

Intraoperative Echocardiography – a new mandatory monitor ?

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Answer No!

- ✦ Intraoperative echocardiography means TOE/TEE
- ✦ This requires training, accreditation and equipment. Cost implication
- ✦ Class I recommendation for use TOE limited to cardiac surgery at present other than for haemodynamic instability
- ✦ Most anaesthetist practicing intraoperative echo accredit with US/GB or EU boards

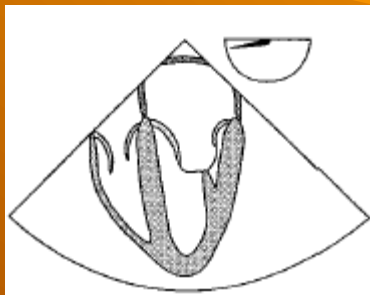
Possibly

- ✦ TOE easy to perform, harder to interpret
- ✦ Answers a lot of questions about haemodynamic instability
- ✦ New technology and cheaper equipment will make it more widely available
- ✦ In future maybe all anaesthetic department should have access to machine and TOE accredited anaesthetist

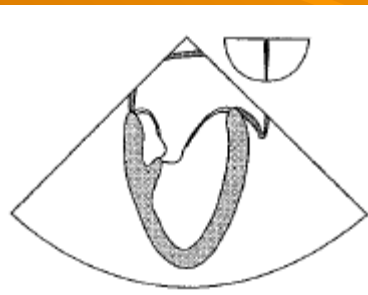
TOE Clinical Cases

- ◆ Will now go through some of standard TOE views
- ◆ Clinical cases to illustrate usefulness of TOE
- ◆ 15 spot the diagnosis questions if time

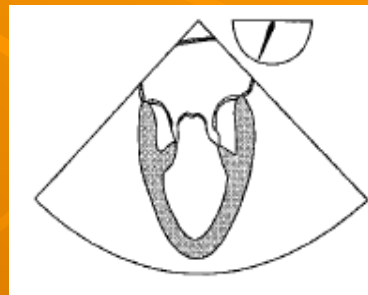




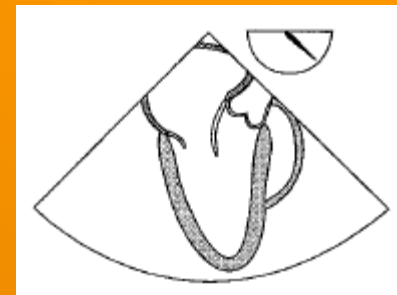
a. ME four chamber



b. ME two chamber



g. ME mitral commissural



c. ME LAX



h. ME AV SAX



i. ME AV LAX



d. TG mid SAX



e. TG two chamber



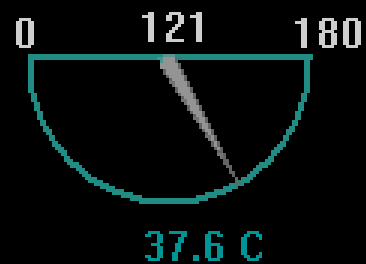
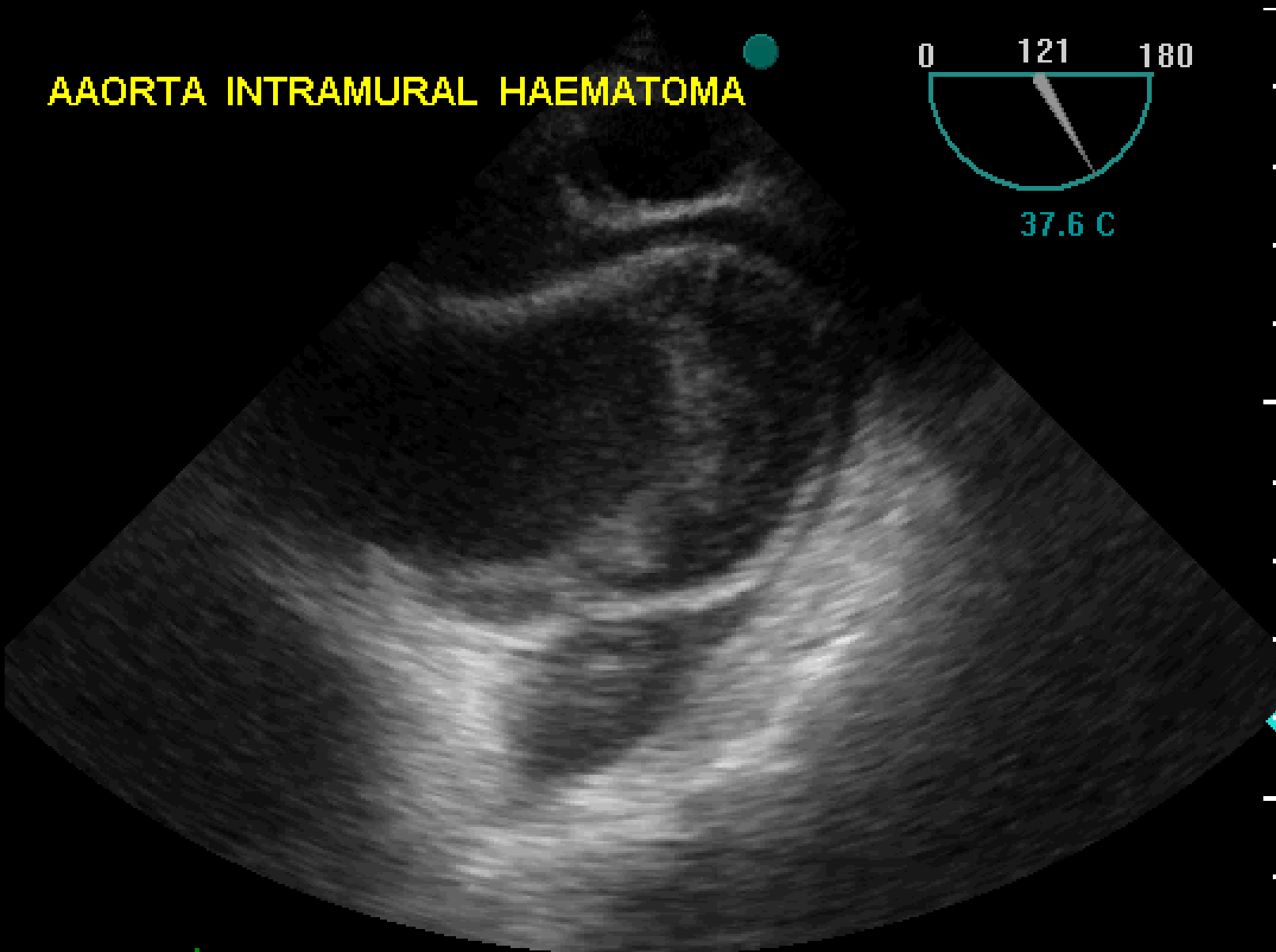
f. TG basal SAX

Easy one to start

- ✦ 54 year old male presents with central tearing chest pain radiating into his back!
- ✦ TOE image of Aortic Arch
- ✦ What is the diagnosis



AAORTA INTRAMURAL HAEMATOMA



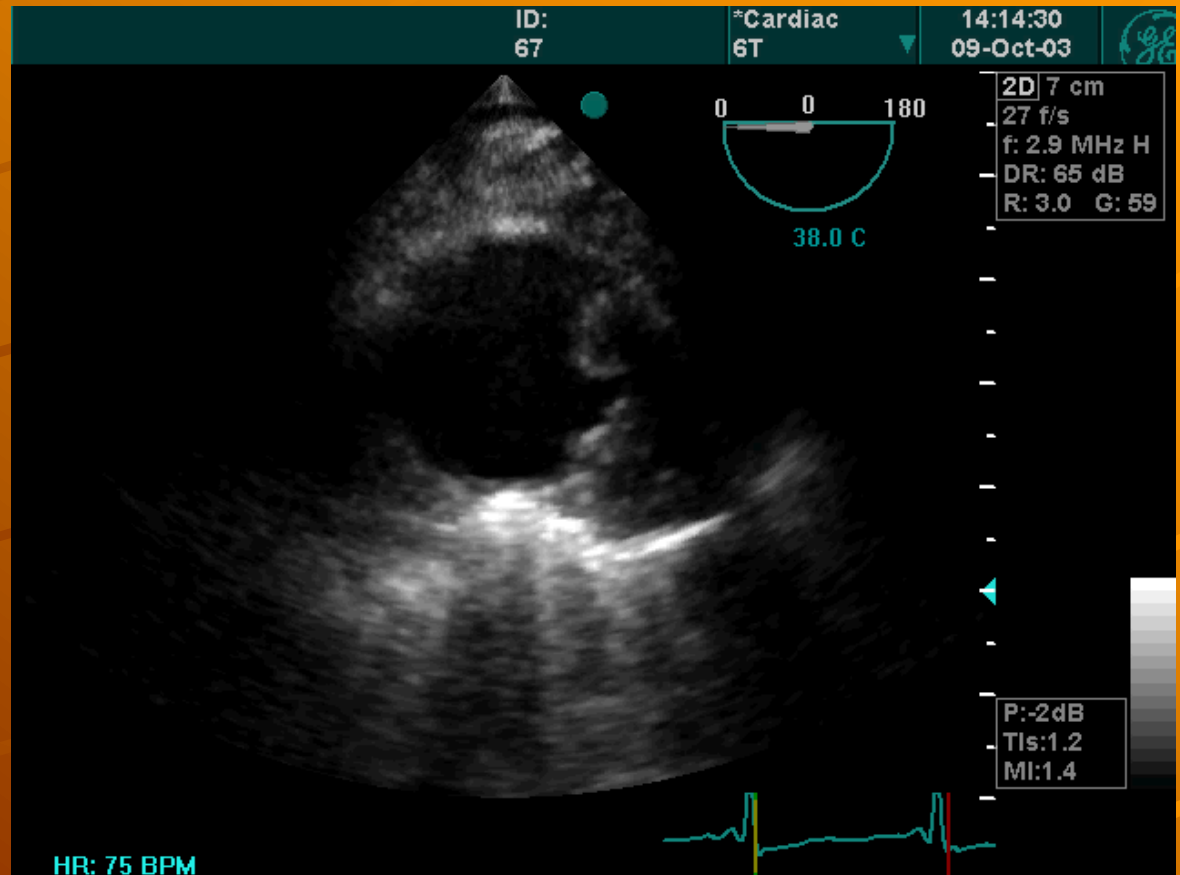
2D 12 cm
27 f/s
f: 2.9 MHz H
DR: 65 dB
R: 0.0 G: 59

P:-2dB
Tls:2.5
MI:1.3

HR: 87 BPM

A Large vessel in the body

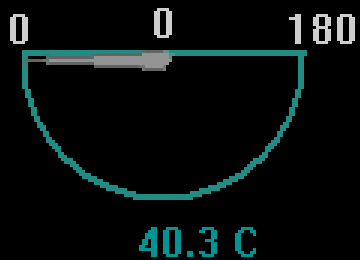
- ✦ What vessel is it
- ✦ What is the abnormality



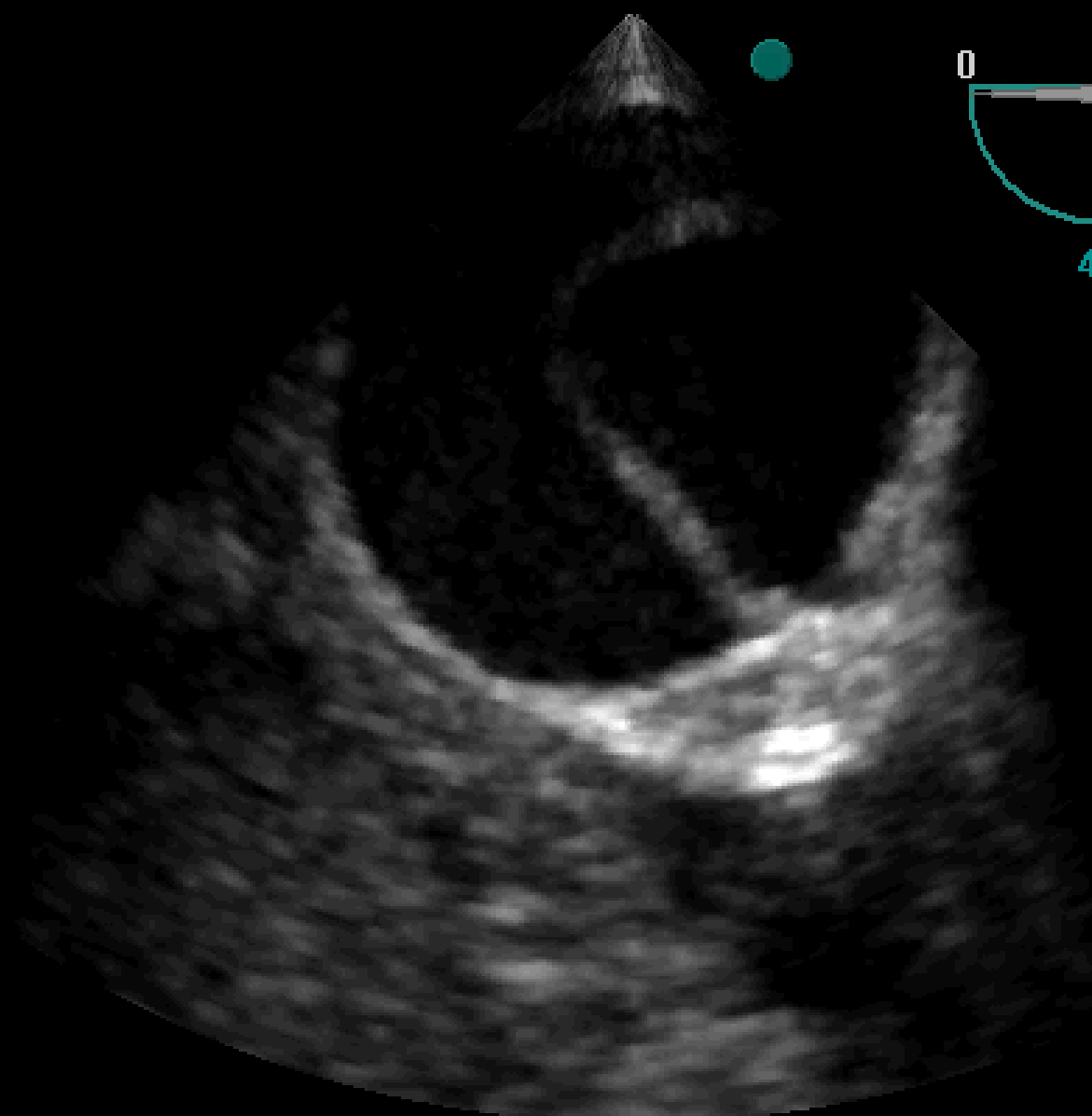
ID:
57

*Cardiac
6T

13:36:26
12-Oct-03



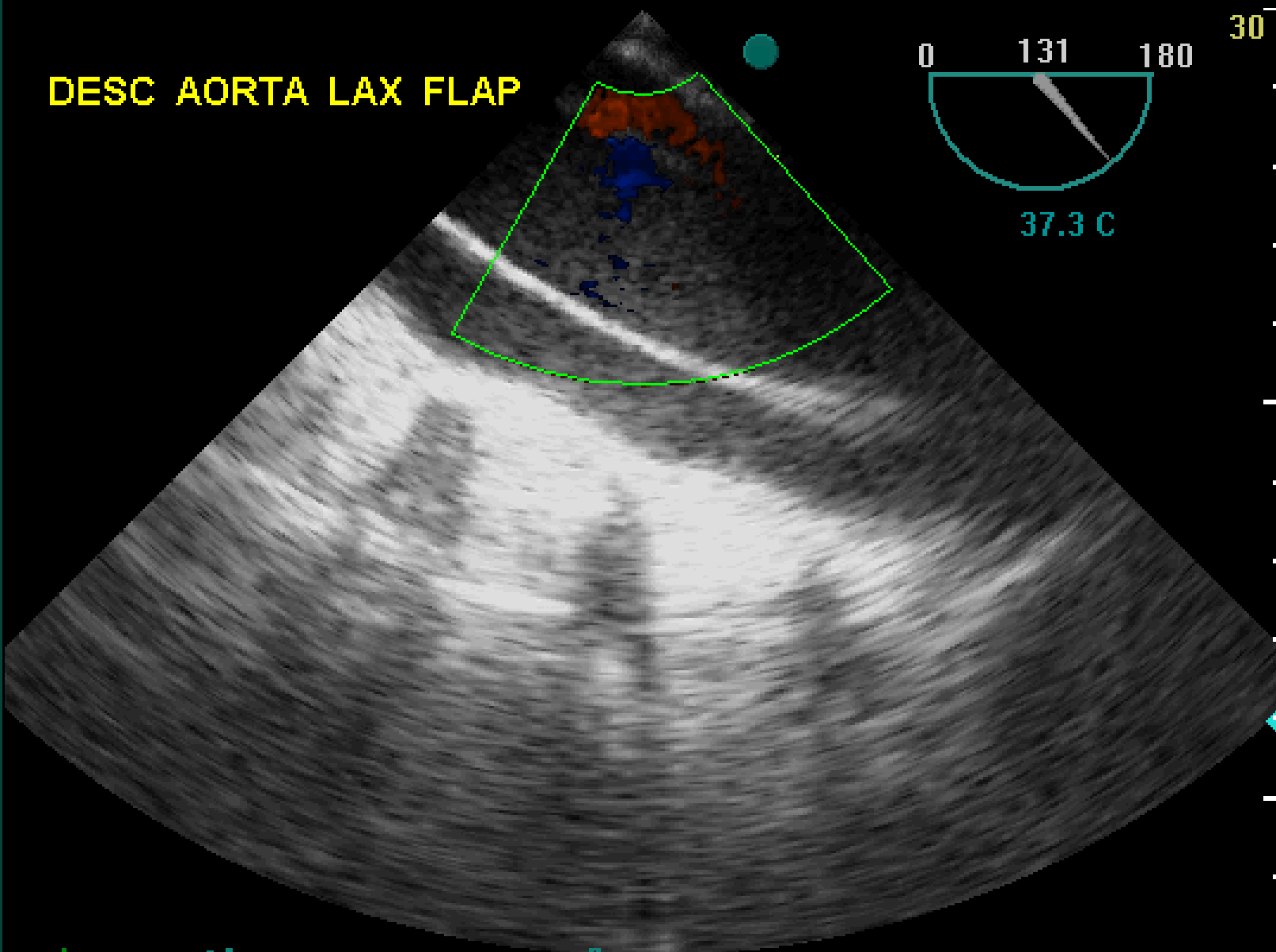
2D 6 cm
27 f/s
f: 2.9 MHz H
DR: 65 dB
R: 3.0 G: 59



