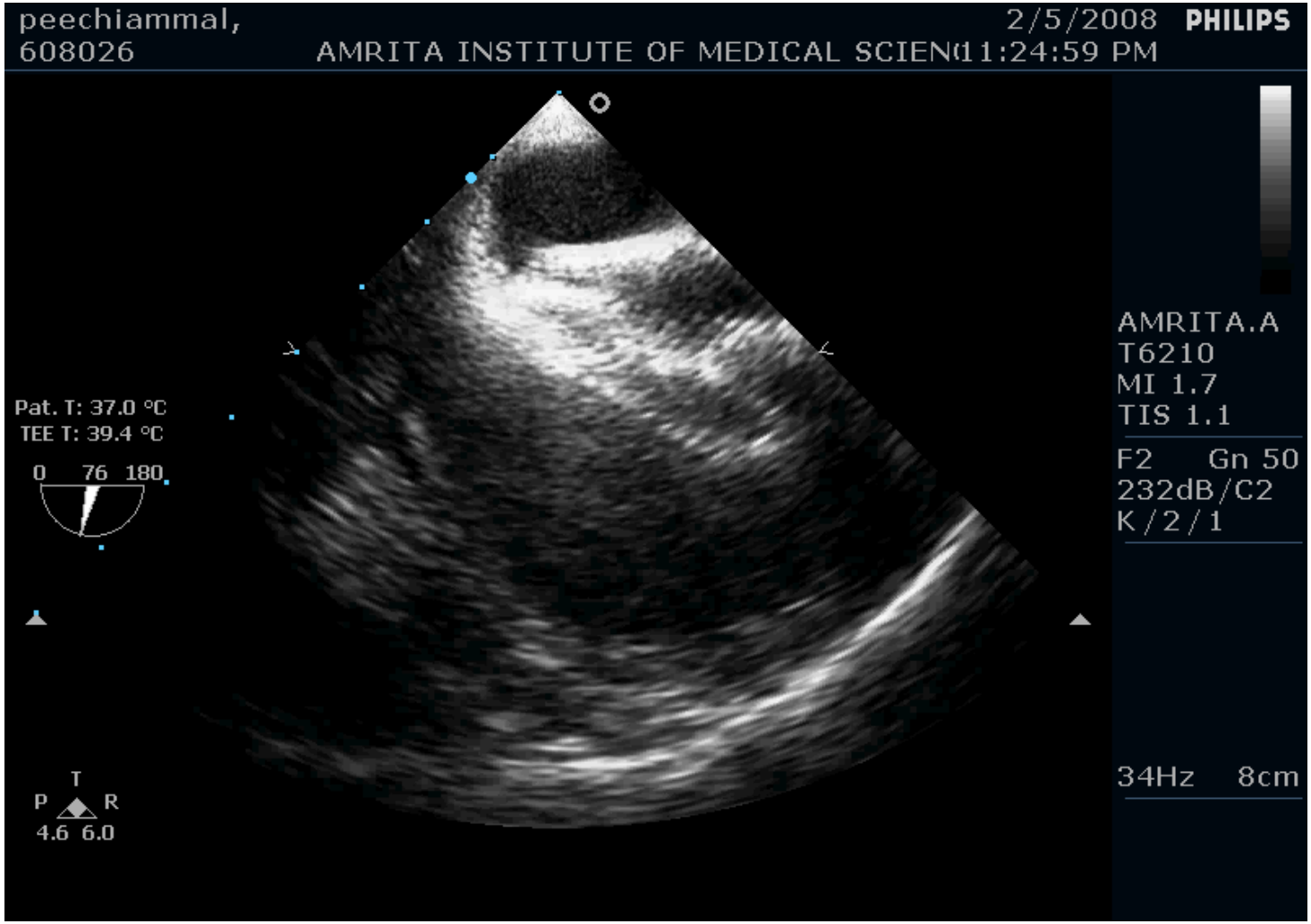
Retroflexed



Conventional



Retroflexed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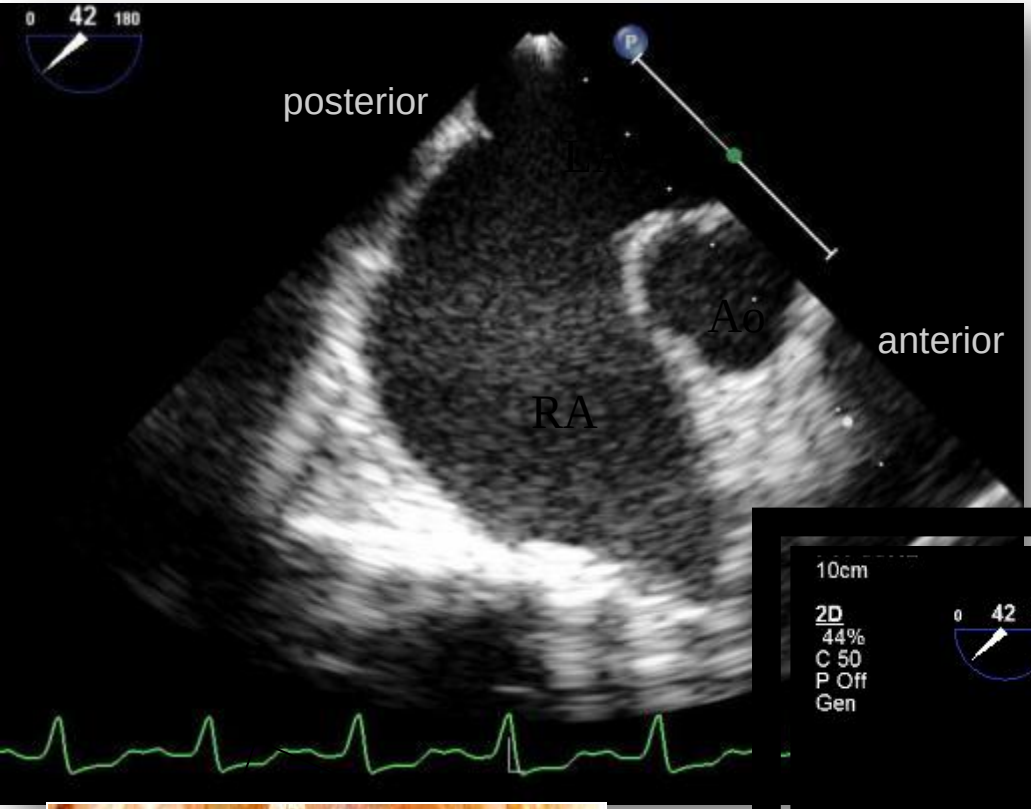
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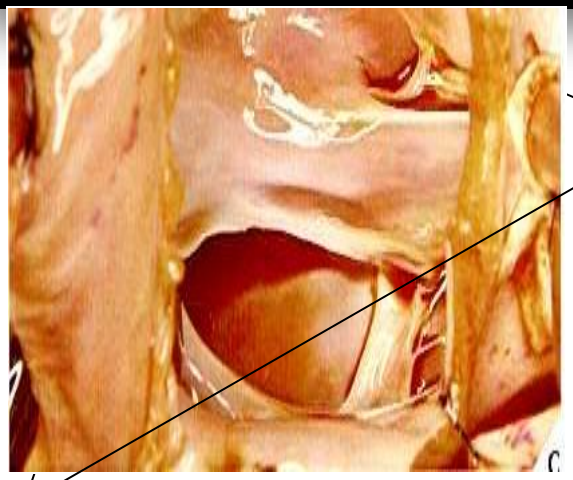
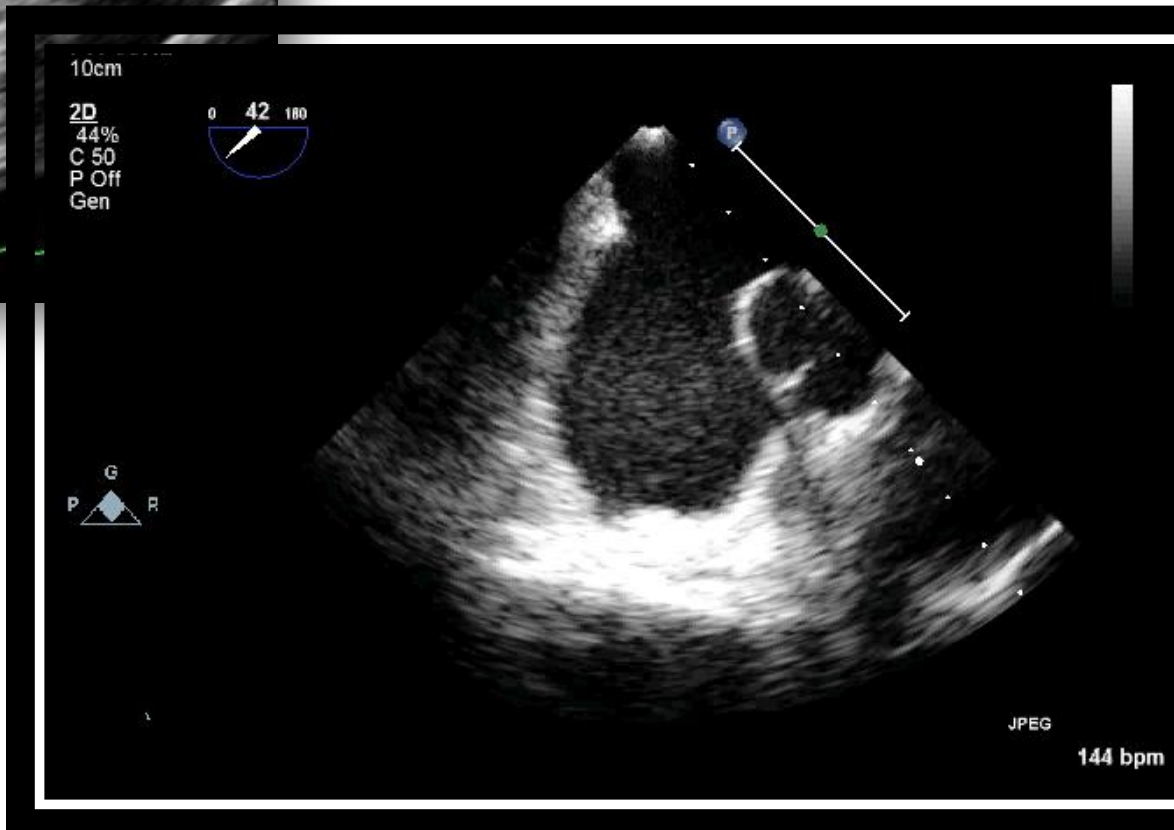
posterior
Ao
anterior
RA




10cm
2D
44%
C 50
P Off
