Case 1

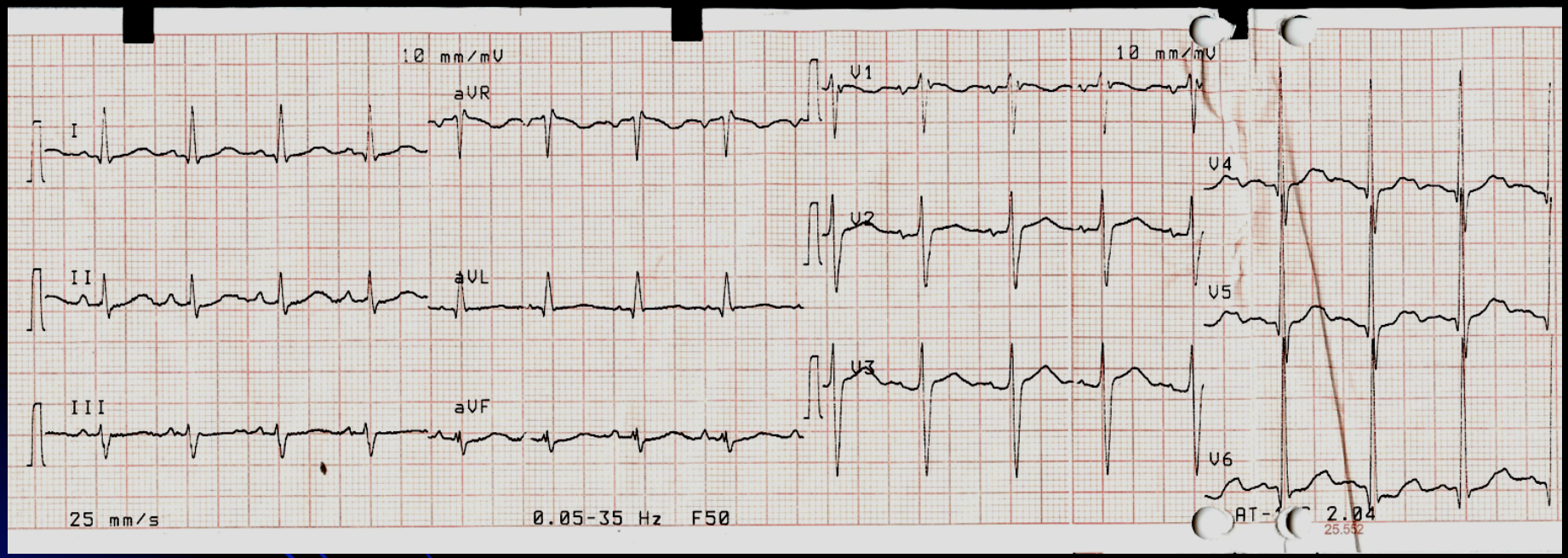
A 23-year-old man with a heart murmur

- A 23-year-old labourer of south-asian ethnic background, experienced a sharp central chest pain, which commenced 20 minutes after climbing 2 floors of stairs, while carrying a 50 kg heavy cement bag.
- The chest pain subsided within 30 minutes, but was followed by progressive and intense shortness of breath and dizziness, for which he presented.
- No fever and no recent history of infection.
- No past history of any serious illness.