P: -2dB
TIs: 1.2
MI: 1.4



DESC AORTA LAX FLAP



30 2D 12 cm
9 f/s
f: 2.9 MHz H
DR: 65 dB
R: 0.0 G: 77

CFM G: 58
f: 4.4 MHz
PRF: 7000 Hz
LVR: 2.6 cm/s

P: -2 dB
TIs: 4.2
MI: 1.3

0.61

-0.61

HR: 196 BPM

1:19:12



Your patient on ITU has a stroke

- ◆ You do a TOE to exclude cardiac thrombus and aortic atheroma
- ◆ When you check the descending aorta you see this image
- ◆ Should you call the surgeons urgently

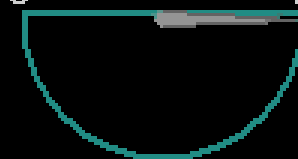
ID:
75

*Cardiac
6T

12:49:29
15-Nov-03



0 180 180



37.3 C

22 2D 8 cm
37 f/s
f: 2.9 MHz H
DR: 65 dB
R: 0.0 G: 61

P: -2dB
TIs: 0.8
MI: 1.4

HR: 70 BPM

0:36:22



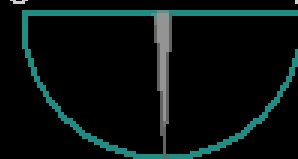
ID:
75

*Cardiac
6T

12:48:08
15-Nov-03



0 91 180



37.8 C

21 2D 8 cm
37 f/s
f: 2.9 MHz H
DR: 65 dB
R: 0.0 G: 61

HR: 135 BPM



0:36:22



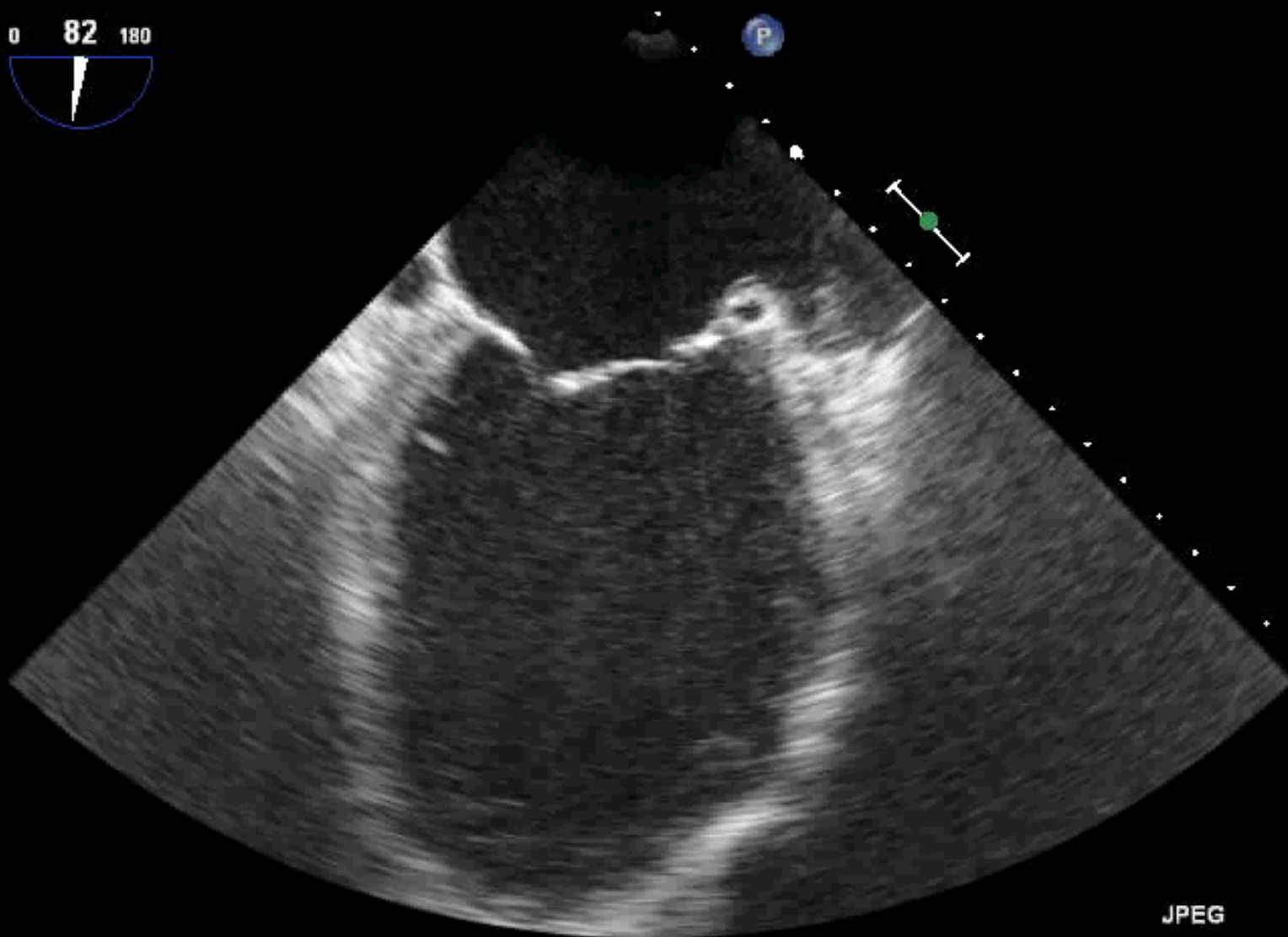
? Fit for surgery

- ◆ 80 yr old male
- ◆ Presents with pulmonary oedema
- ◆ Echo results



FR 35Hz
18cm

M4

2D
76%
C 50
P Off
Gen

JPEG

PAT T: 37.0C
TEE T: 38.4C

75 bpm

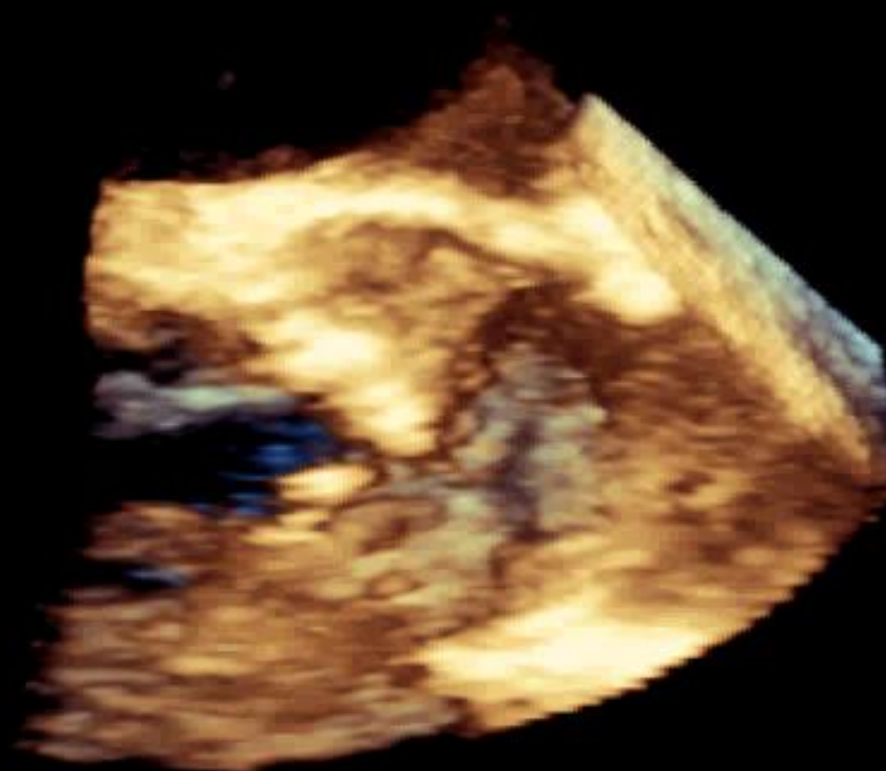
1	AV Vmax	4.49 m/s
	AV Vmean	3.06 m/s
	AV maxPG	80.57 mmHg
	AV meanPG	43.40 mmHg
	AV VTI	83.1 cm
	AV Env.Ti	272 ms
	HR	75 BPM



FR 23Hz
7.6cm

M4

Live 3D
3D 42%
3D 40dB
Gen



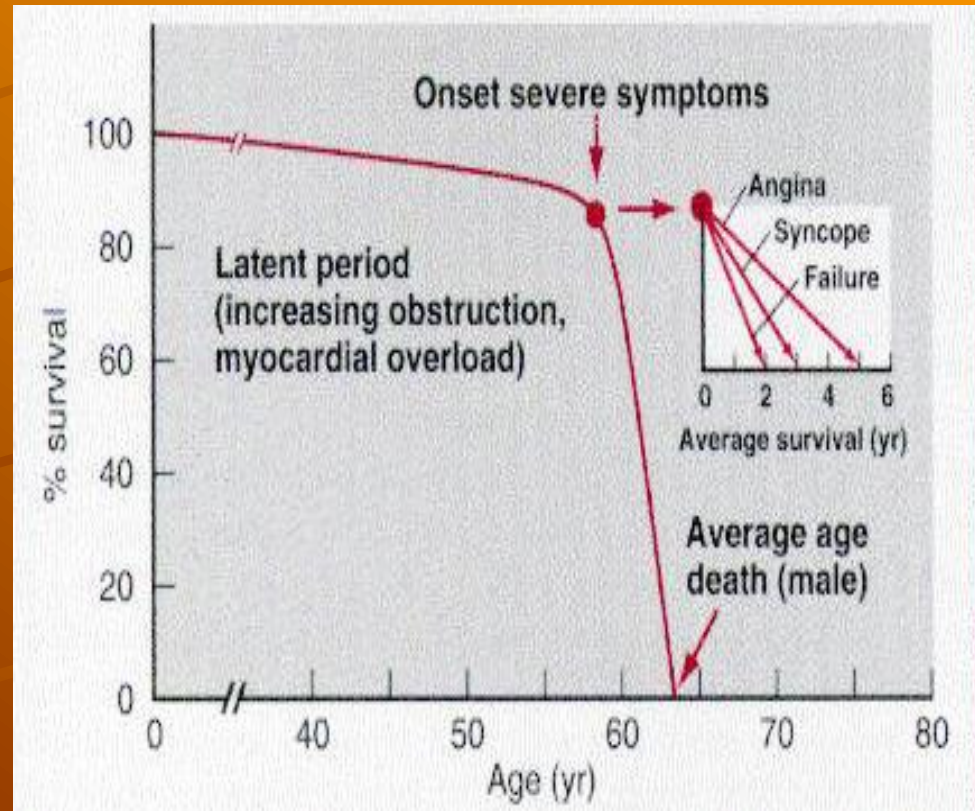
JPEG

PAT T: 37.0C
TEE T: 40.0C

55 bpm

Surgeon refuse patient

Any other options?



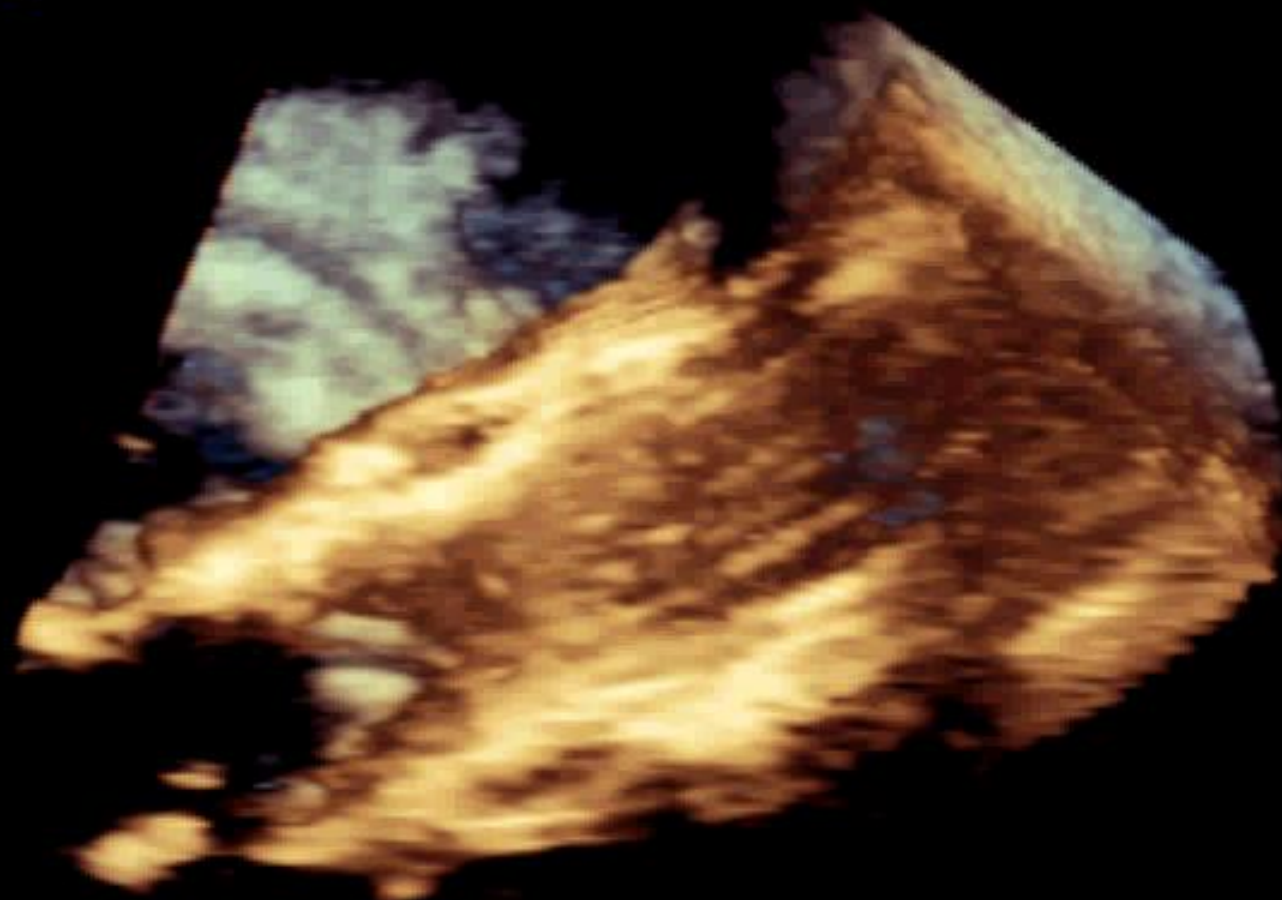
TAVI



FR 12Hz
9.9cm

M4

Live 3D
3D 31%
3D 40dB
Gen



JPEG

PAT T: 37.0C
TEE T: 40.5C


64 bpm

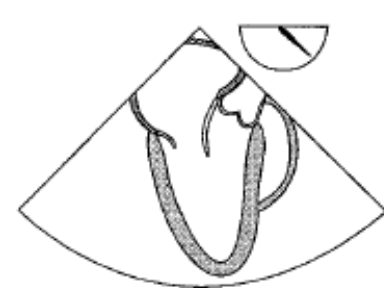
58 year old Male on CCU

- ◆ 4 days after posterior/septal Myocardial infarction
- ◆ Sudden onset SOB, Sats 85% on 4 l/m
- ◆ On examination – pansystolic murmur, basal creps



Diagnosis and Management

- 
- ✦ Pulmonary oedema
 - ✦ Cardiogenic shock
 - ✦ Pneumonia
 - ✦ PE
 - ✦ Acute VSD
 - ✦ Papillary muscle rupture
 - ✦ ABC
 - ✦ ICU
 - ✦ Off load
 - ✦ Inotropes
 - ✦ CPAP
 - ✦ Ventilation



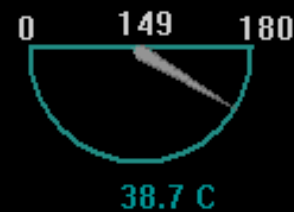
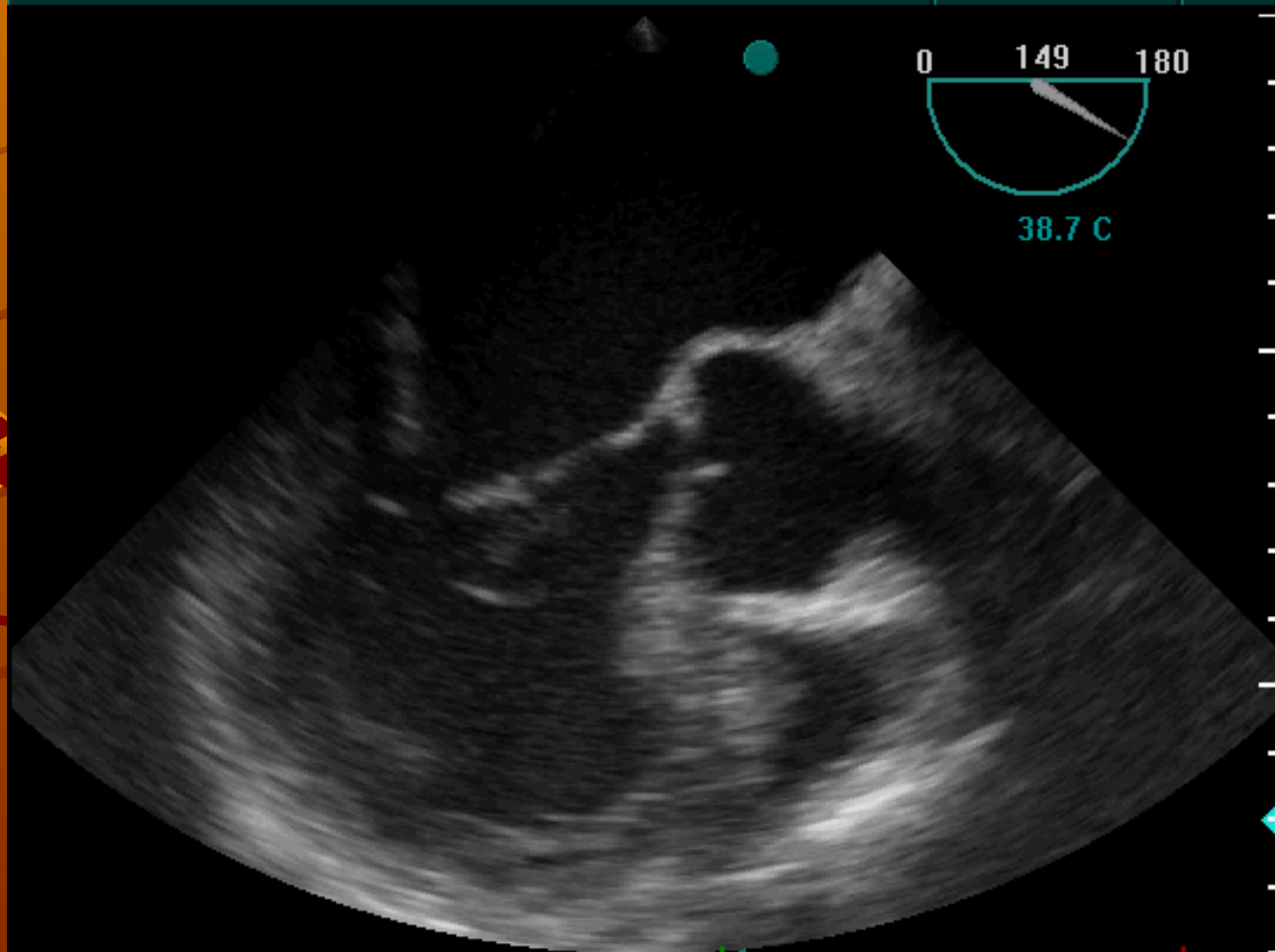
c. ME LAX