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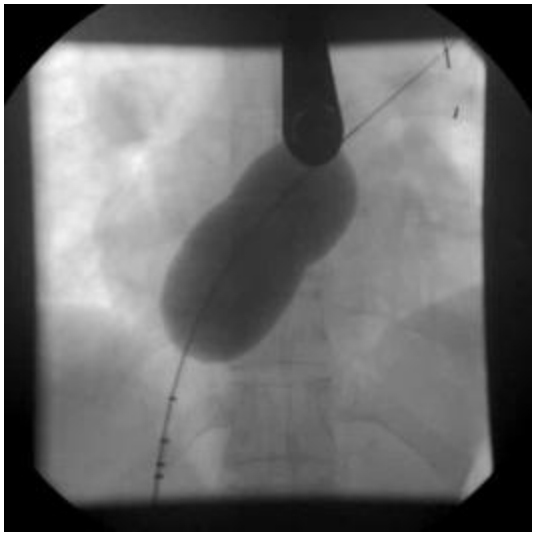
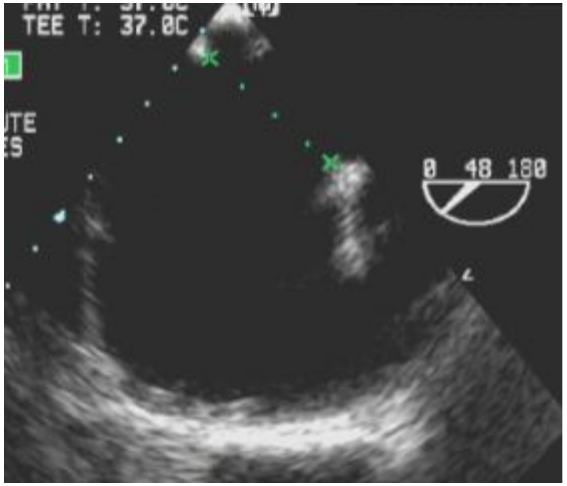
0 42 180
G
P
R
JPEG
144 bpm

Choosing size of the device

- Balloon stretched diameter
  - Unrealistic for large ASDs with minimal rims?
- Largest dimension on TEE
  - + 2mm to be safe
  - ± 1mm in small children
  - + 4 mm
    - Deficient margins
    - Floppy
    - Adjacent defects