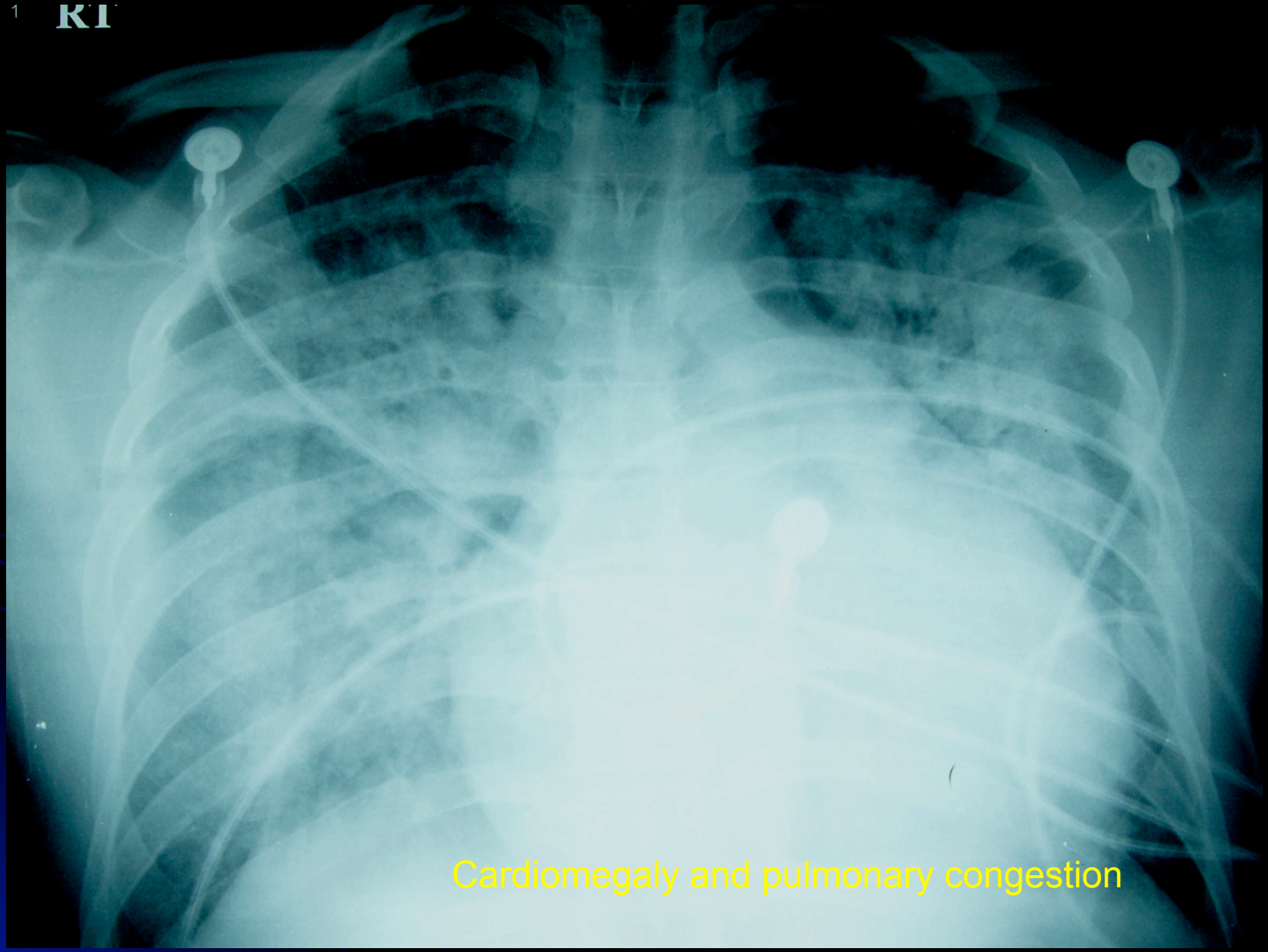
Physical:

- SOB. Tachycardic 100 BPM. BP 110/50 mmHg. Normal temperature. Transdermal O2 sat. 91%.
- Marked pulsation of jugular veins.
- A palpable thrill the sternum.
- 4/6 loud systolic-diastolic „machinery“ murmur over left sternal border. No S3 or S4.
- Chest clear.
- Peripheral pulses were bounding.
- Abdomen normal.

ECG: Sinus Rythm, tachycardia 101 BPM, incomplete RBBB.