DUKE,STEPHEN

ID:H679059
60

*Cardiac
6T

14:17:06
22-Aug-03



2D 14 cm
27 f/s
f: 2.9 MHz H
DR: 65 dB
R: 0.0 G: 61

P:-2dB
TIs:2.5
MI:1.2

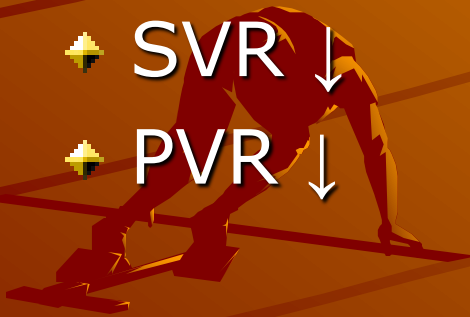
HR: 92 BPM



Management of acute MR

- ✦ Preload $\uparrow \downarrow$
- ✦ HR \downarrow tx AF
- ✦ Maintain contractility
- ✦ SVR \downarrow
- ✦ PVR \downarrow

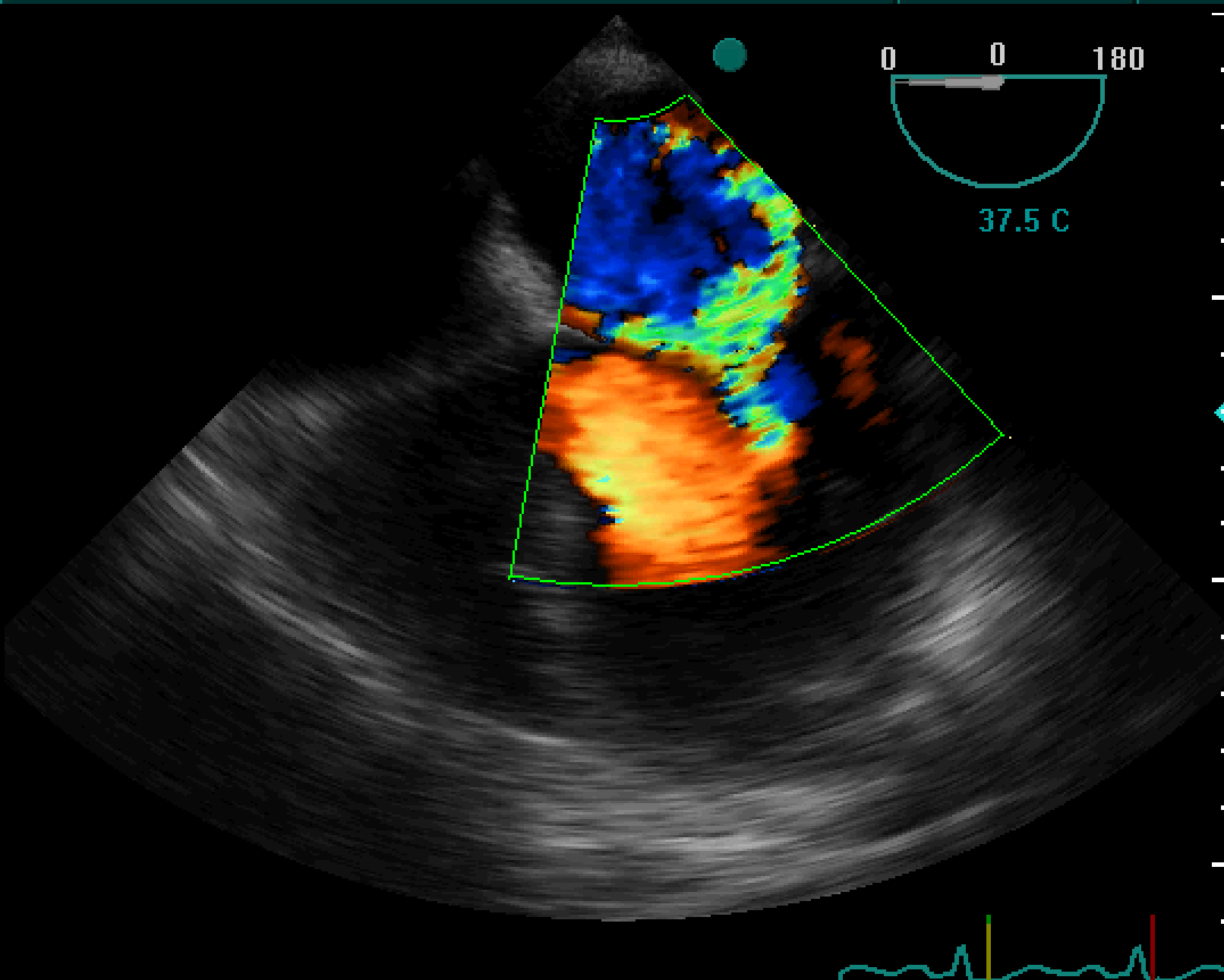
- ✦ Repair
- ✦ Replace
- ✦ Mechanical or Tissue Valve



ID:H854377
65

*Cardiac
6T

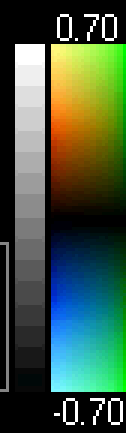
13:48:01
05-Aug-03



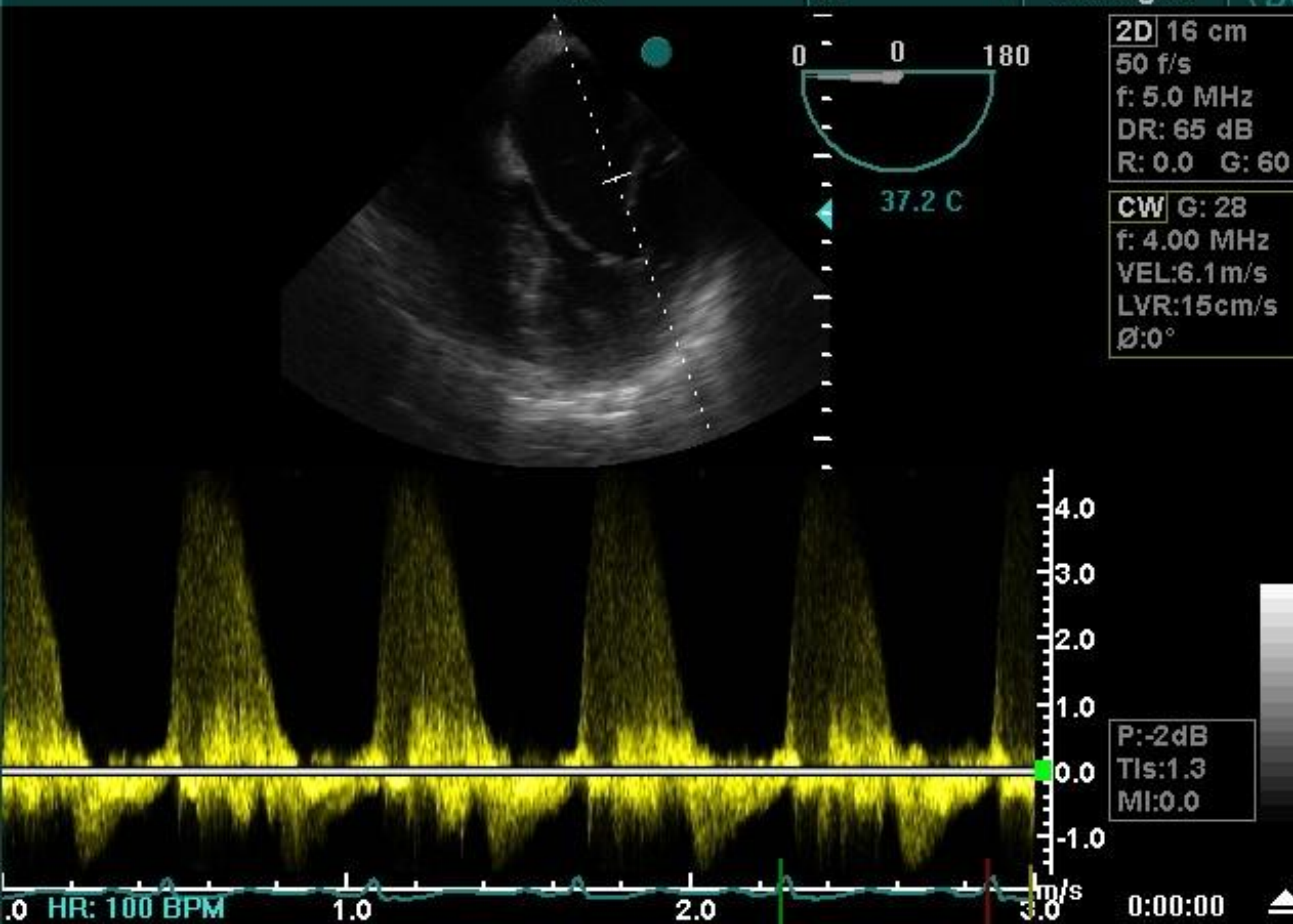
2D 16 cm
17 f/s
f: 5.0 MHz
DR: 65 dB
R: 0.0 G: 60

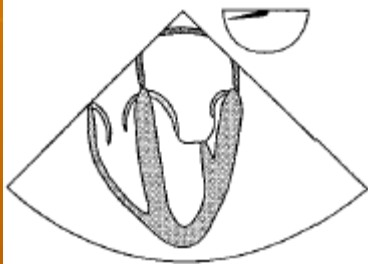
CFM G: 58
f: 3.6 MHz
PRF: 6500 Hz
LVR: 3.2 cm/s

P: -2 dB
TIs: 4.2
MI: 1.1

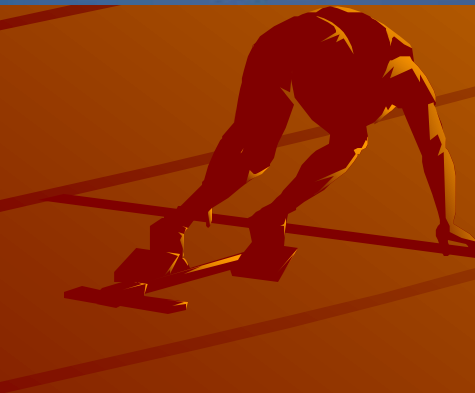


HR: 110 BPM





a. ME four chamber

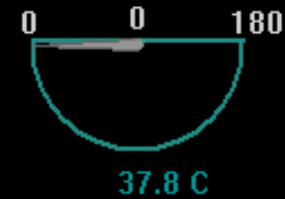
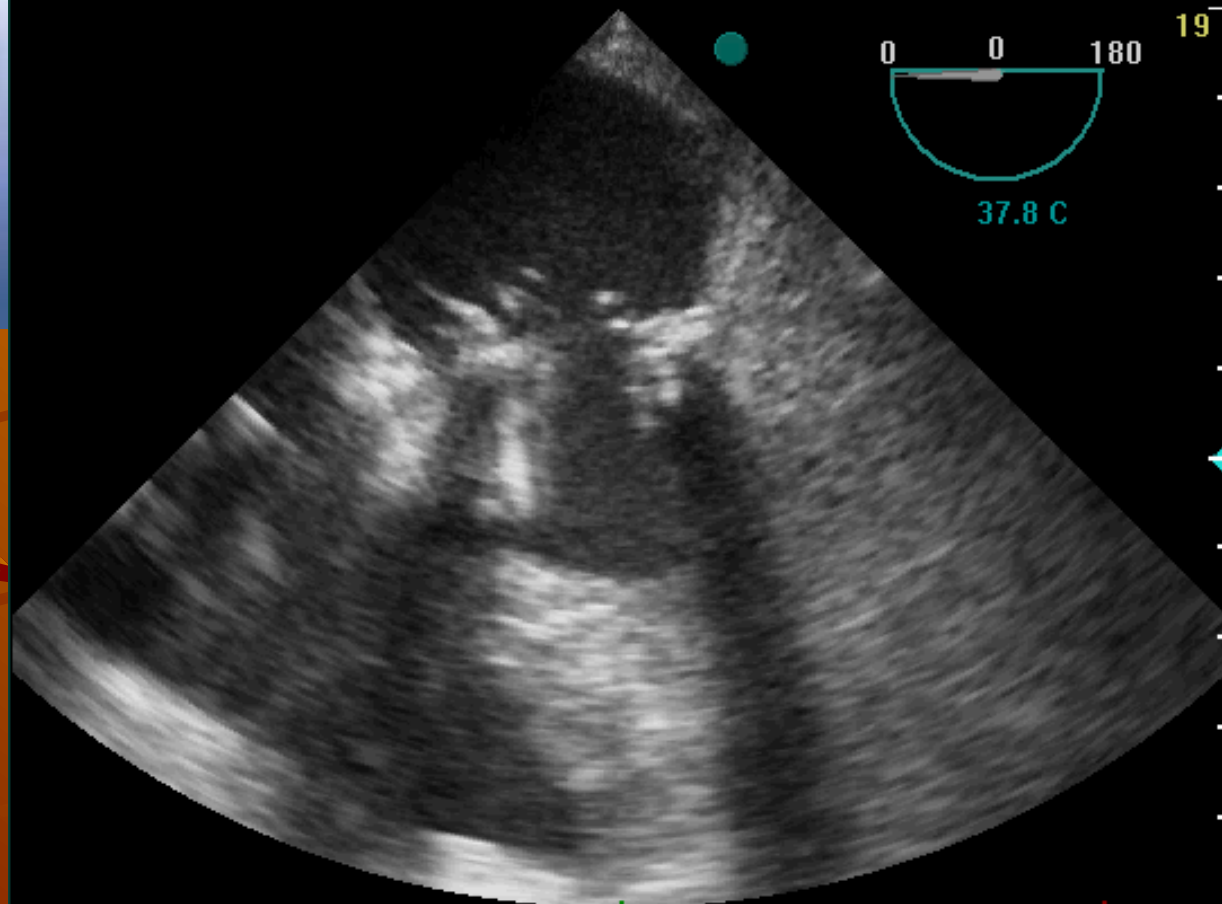