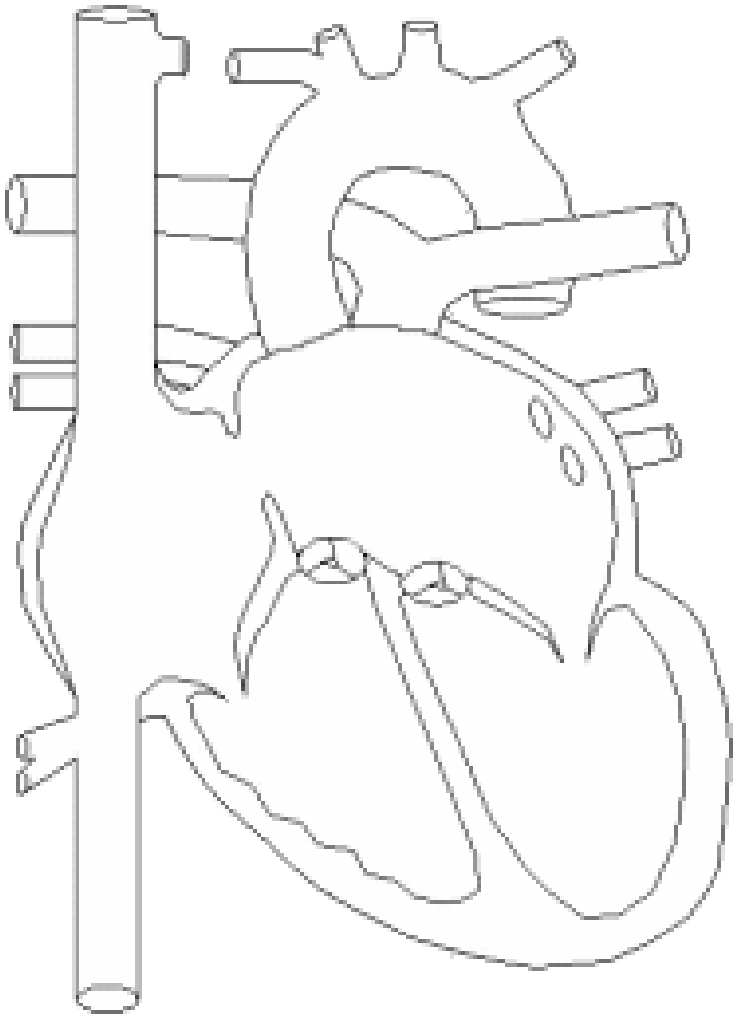


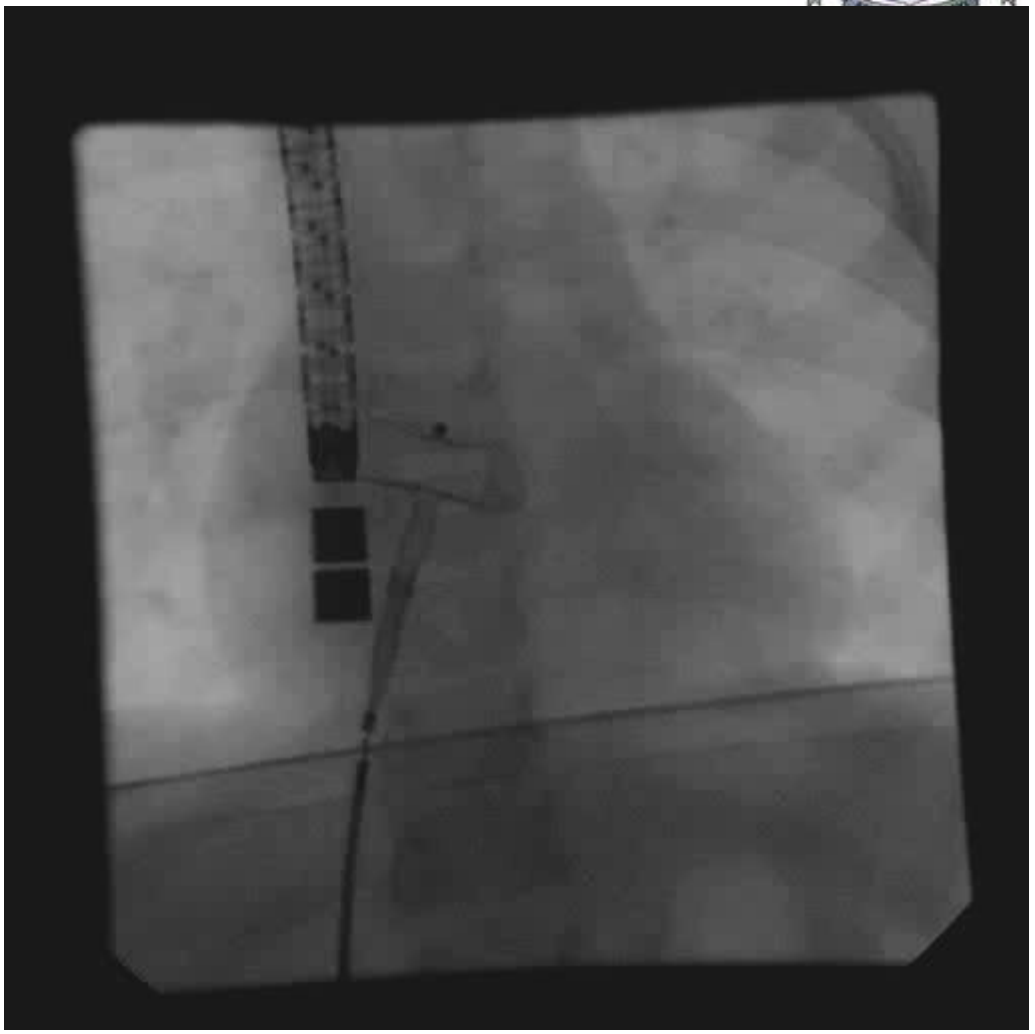
Acceptable limits of device sizing

- Children:
  - 8-10 Kg: < 15 mm
  - 10-15 Kg: < 20 mm
  - 15-25 Kg: < 28-30 mm
- Adults:
  - 40-46 mm

(Kannan BRJ, Anil SR, Sivakumar K, Kumar RK, Transcatheter closure of the very large atrial septal defects using the Amplatzer septal occluder, Catheterization and Cardiovascular Interventions 2003;59:522-527)

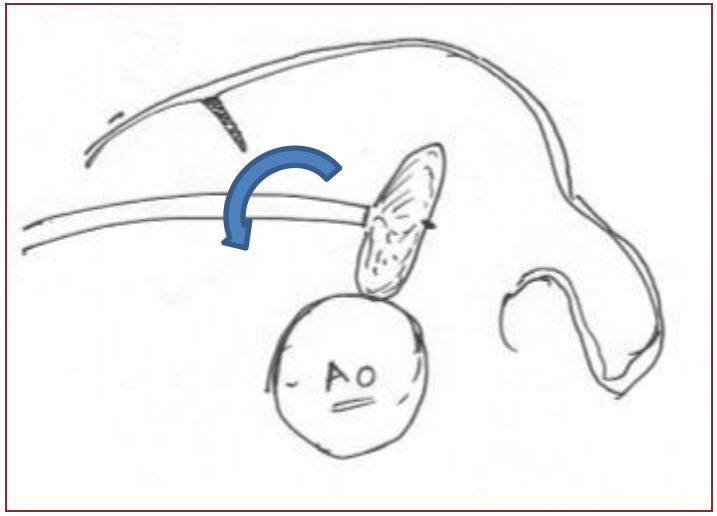
Device Deployment: Usual Sequence

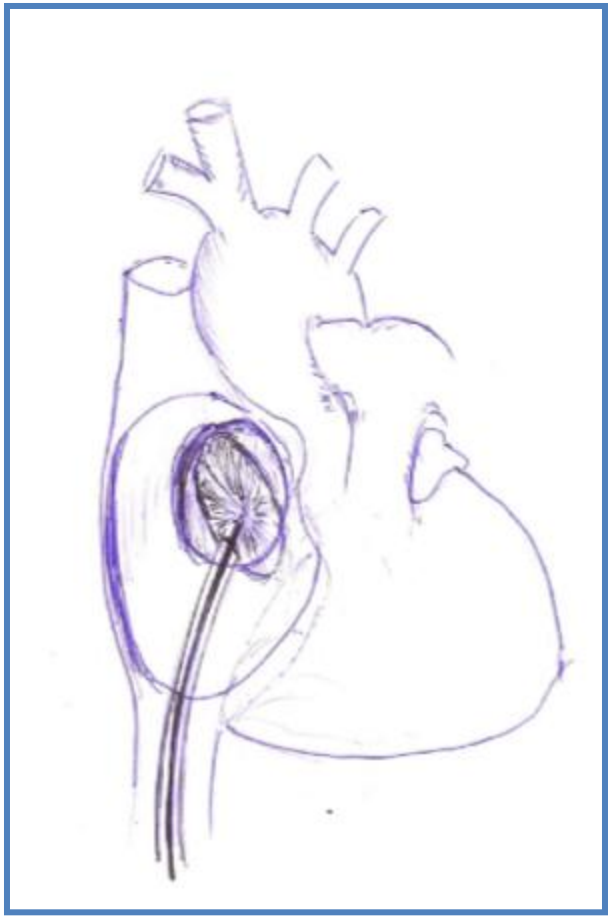




ASD with deficient rims: deployment not likely to be straightforward?

- **Poor alignment of assembly vs. plane of the defect**



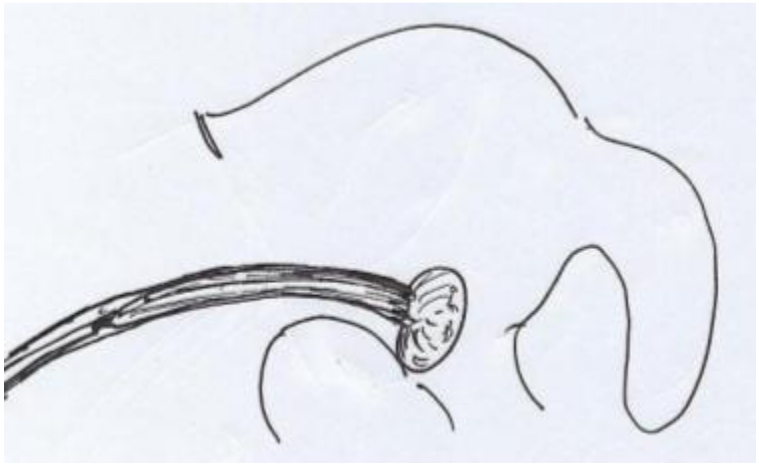


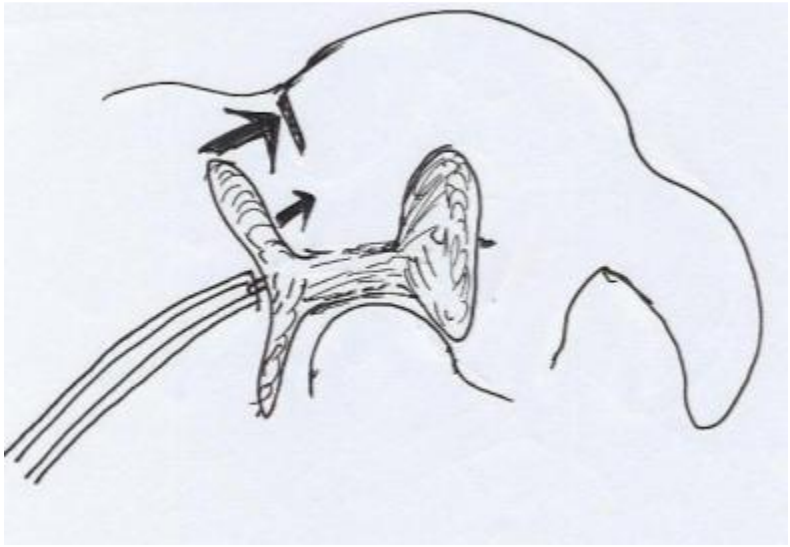
Device Deployment Techniques to Ensure Rim Capture

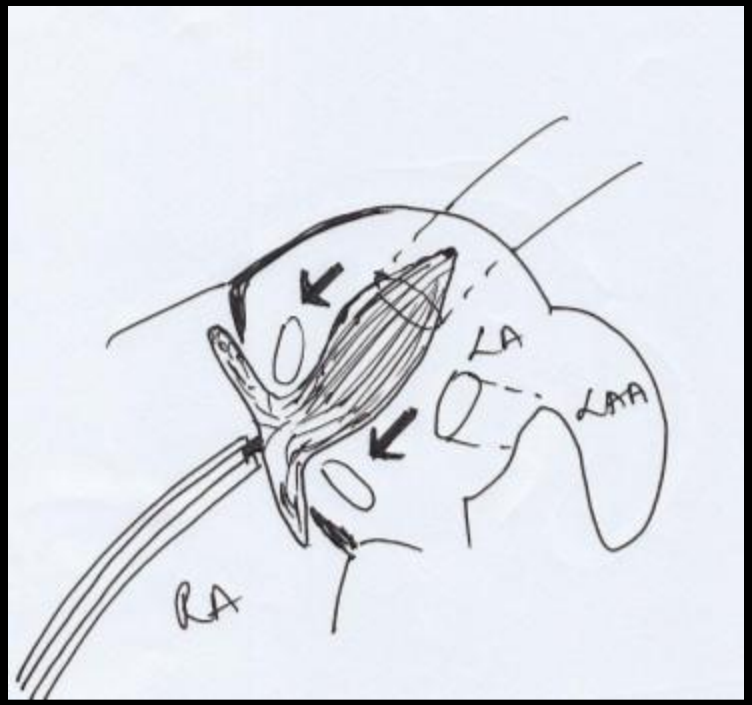
Right atrial disc should form to the right of the septal plane before the left atrial disc can slip out

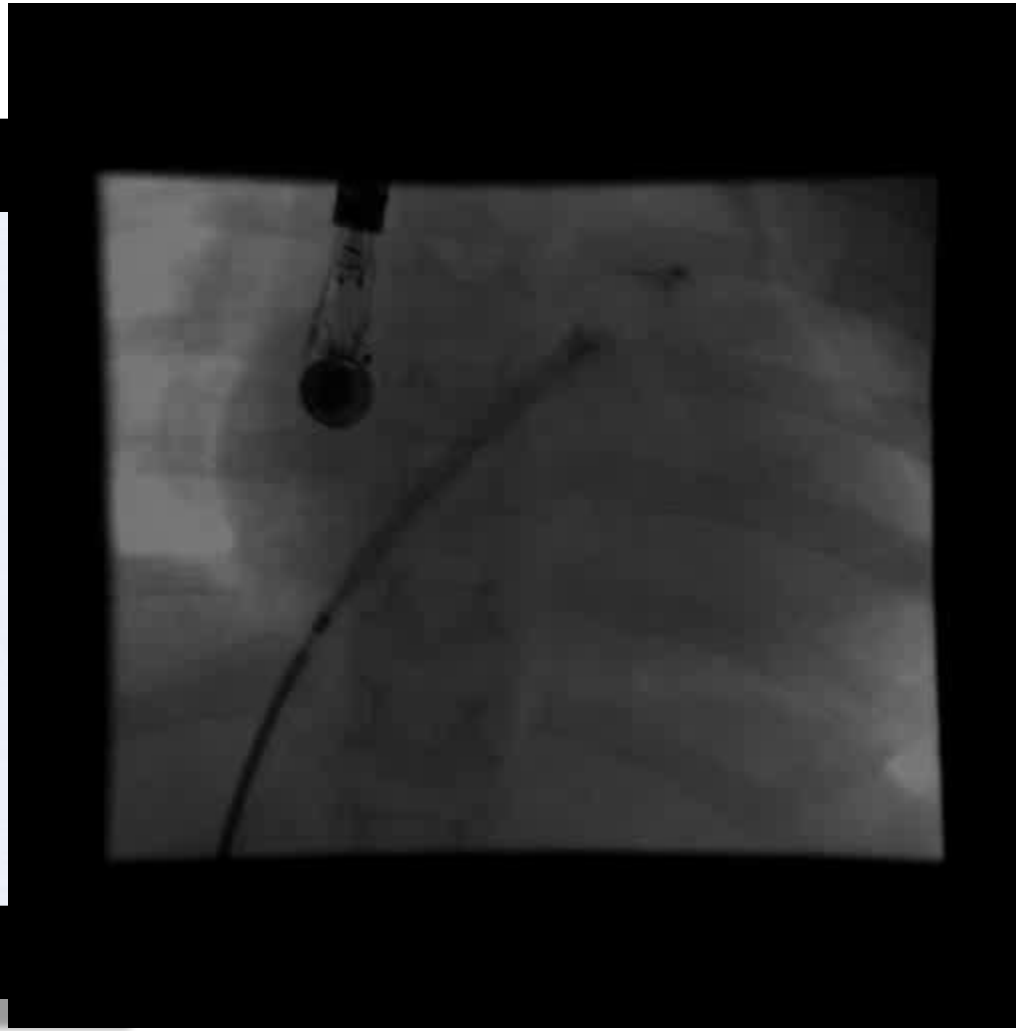
- ☞Rapid release
- ☞Hold on to the LA disc until RA disc is positioned