WHITEN, JANET
St Georges Hospital

ID: H823559
62

Cardiac
6T

16:32:13
04-Apr-03



19 2D 10 cm
66 f/s
f: 6.7 MHz
DR: 65 dB
R: 0.0 G: 65

P: -2dB
TIs: 3.8
MI: 1.3

HR: 77 BPM

3:06:01

St. Jude's Valve
Open Position



Rotating disk

Sewing Ring

ID:
48

*Cardiac
6T

2:04:54 pm
16-Dec-03



0 46 180



41.0 C

1 2D 10 cm
27 f/s
f: 2.9 MHz H
DR: 65 dB
R: 0.0 G: 61

P:-2dB
TIs:1.8
MI:1.4

0:31:28



10:47:07 am



TE-VSM

61Hz

7.0MHz

35mm

TEE

TEE

Core Temp=37.5°C

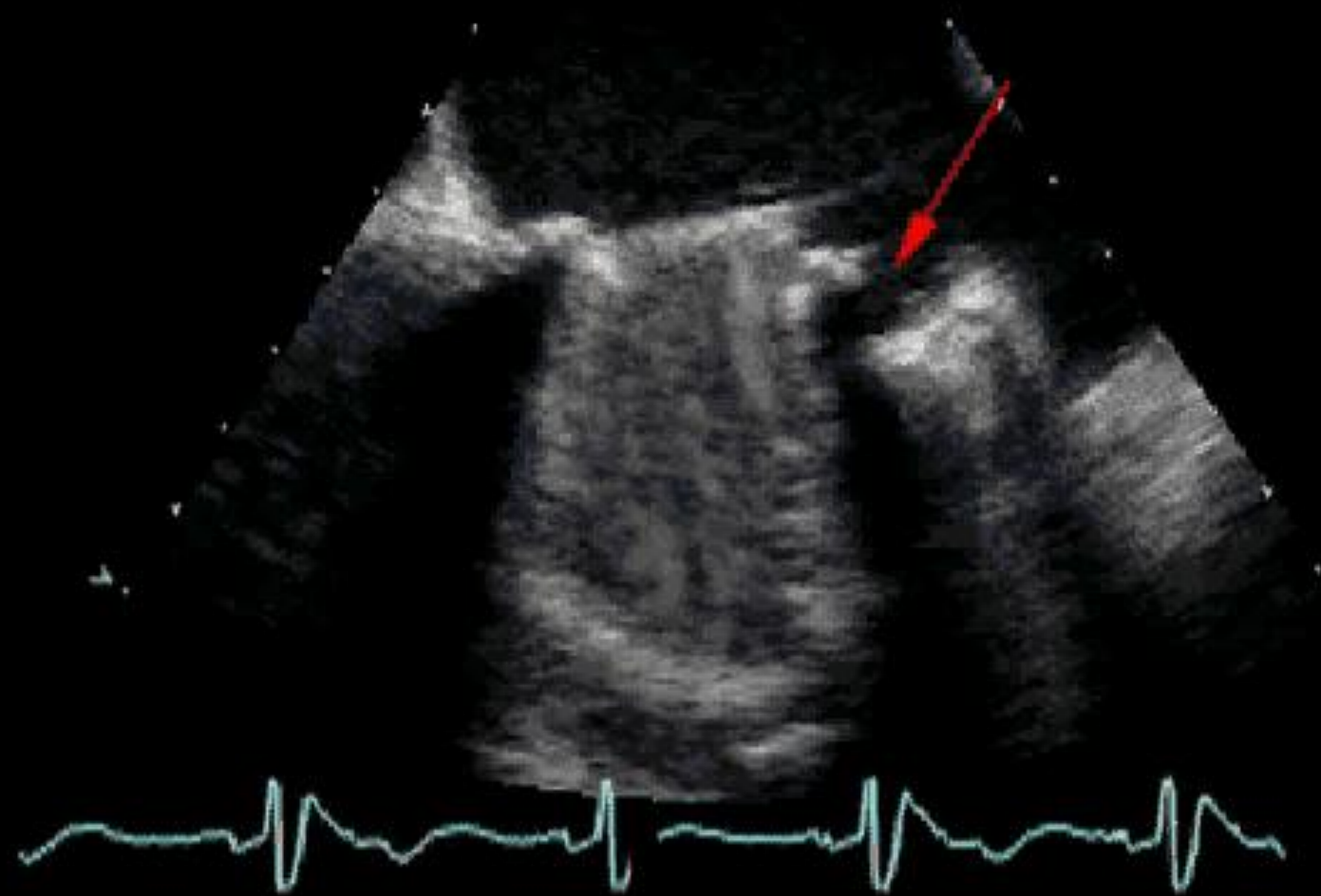
70dB 51/ 0/1/4

Gain= 3dB Δ=2

Store in progress

00 0:04:33

HR= 58bpm

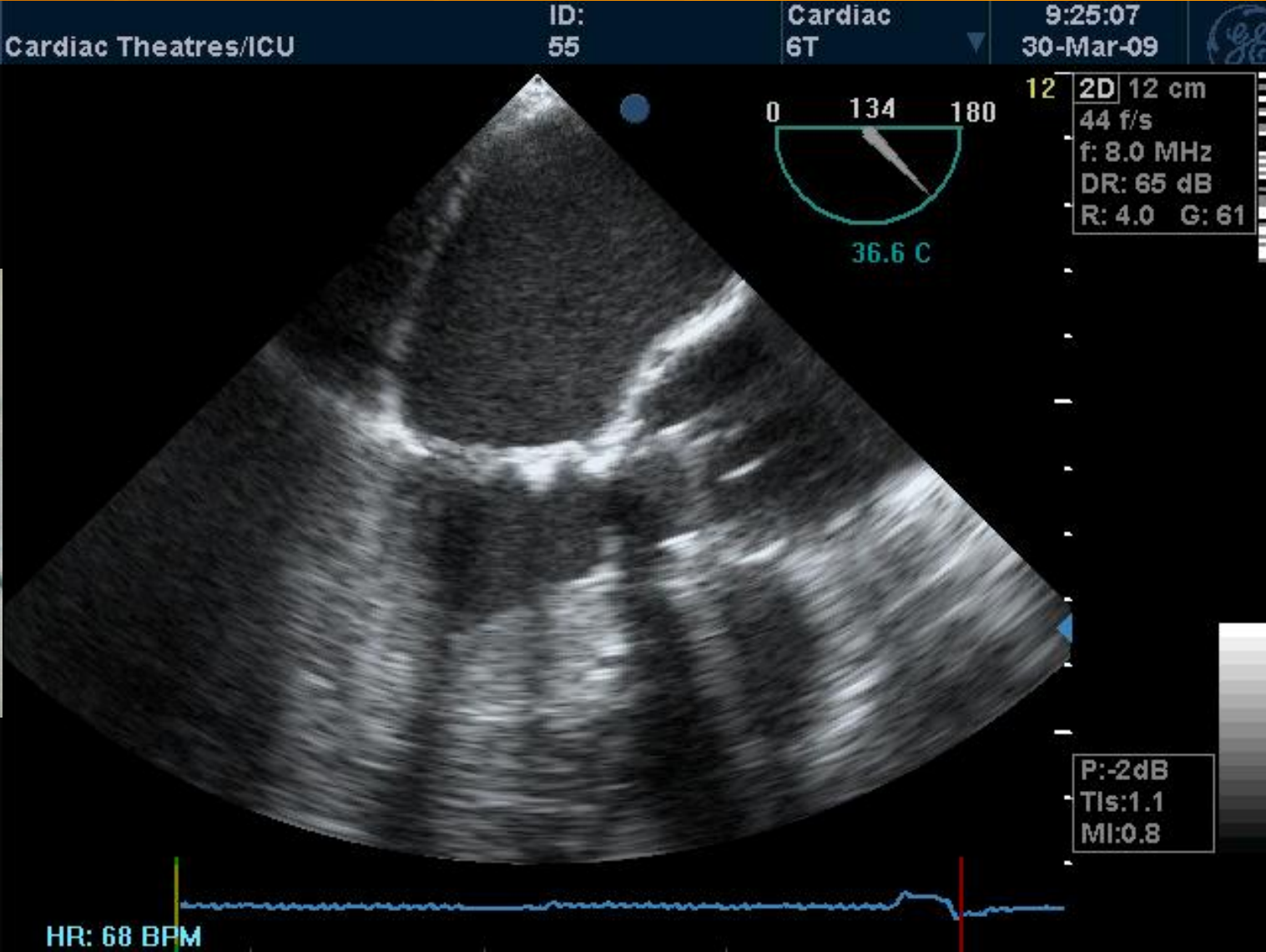
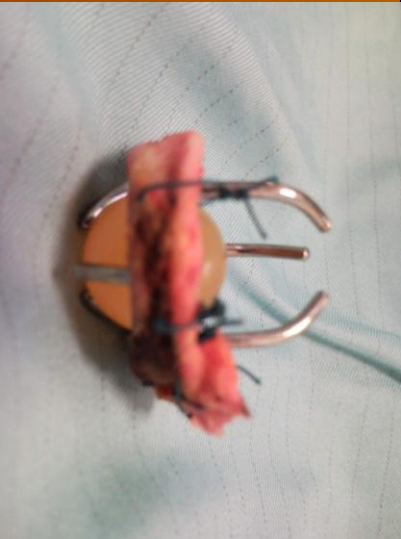


Exit

Res Box



i. ME AV LAX



24 year old student with 2 hours episode of dysarthria

- ◆ Previously fit and well
- ◆ 1 week history of URTI episode followed bout of coughing
- ◆ No history EtOH or Drug abuse



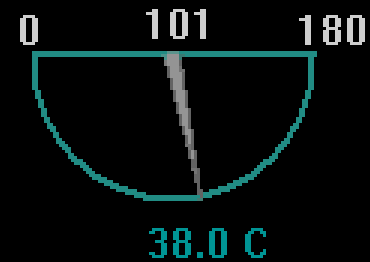
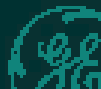
Investigation

- ◆ ECG normal
- ◆ CT head normal
- ◆ Transthoracic echocardiogram normal
- ◆ Transoesophageal echocardiogram PFO
- ◆ Scheduled for Device closure with TOE guidance

ID:
64

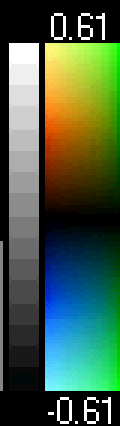
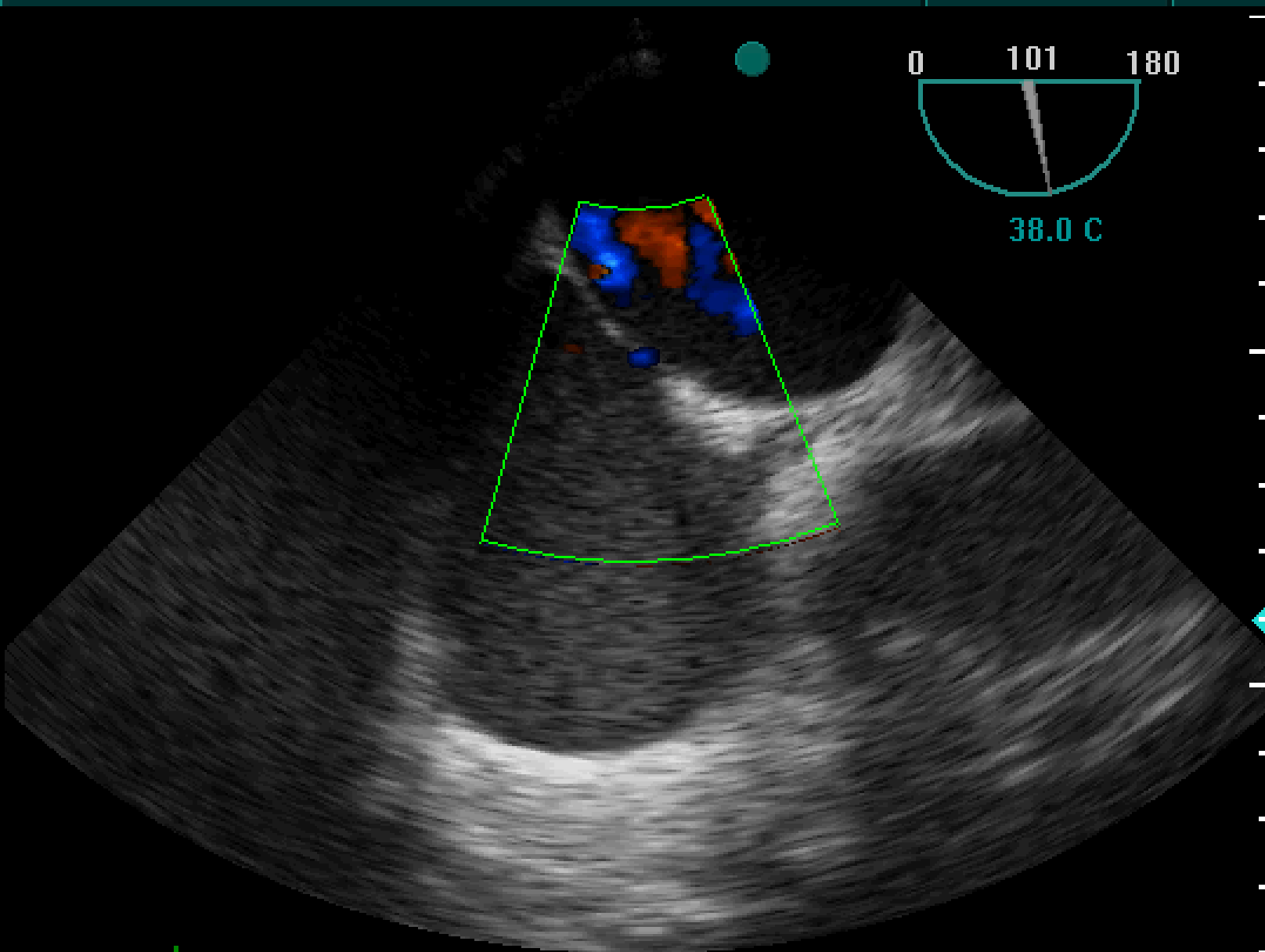
*Cardiac
6T

10:17:56
23-Oct-03



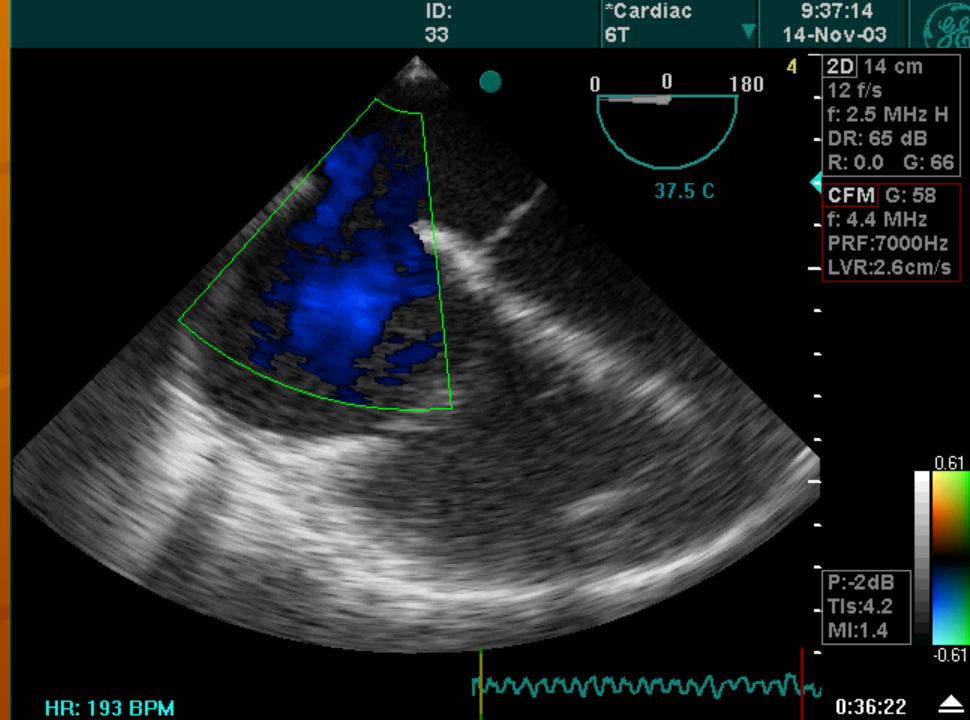
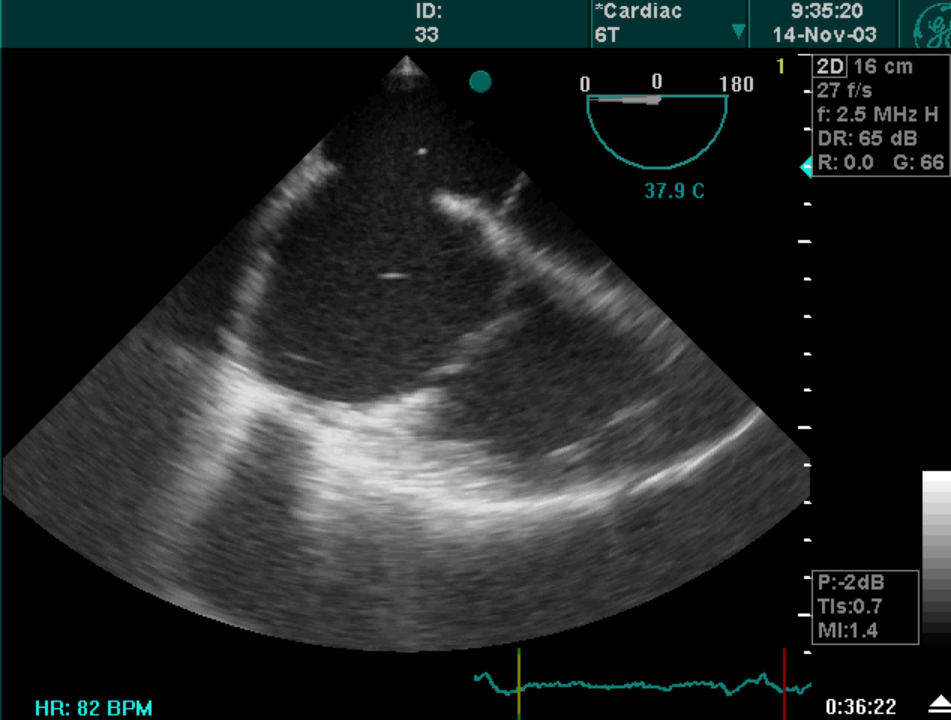
2D 14 cm
15 f/s
f: 2.9 MHz H
DR: 65 dB
R: 0.0 G: 61