What to do when deployment is not straightforward?

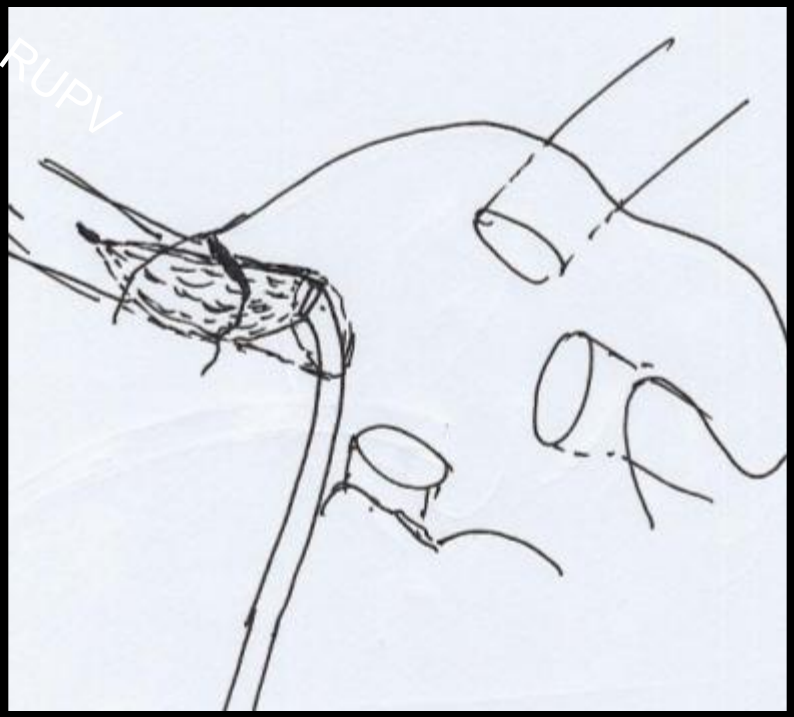


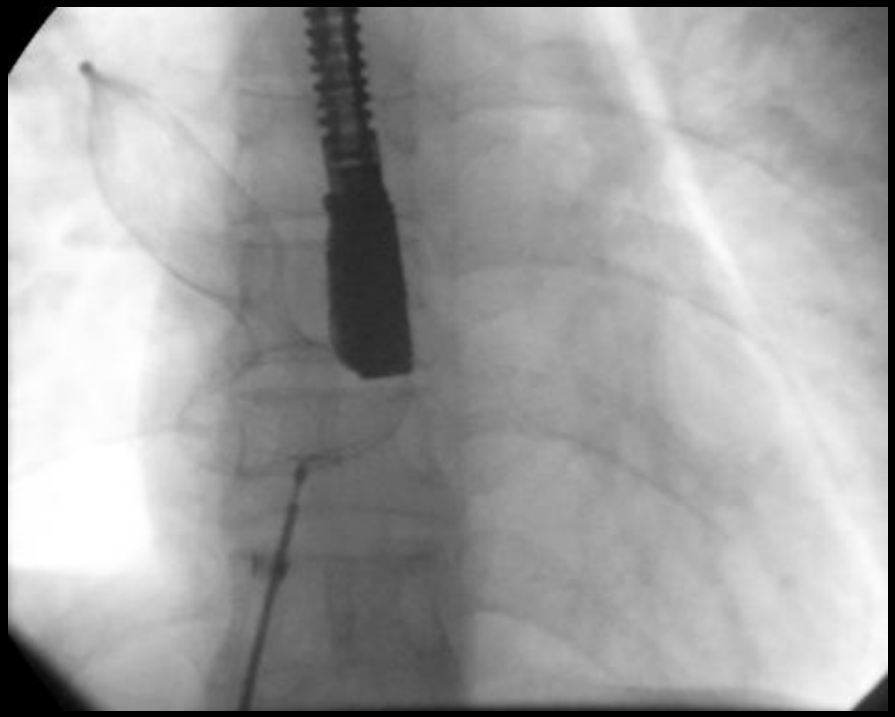


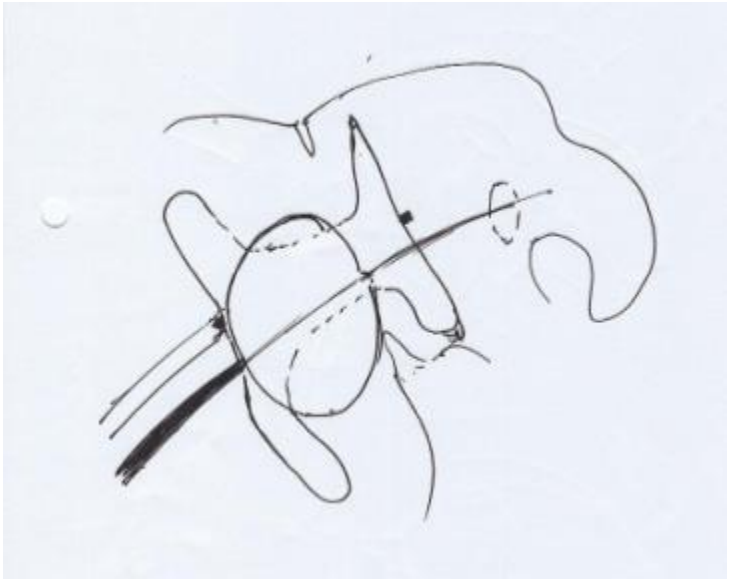

LA