CFM G: 49
f: 4.4 MHz
PRF: 7000 Hz
LVR: 2.6 cm/s

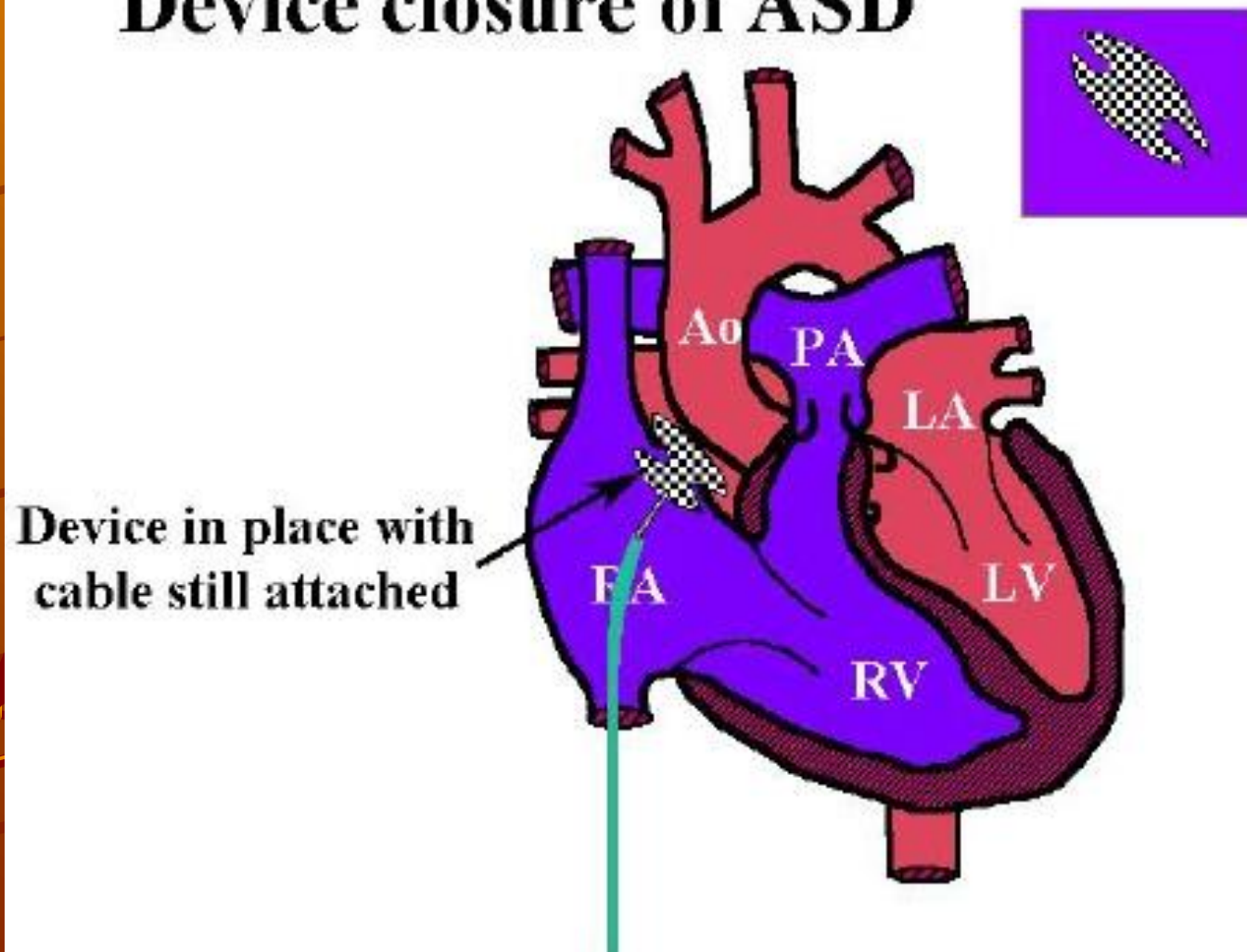


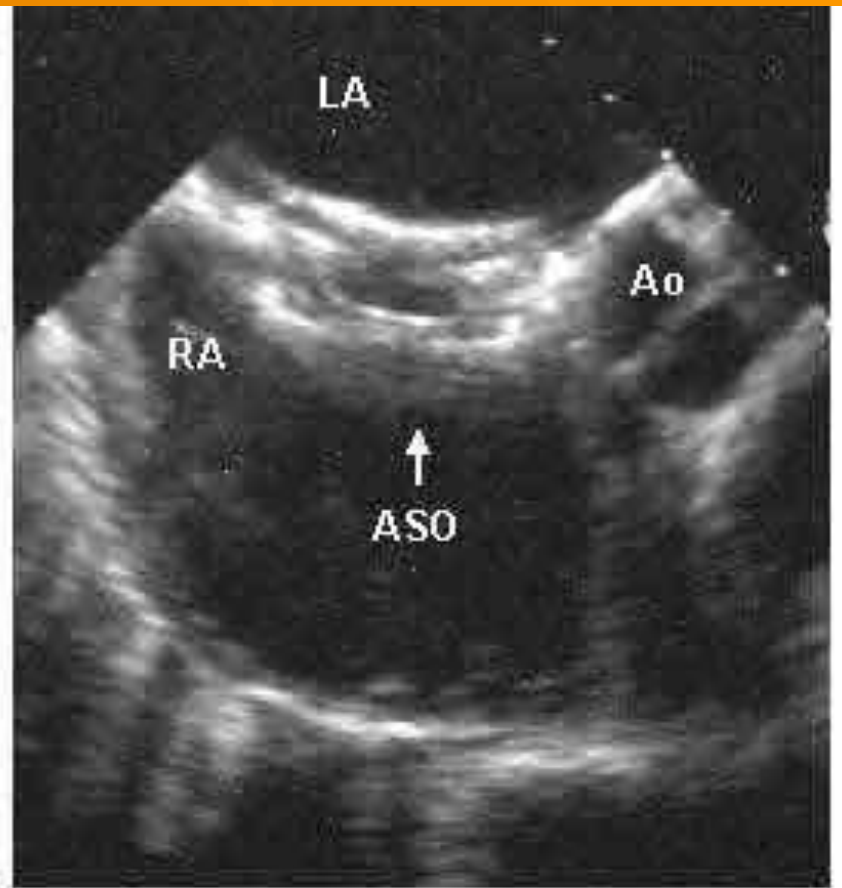
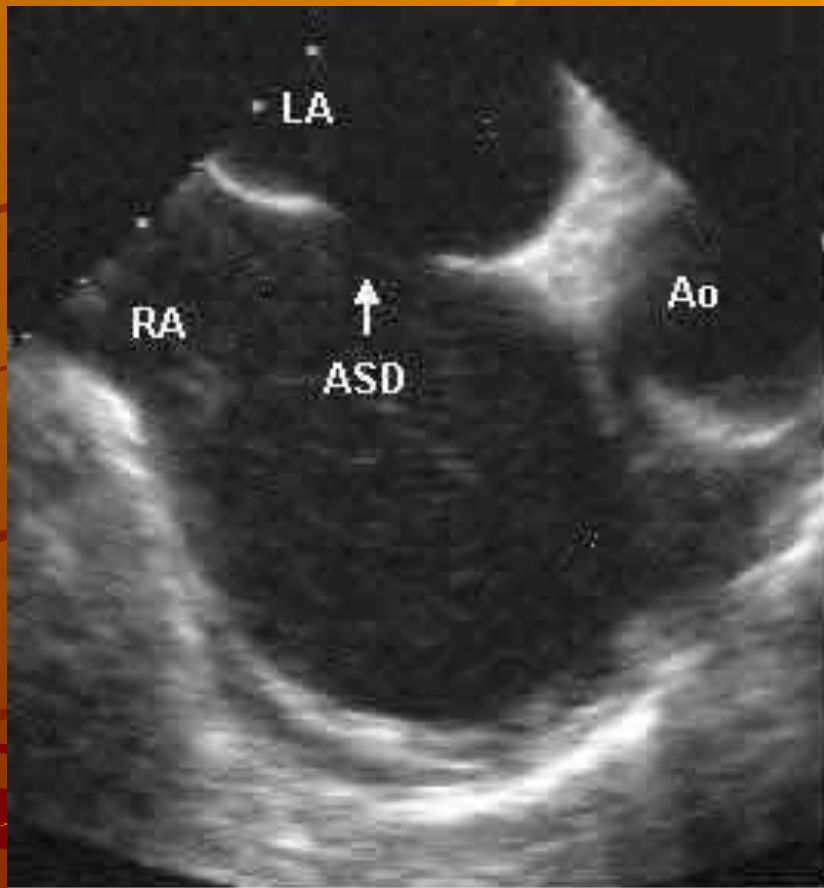
P: -2 dB
TIs: 4.2
MI: 1.1

HR: 76 BPM



Device closure of ASD





VSD

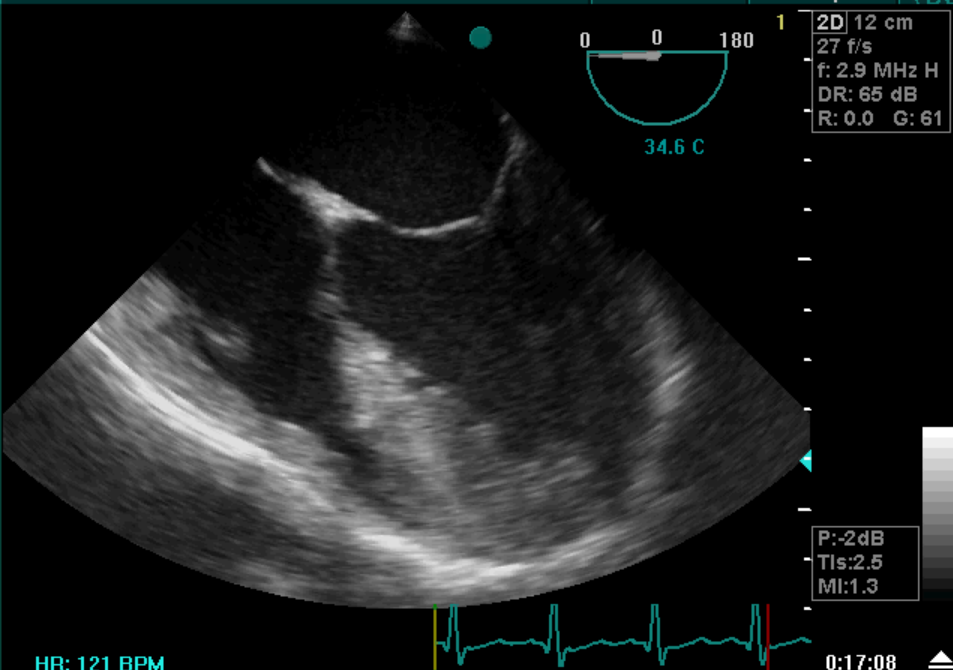
- ◆ Congenital or Acquired
- ◆ Perimembranous, muscular, infundibular
- ◆ $L \Rightarrow R$ shunt
- ◆ Restrictive \leftrightarrow Large (PVR/SVR)
- ◆ Pul. HT. if $Q_p/Q_s = 2-4:1$

DE GOUVEIA,JOAO

ID:H832565
36

*Cardiac
6T

10:24:28
24-Sep-03

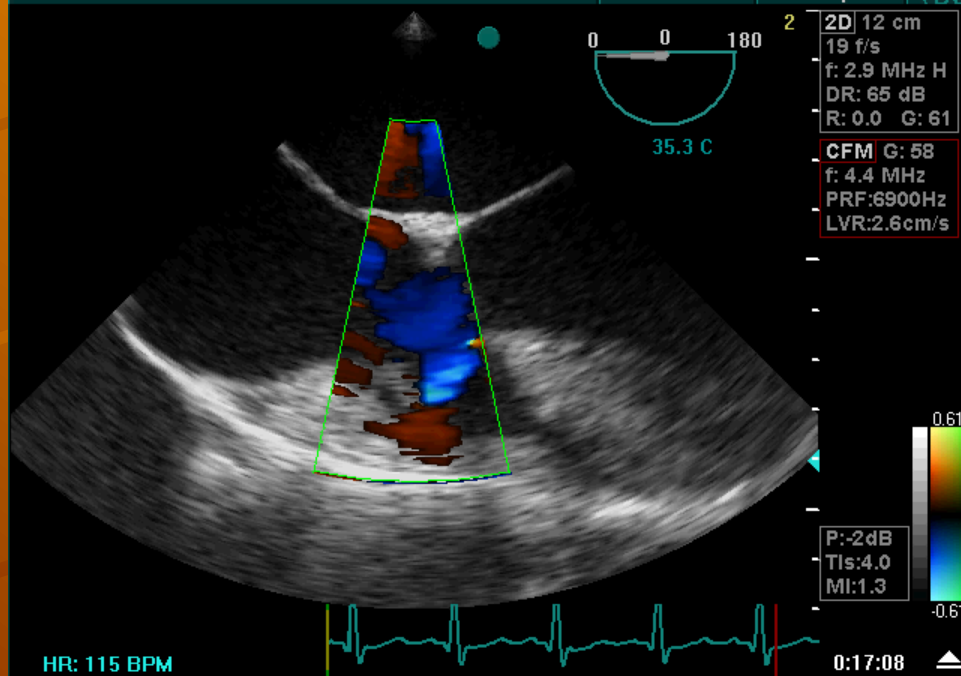


DE GOUVEIA,JOAO

ID:H832565
36

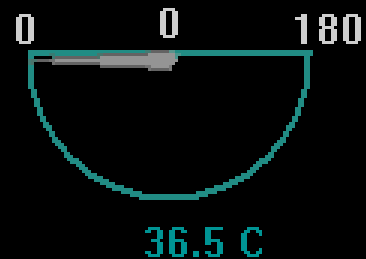
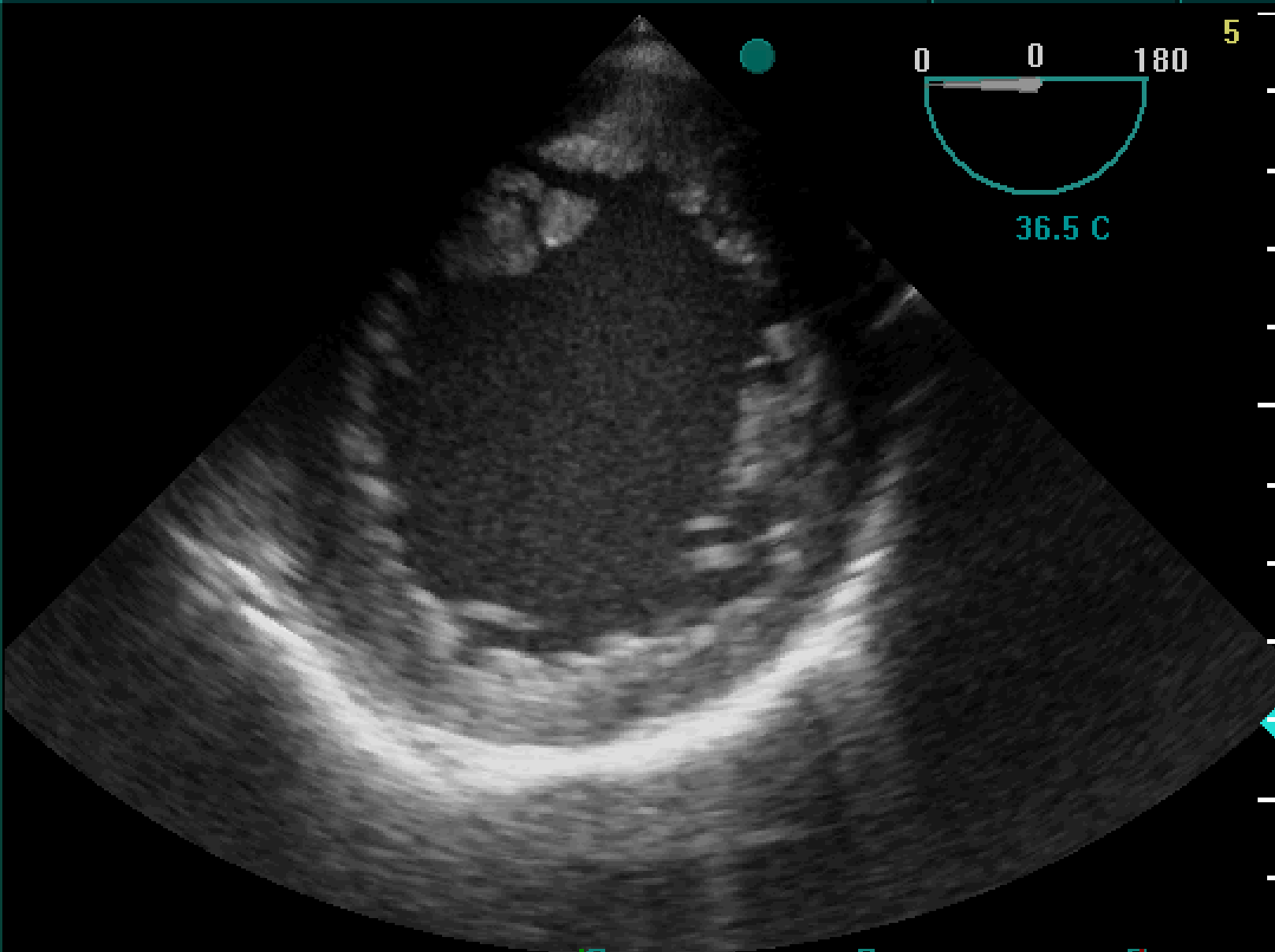
*Cardiac
6T

10:24:48
24-Sep-03



Assessing Ventricular Function

- ◆ Look at contractility wall thickening
- ◆ Measure Fraction shortening
- ◆ Measure Fractional Area of Contraction
- ◆ Stroke volume
- ◆ Best view is doughnut view.
Transgastric short axis



5

2D	12 cm
51 f/s	
f: 2.9 MHz H	
DR: 65 dB	
R: 0.0	G: 61

P: -2dB
TIs: 2.4
MI: 1.0

HR: 72 BPM

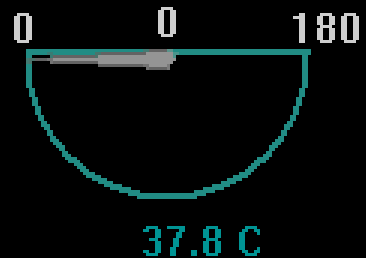
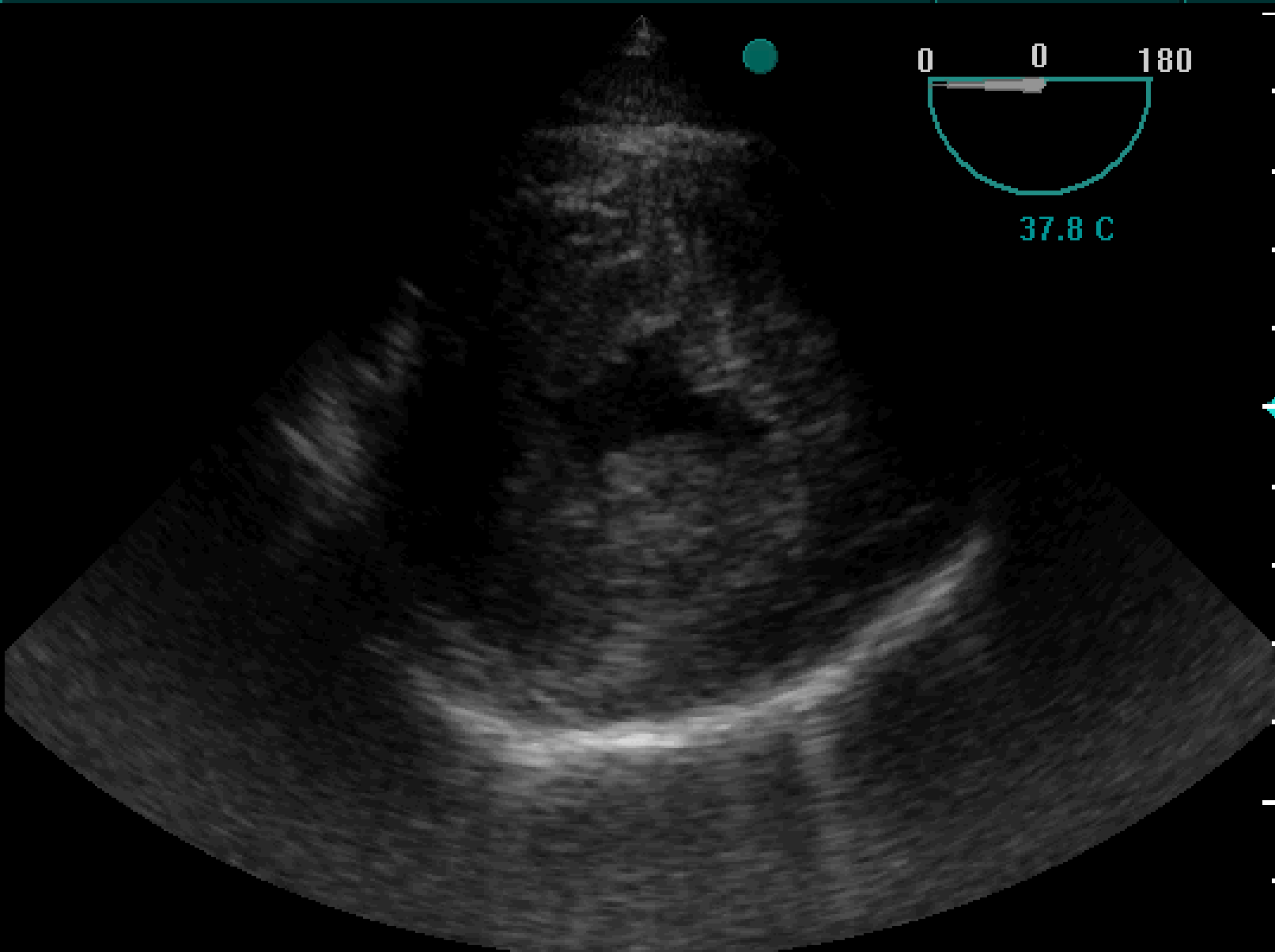
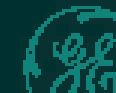
0:17:07