LAA
RA

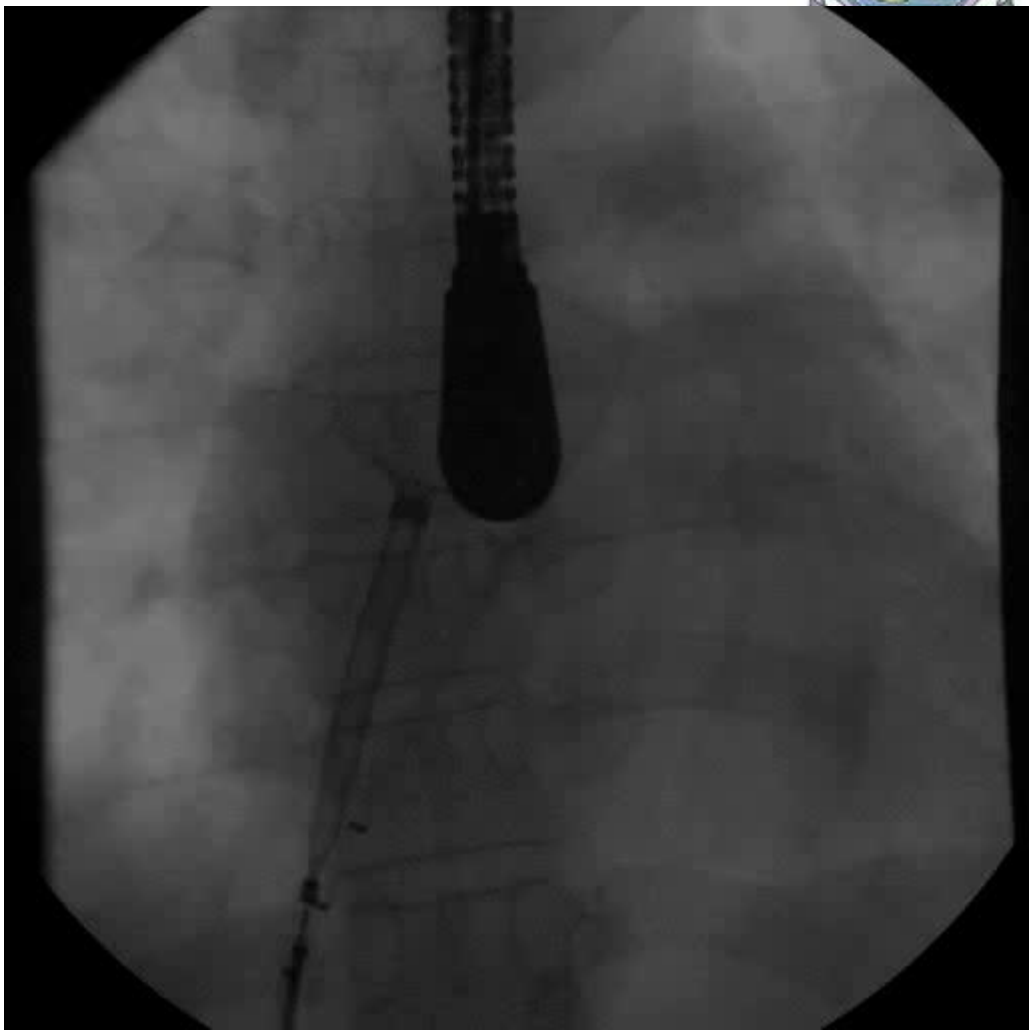


☞ ASDs with floppy or deficient posterior margins



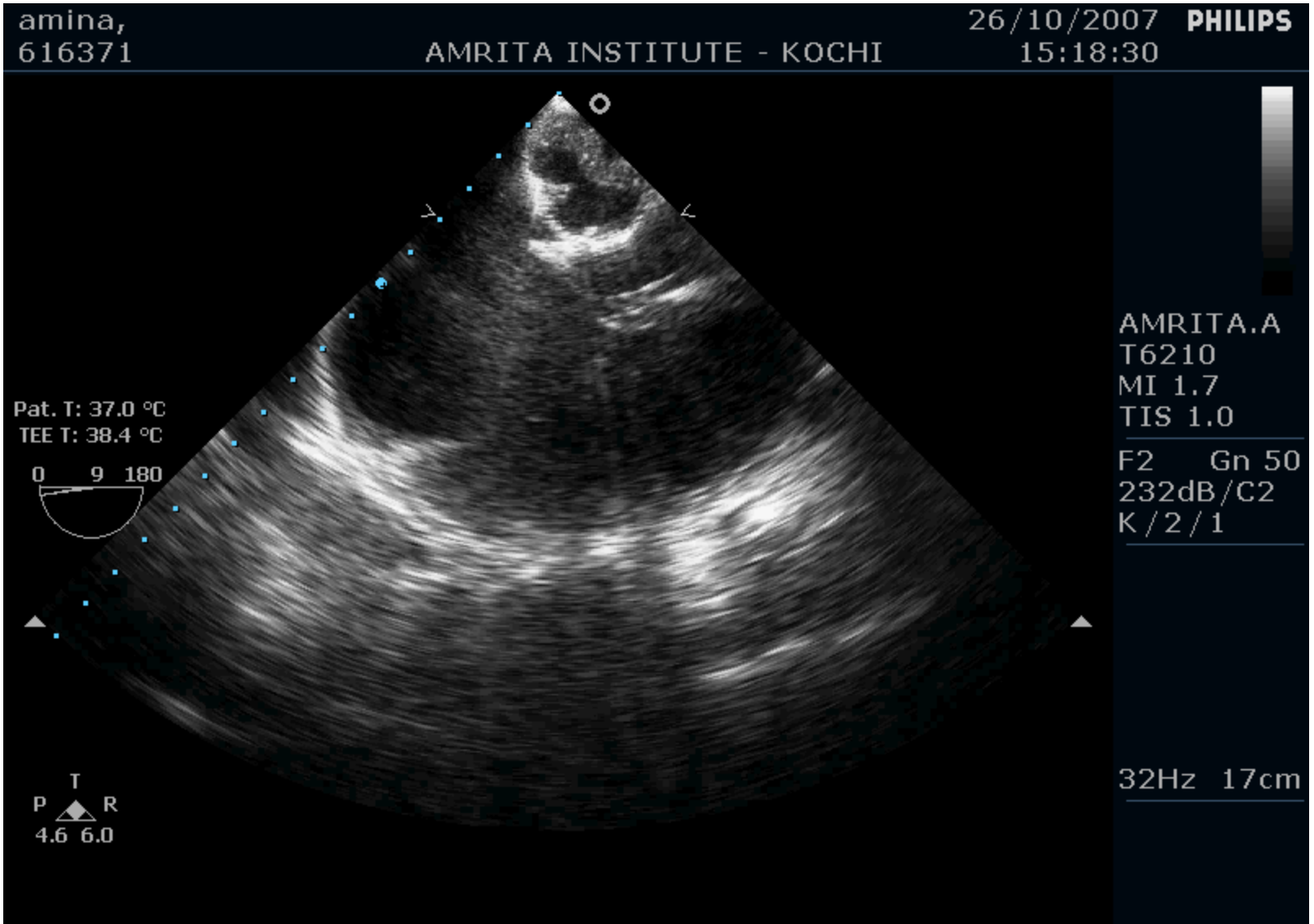




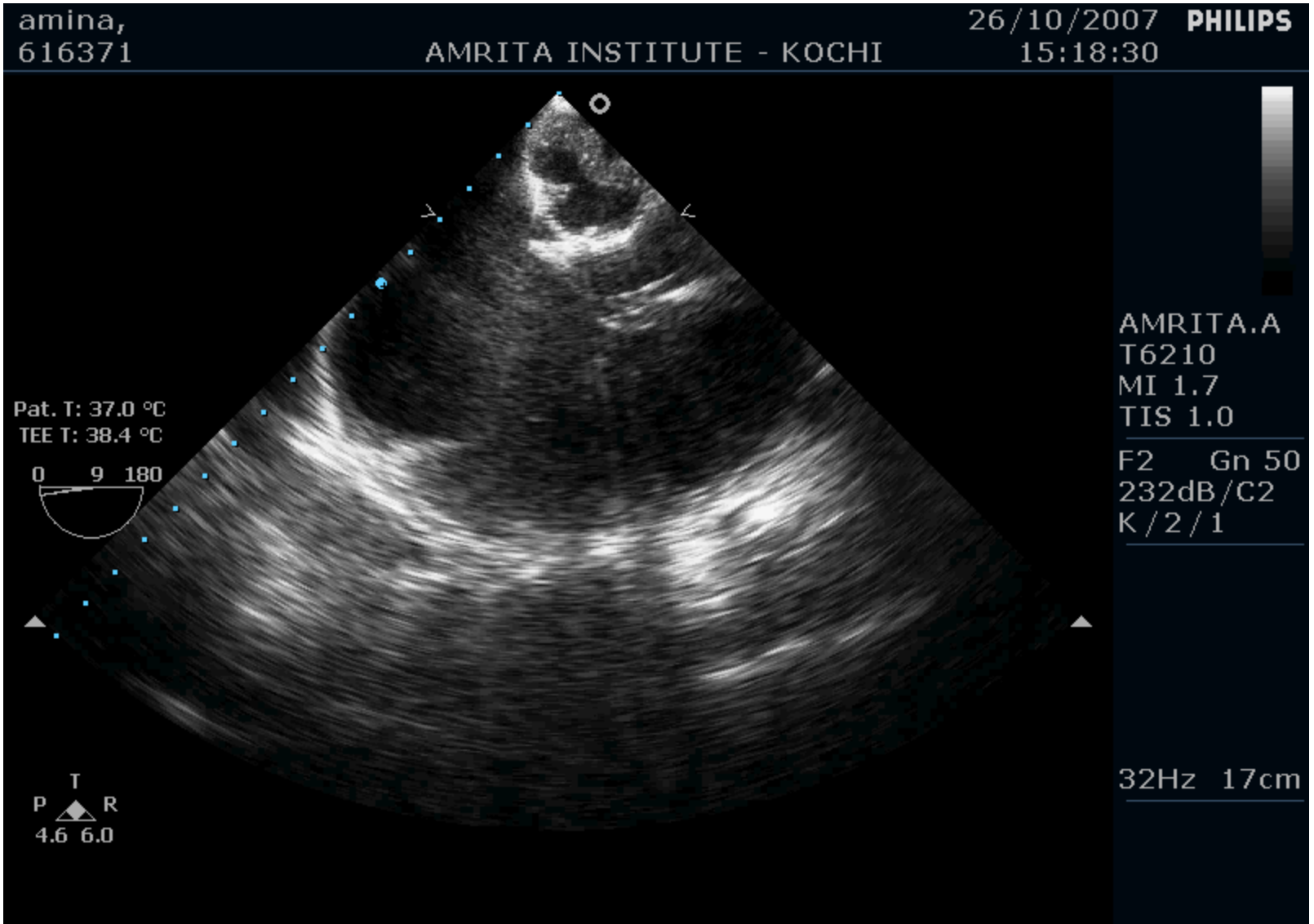