BRANDON,RITA

ID:H837693
41

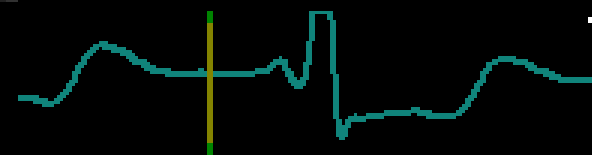
Cardiac
6T

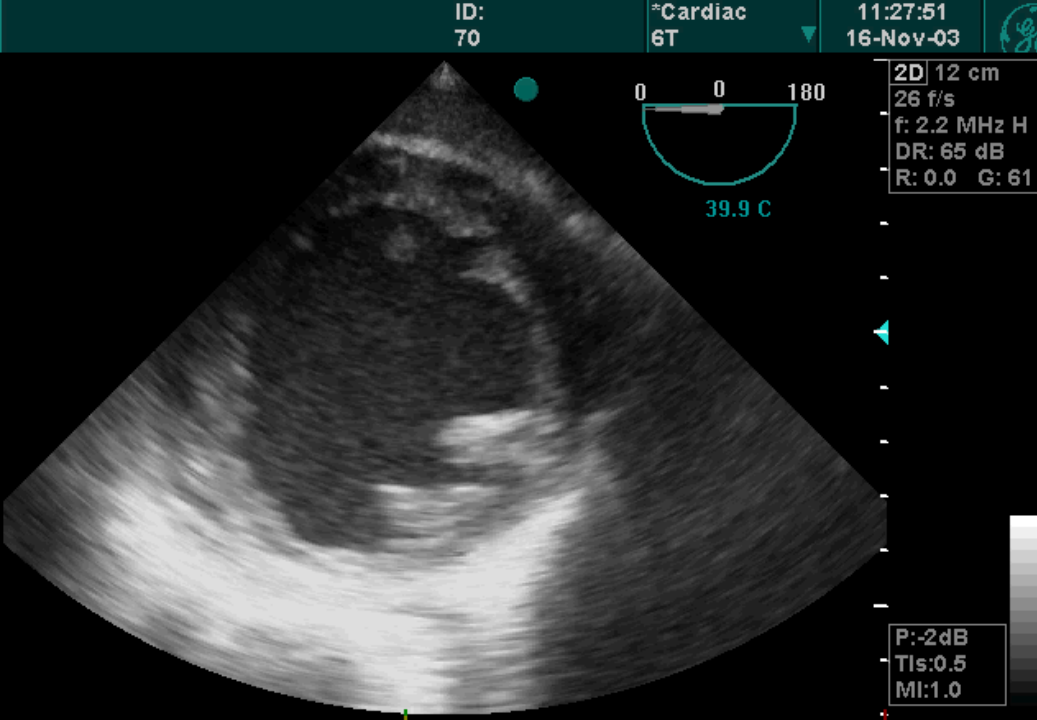
9:24:18
04-Aug-03



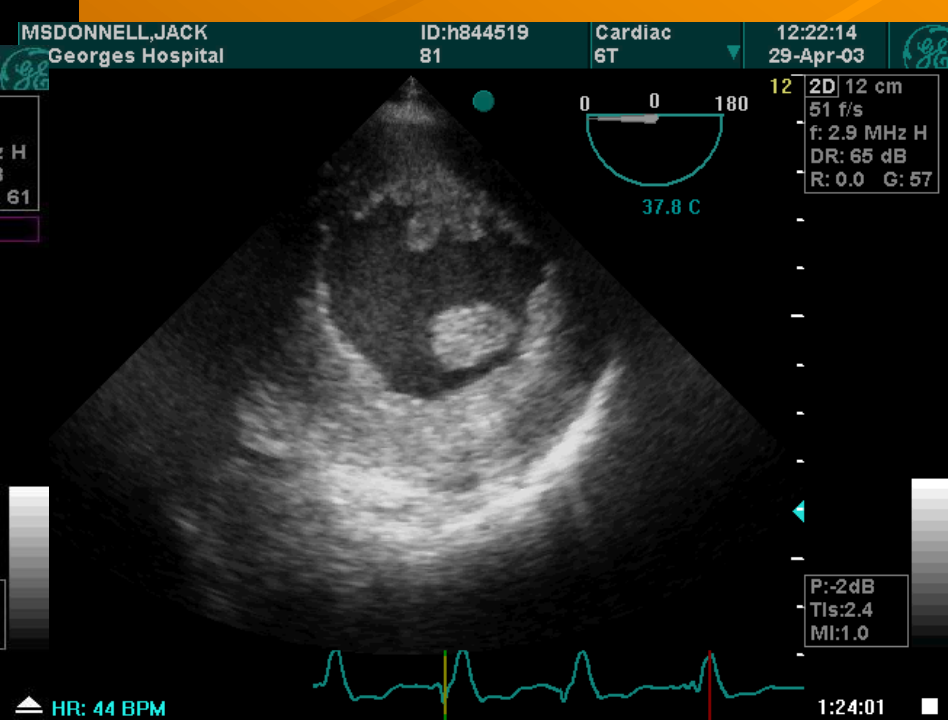
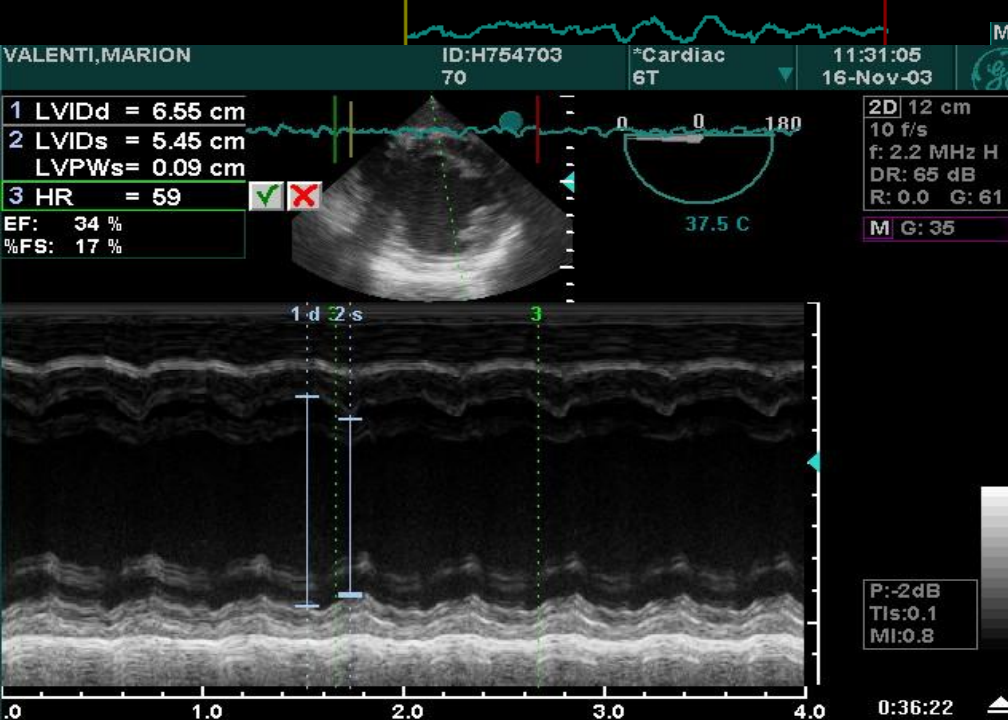
2D 12 cm
51 f/s
f: 2.9 MHz H
DR: 65 dB
R: 0.0 G: 61

P:-2dB
TIs:2.1
MI:1.4





Normal
Hypokinesis
Akinesis
Dyskinesis

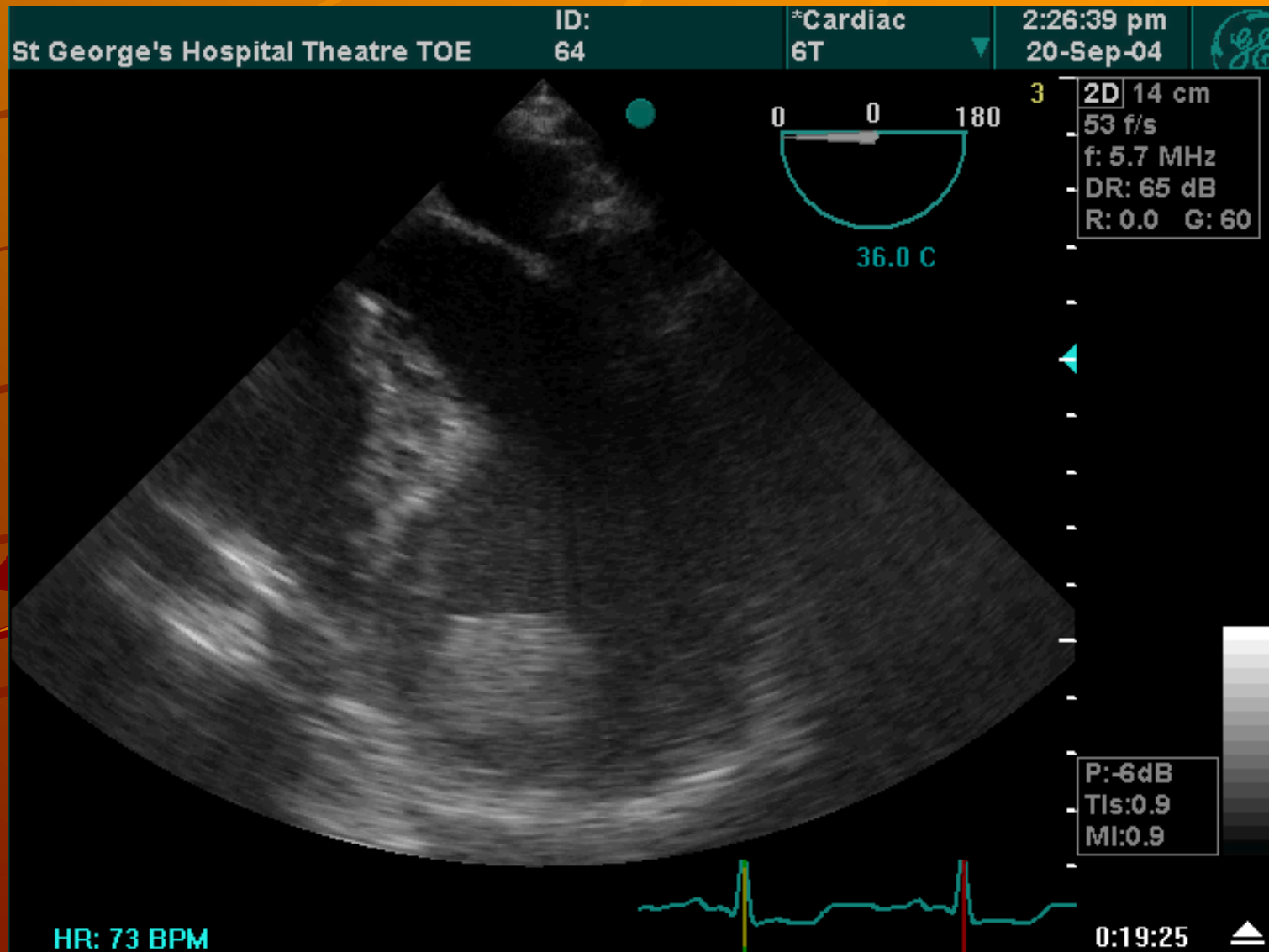


Spot the Diagnosis Test

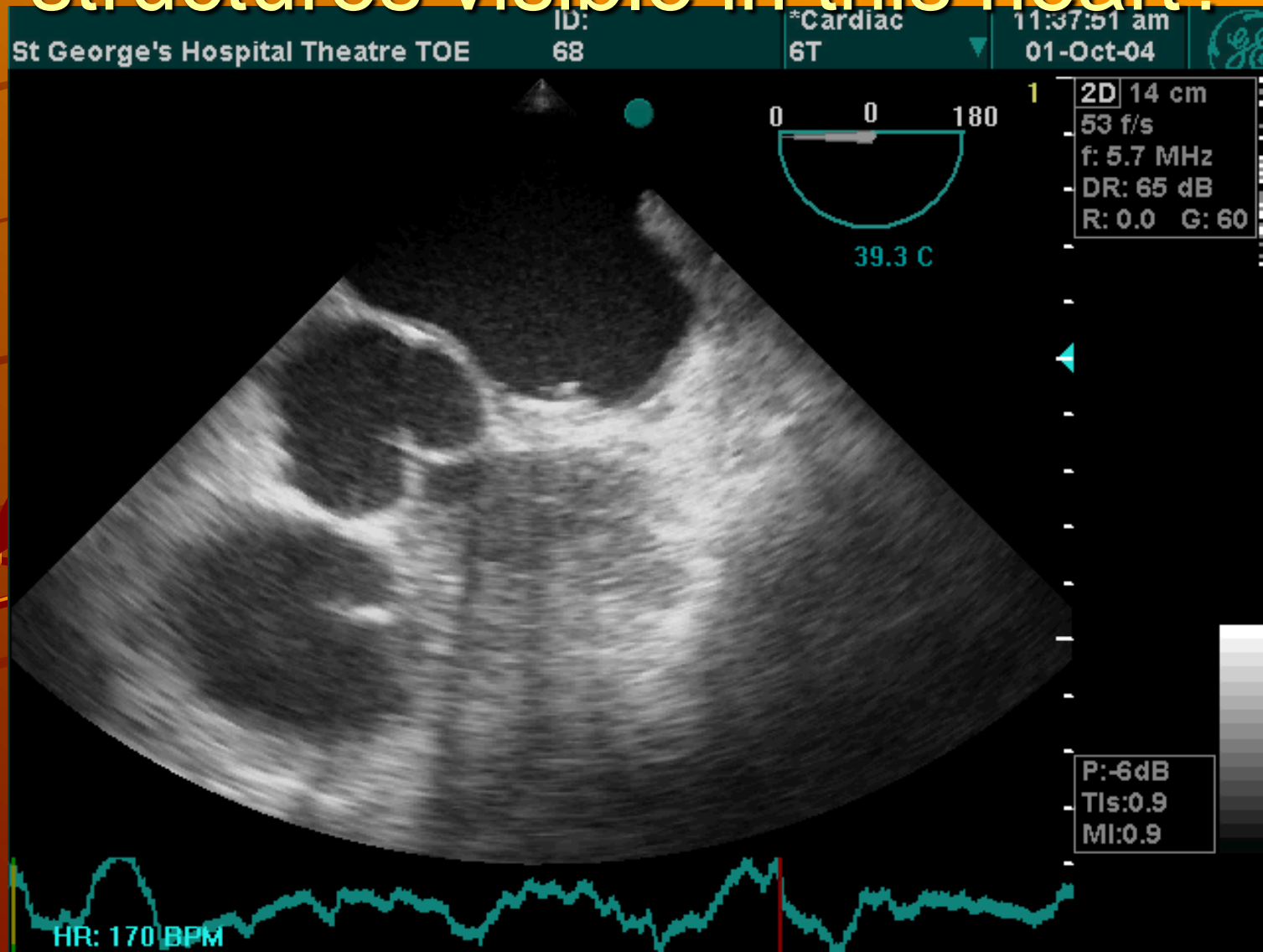
- ◆ 15 images
- ◆ Write down diagnosis
- ◆ Name on the answer sheet + subspecialty
- ◆ Top score gets prize awarded by Dr Cregg



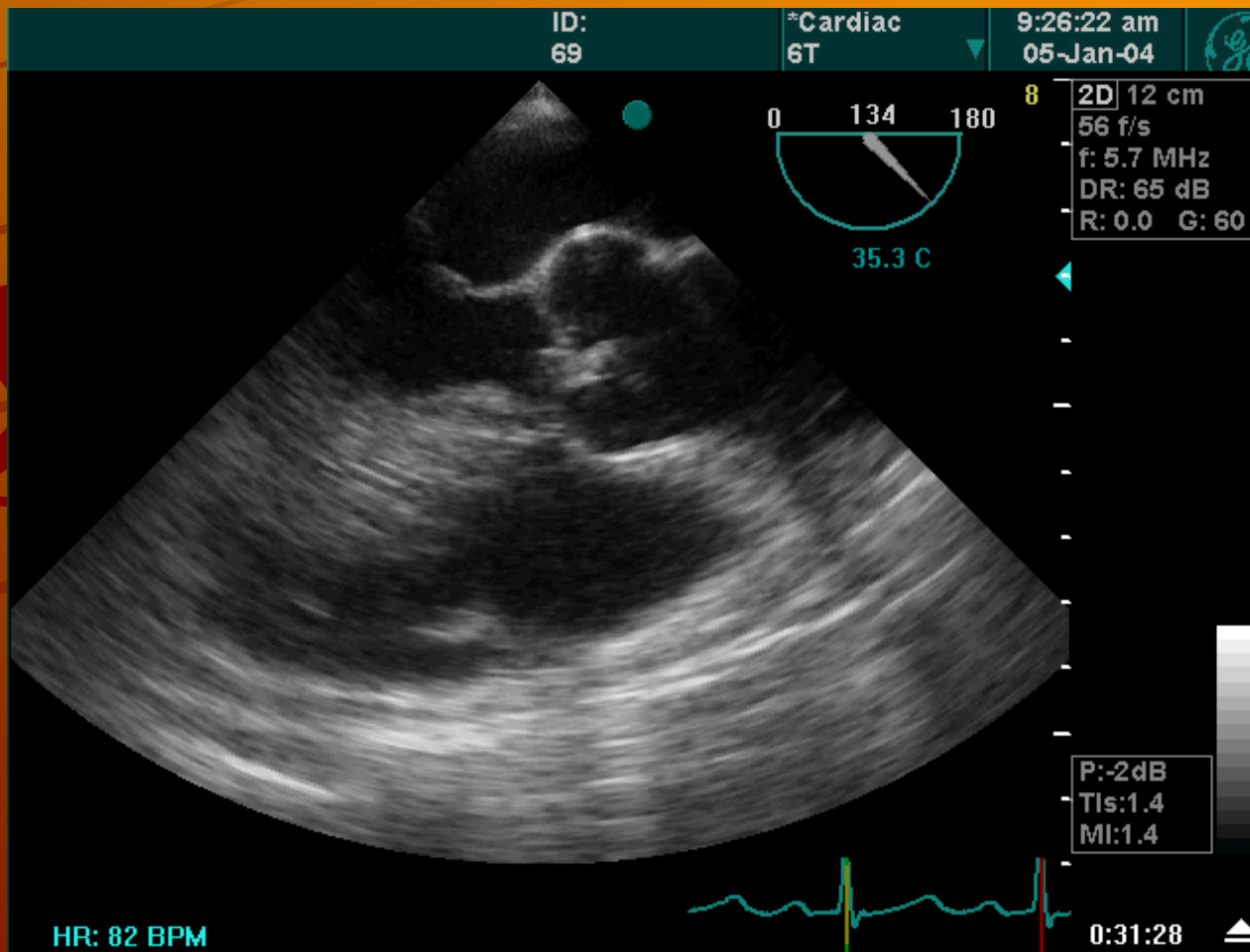
1. What is the major abnormality?