Dalvi BV et al Catheter Cardiovasc Interv. 2005 Jan;64(1):102-7.

Echo guided deployment



Echo guided deployment

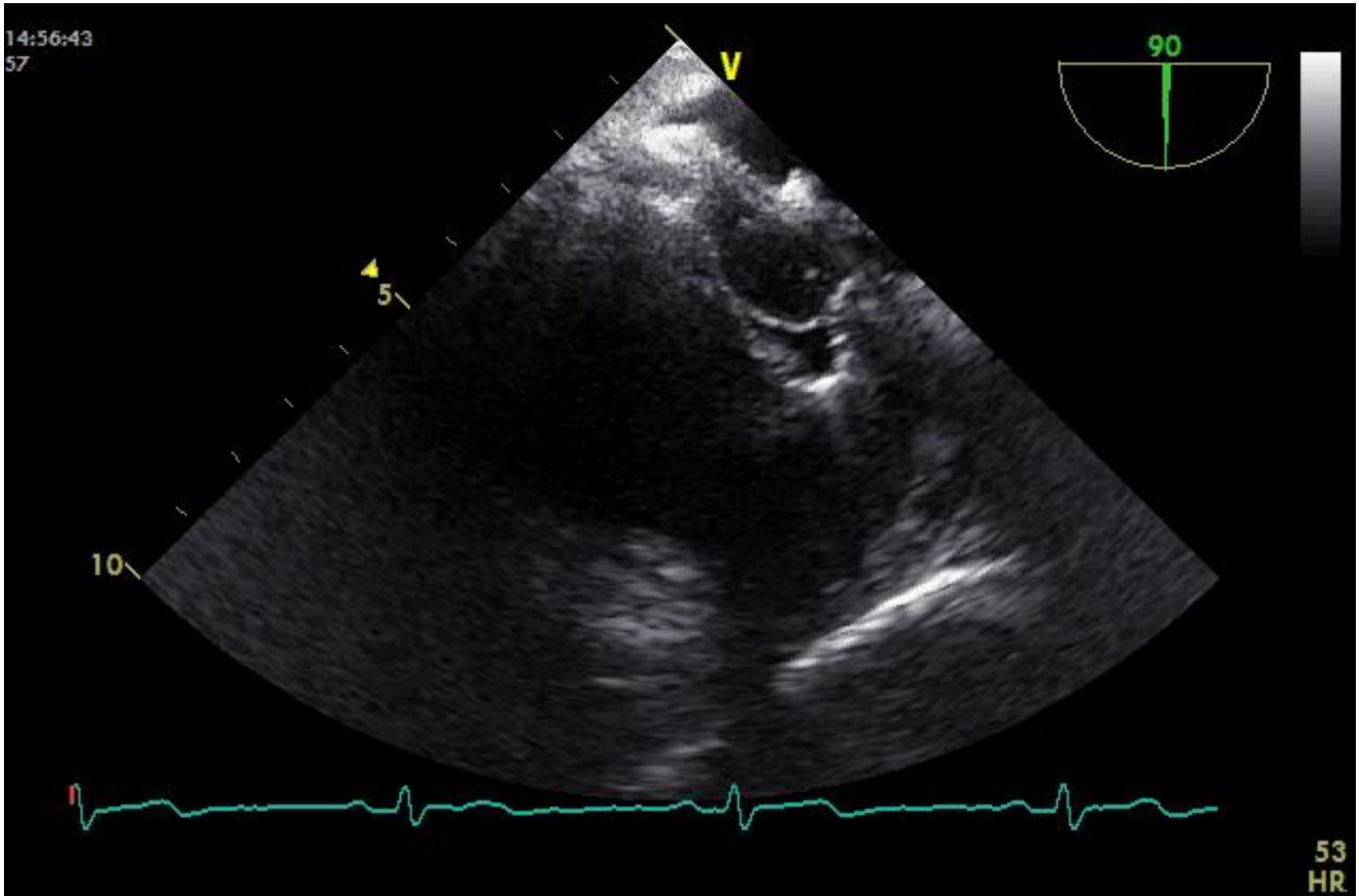


Other “ Tricks”