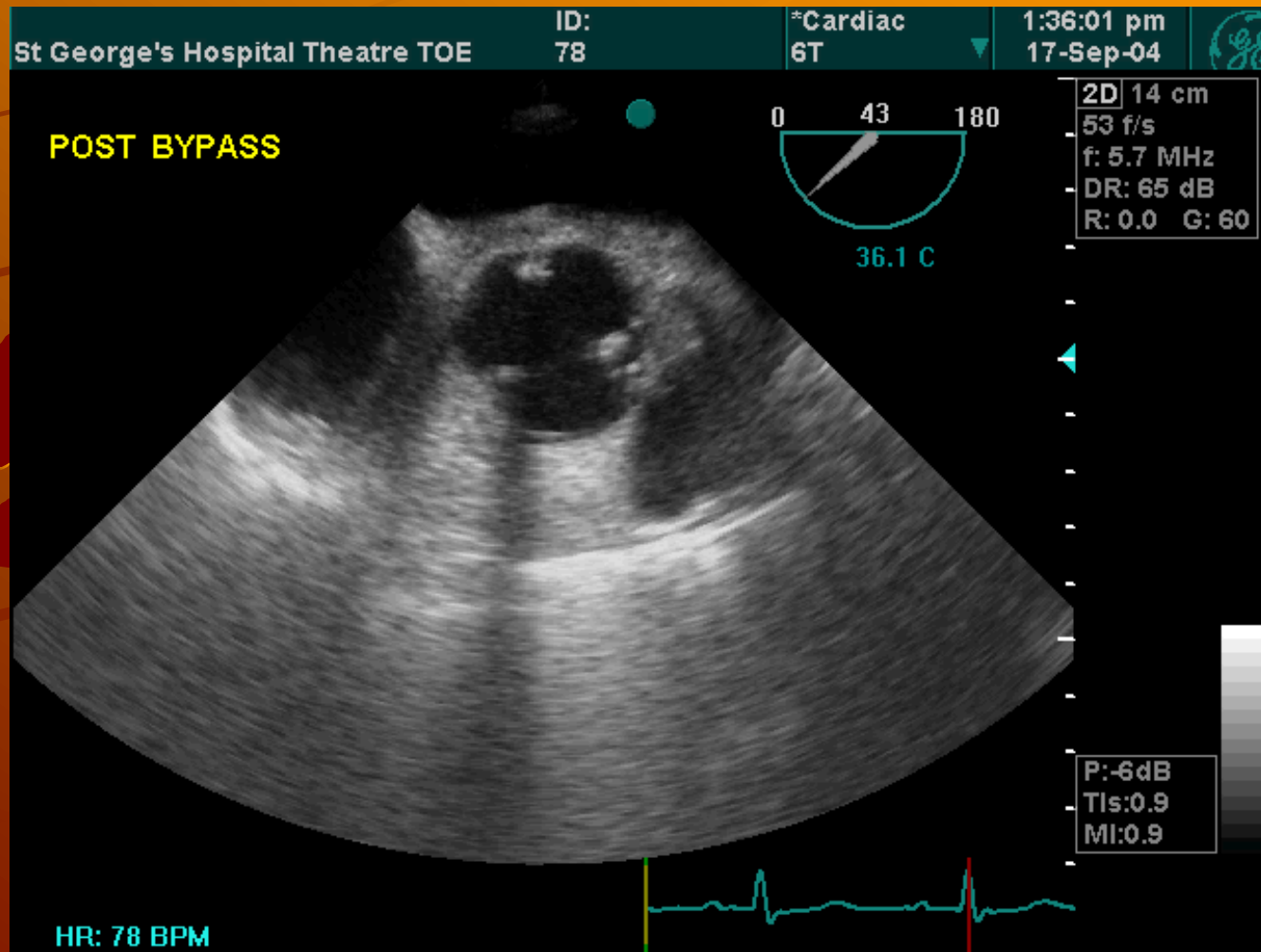
2. What are the two manmade structures visible in this heart?



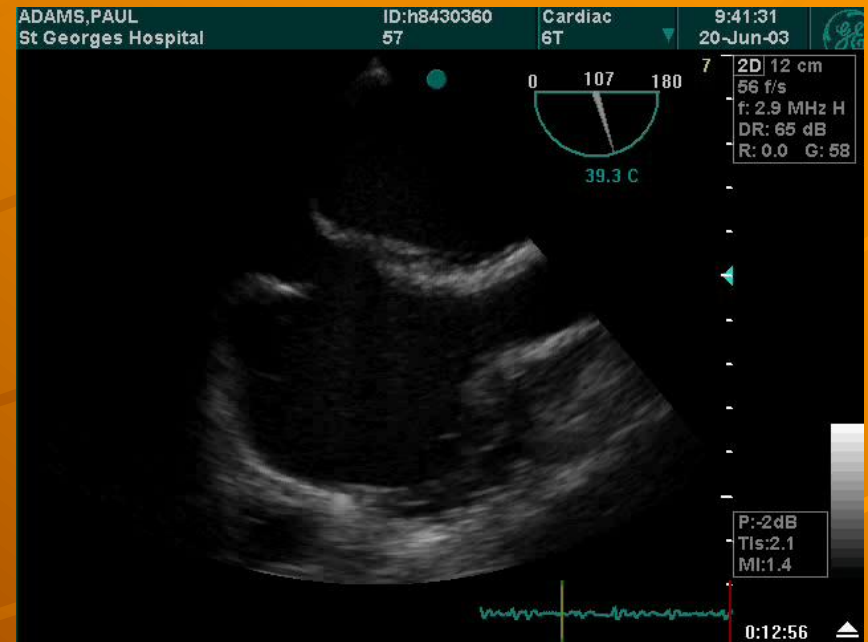
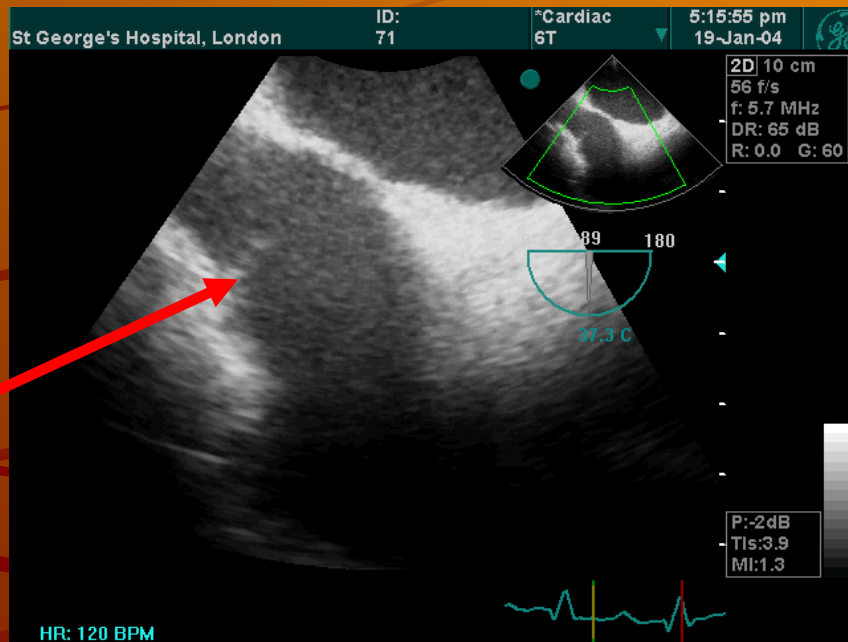
3. Which Valve, what is wrong with it ?



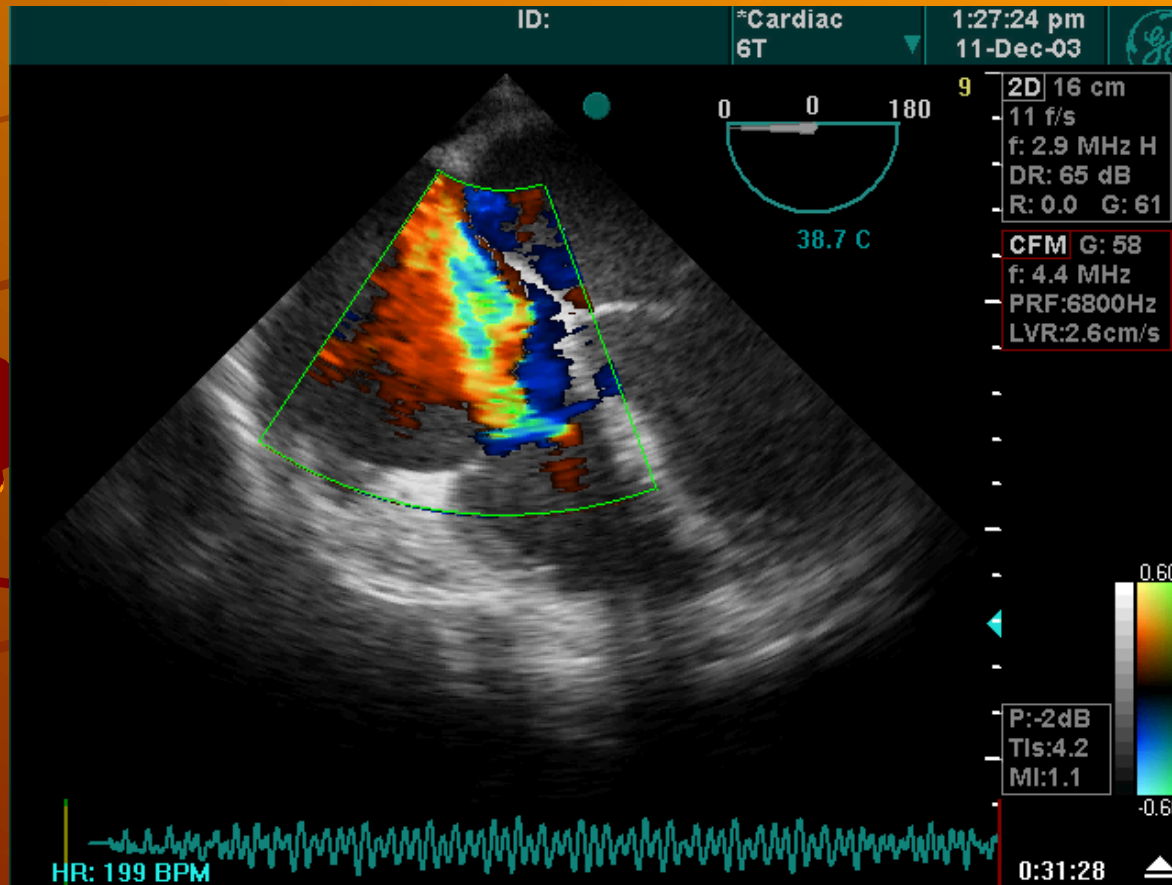
4. Which valve, mechanical or tissue?



5. View of IVC and RA. What is highlighted by red arrow

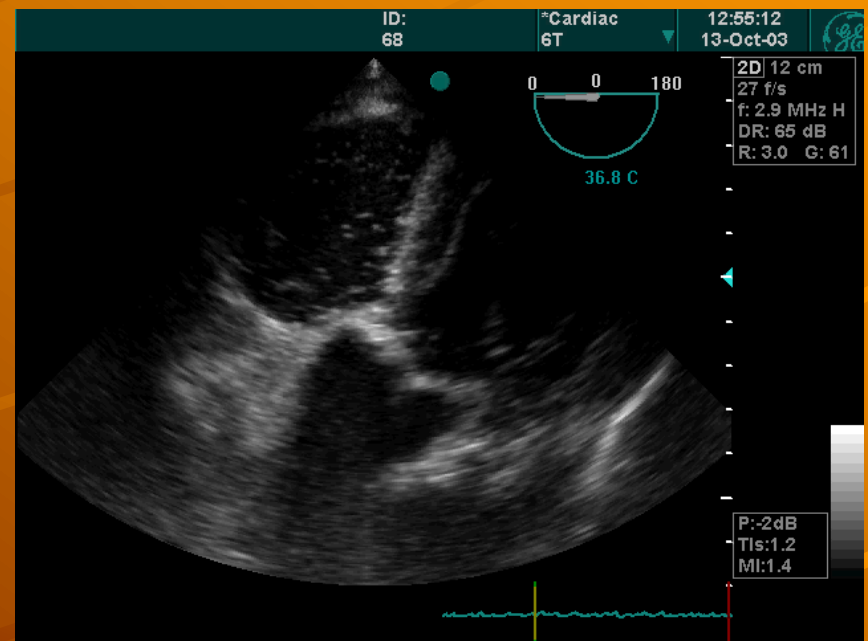
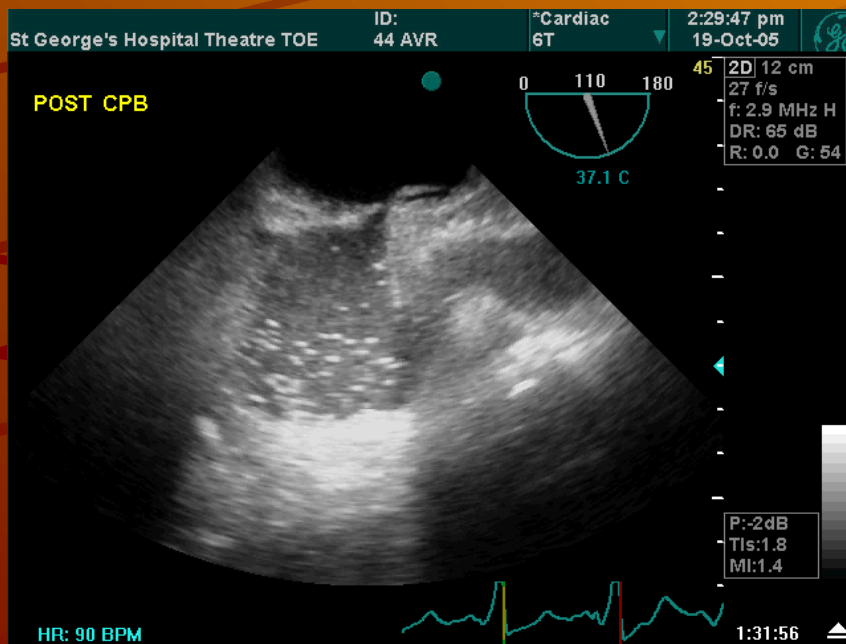


6. What is the problem ?

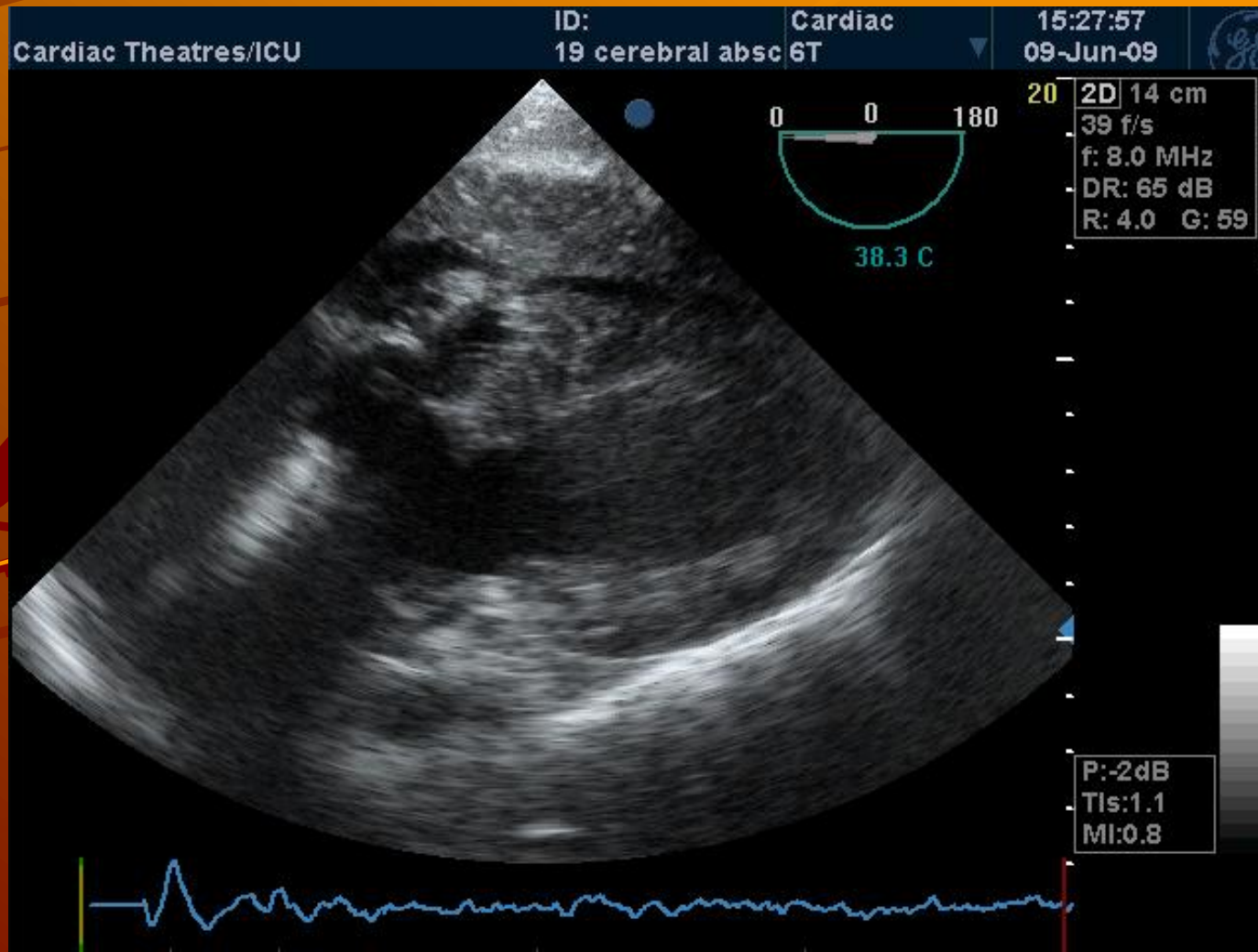


7. What are the little white dots?

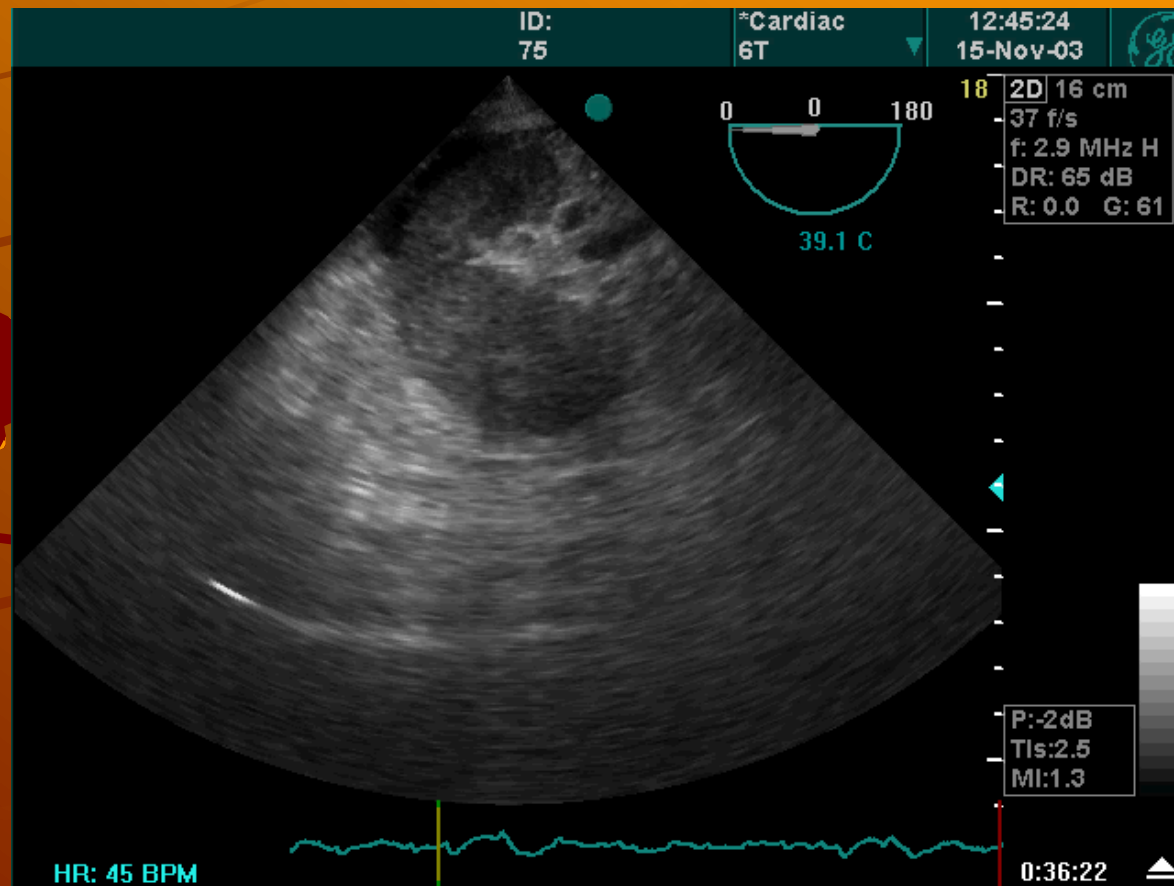
?



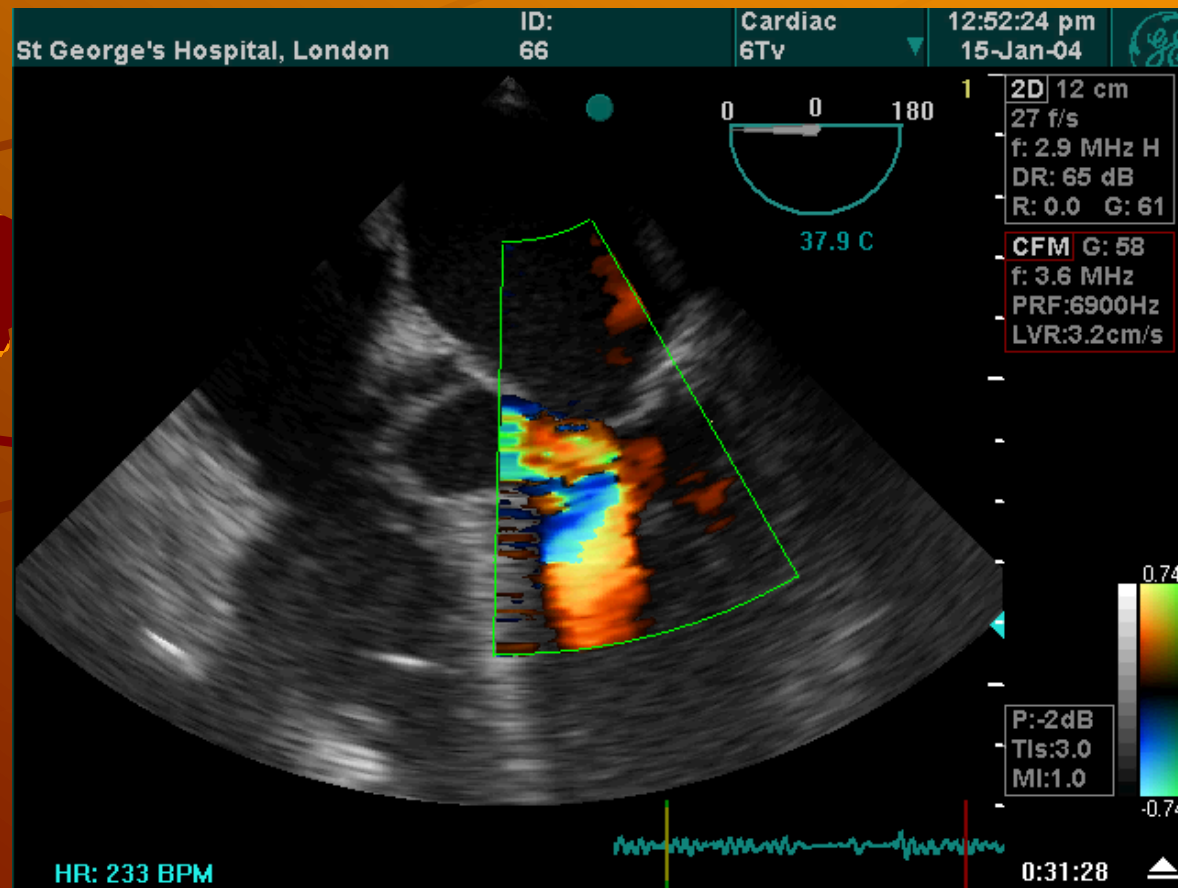
8. What congenital abnormality is this ?



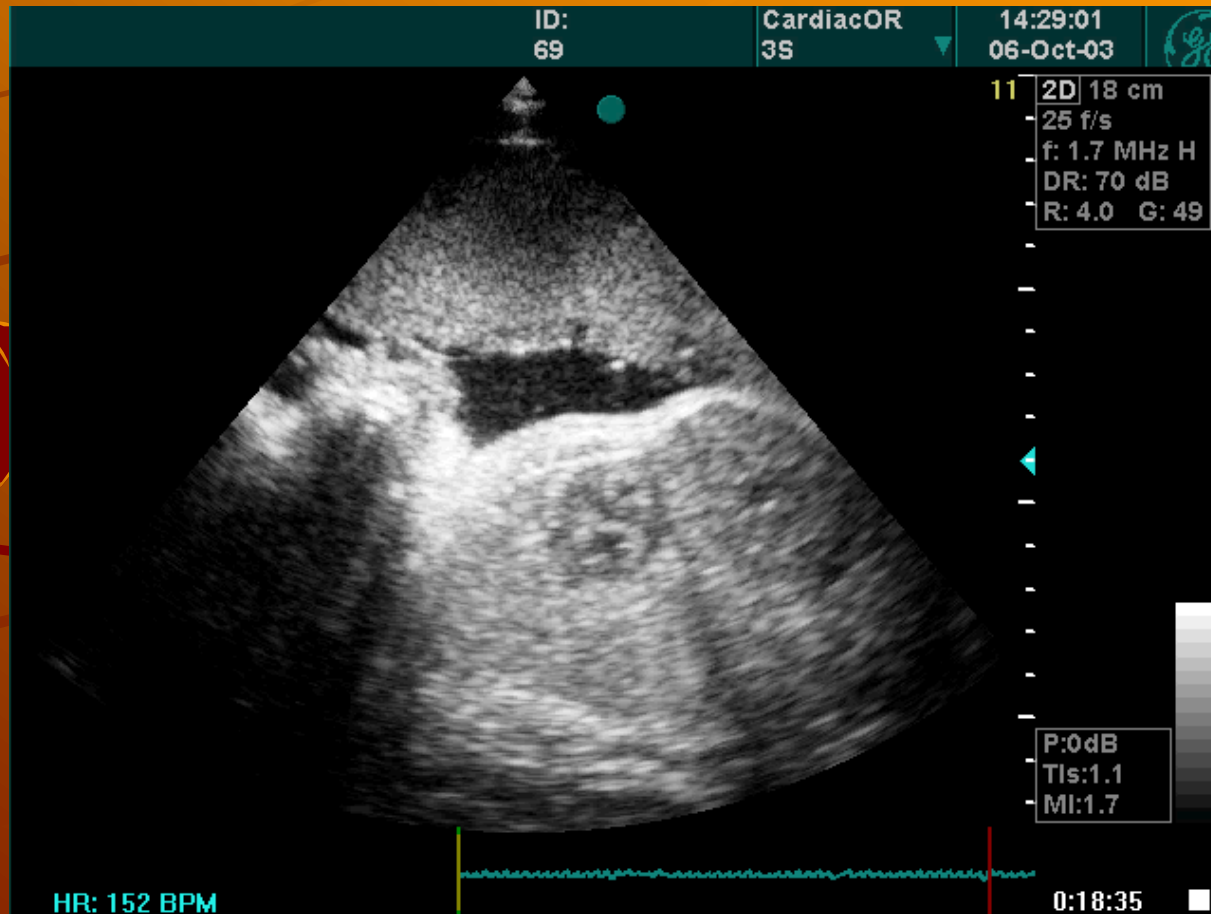
9. What is this ?



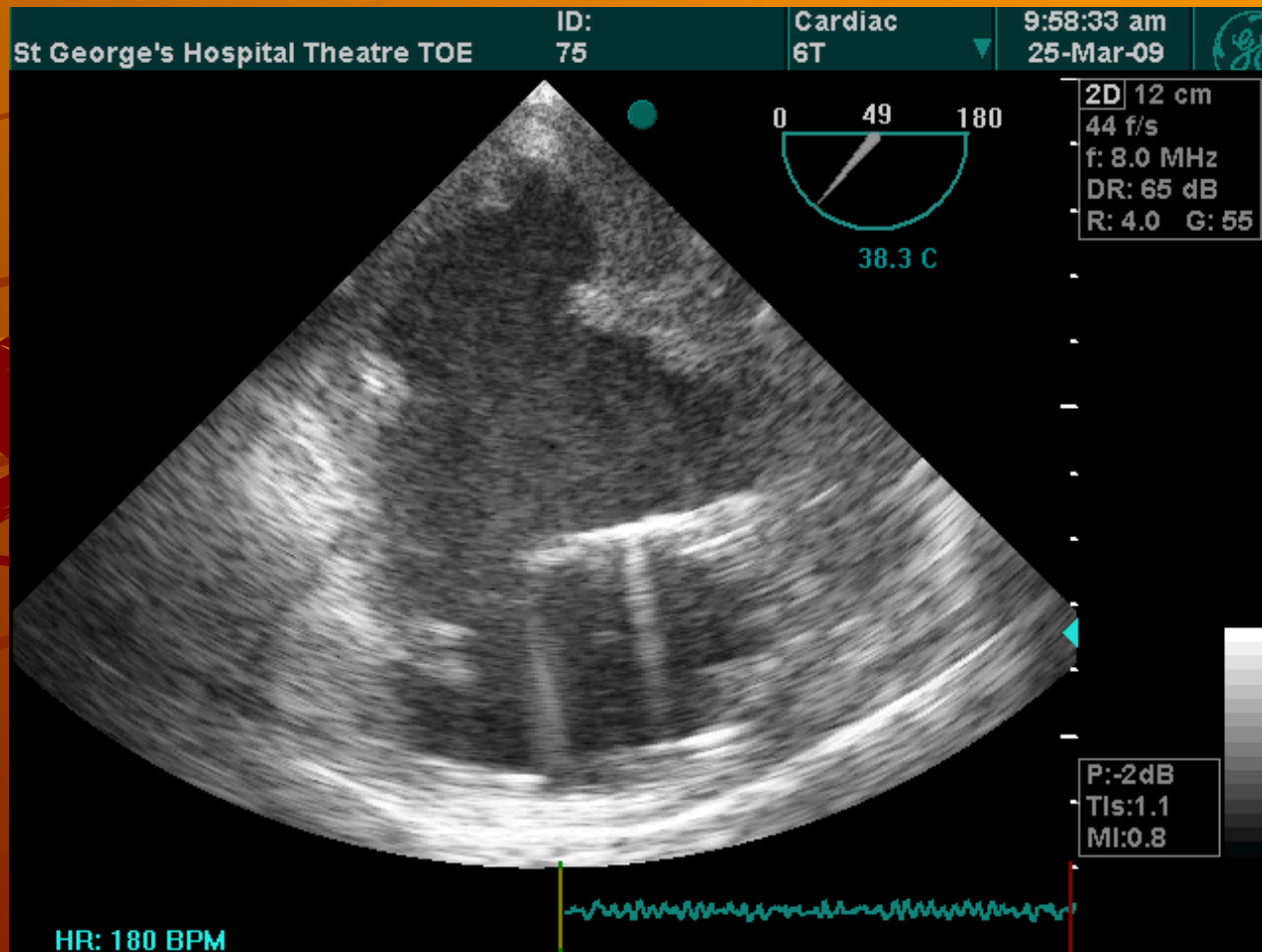
10. The cardiologist said patient had an 80mmHg gradient across his AV. Intra-operative TOE showed normal AV. What's going on !



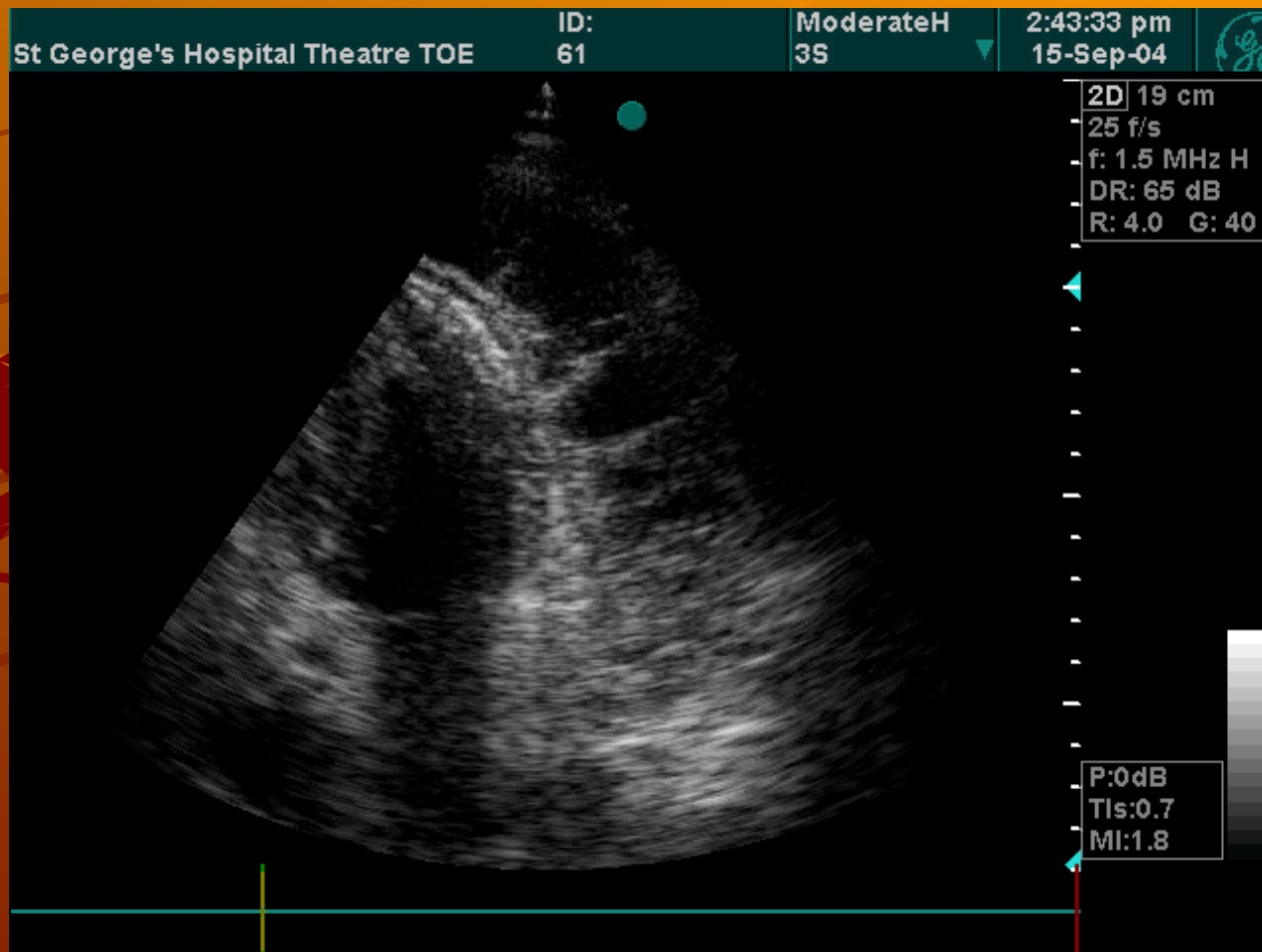
12. 28 year old ODP presents with abdominal distension. What is the diagnosis



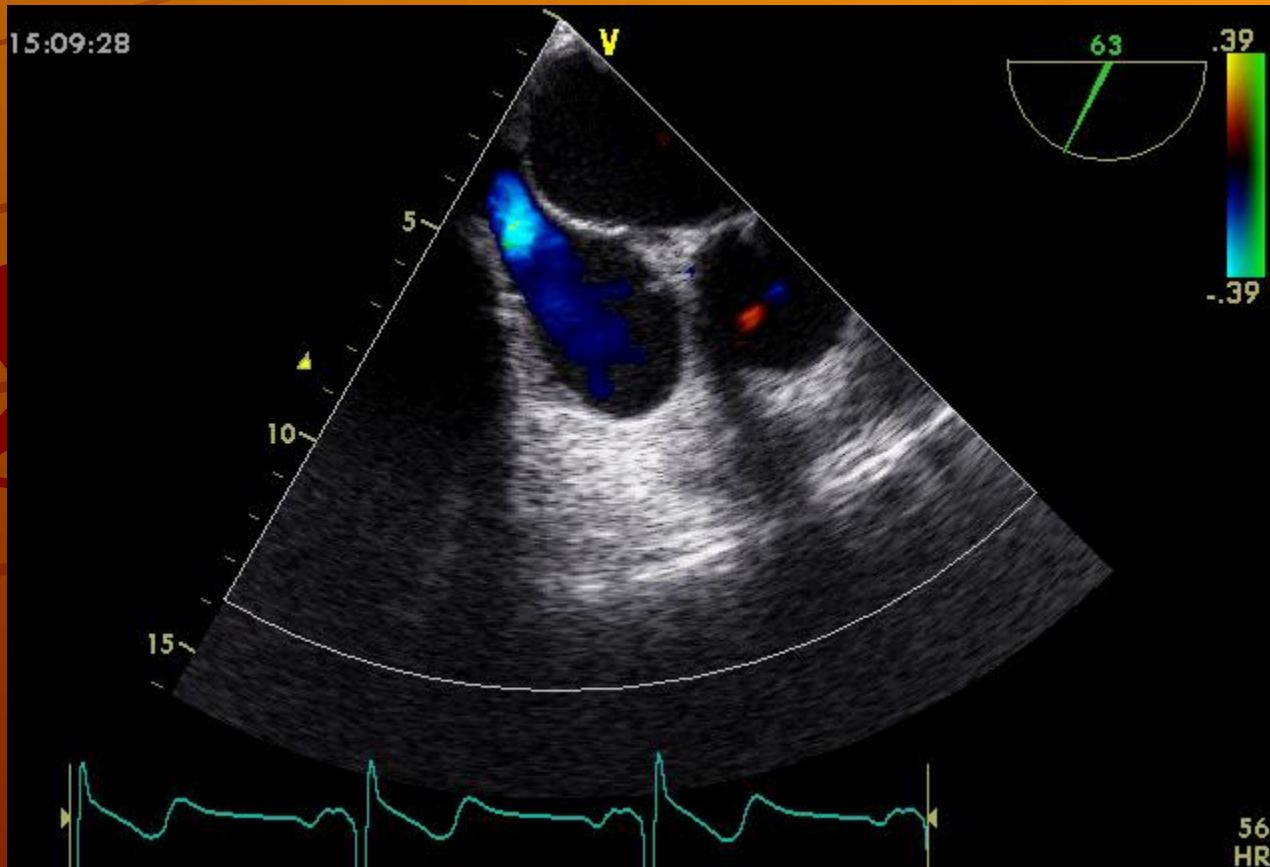
13. Patient had thoracic aortic stent two weeks ago. What's wrong now?



14. Asian patient SOB. Abnormality?



15. Attempt by cardiologist to cross Intraatrial septum with catheter failed. Which vessel did they end up in?



Thank you

- ✦ Hand paper to person on your right they can mark it. Hand in at end of session
- ✦ Dr Roman Cregg will announce winner and award prize at end of meeting
- ✦ Cardiologists and Cardiac anaesthetists automatically disqualified!