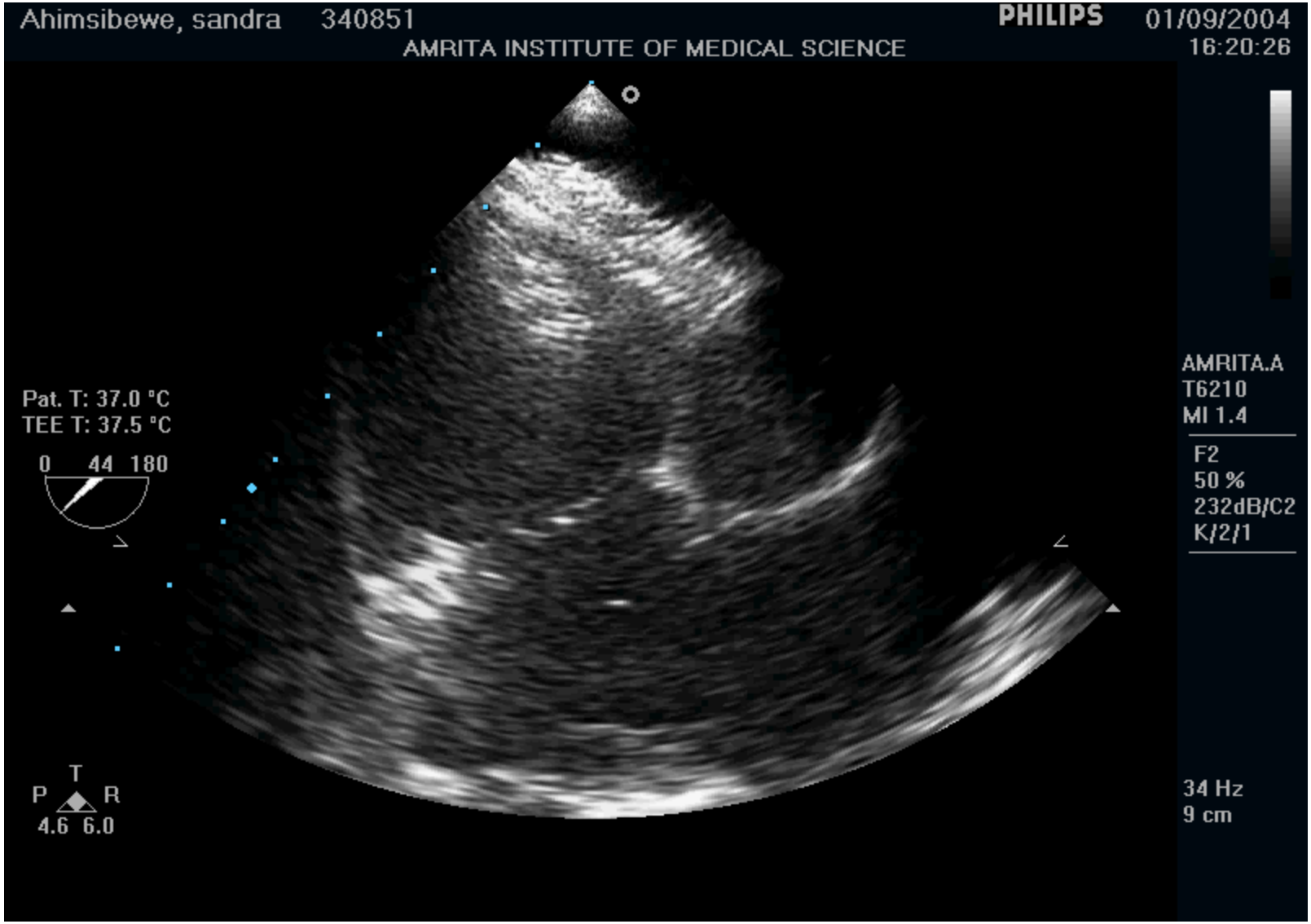
Making the sheath “coaxial to the defect

- Hausdorf
- Fu-star
- Cutting away a part of the sheath (Latson technique)

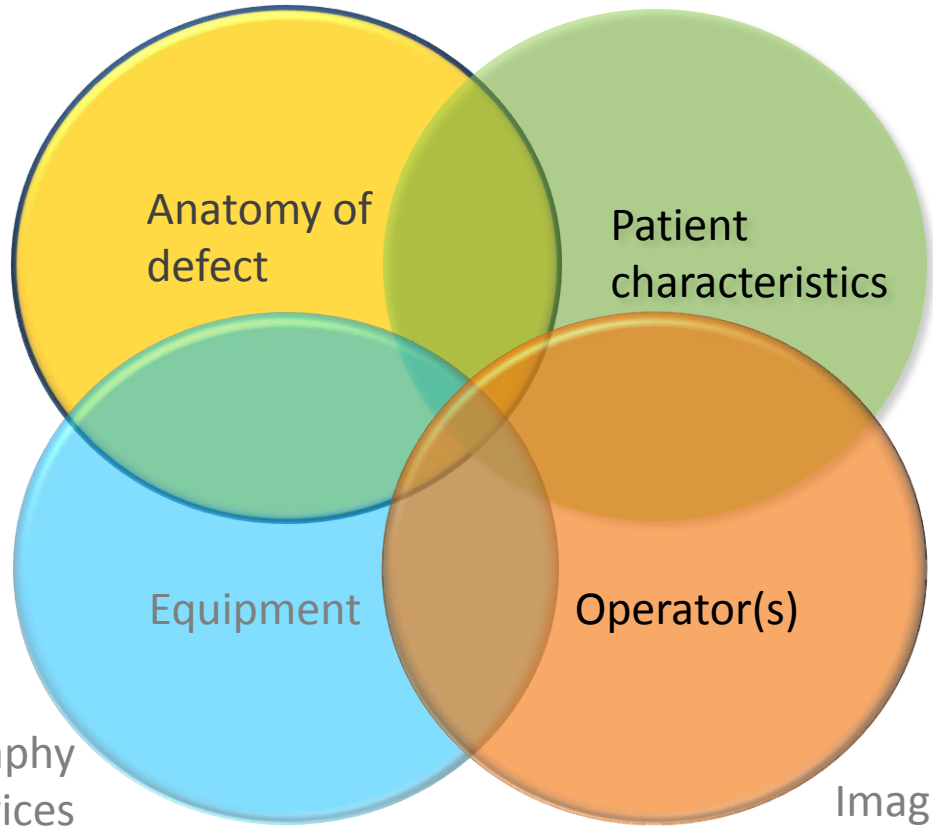
Assessment before release



Testing device stability



What Determines Results of Catheter Closure of ASD?



Size
Location
Margins
Neighboring structures
Associated lesions

Weight
Age
Co-morbidity

Echocardiography
Devices
Delivery systems

Imaging guidance
Experience
Hand-eye coordination