Chest X-Ray:



Cardiomegaly and pulmonary congestion

Lab investigations:

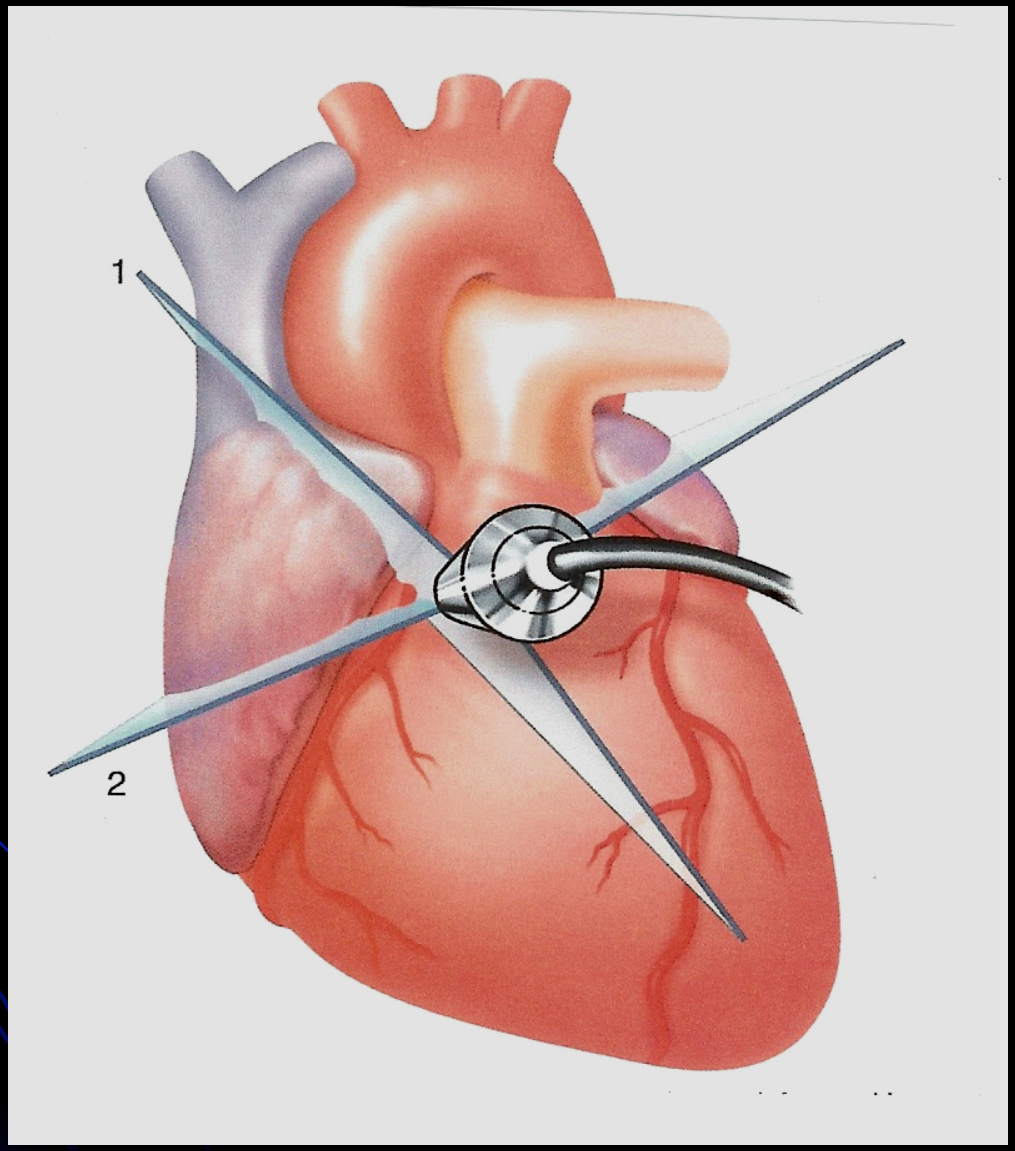
- Electrolytes, Creat., liver enzymes, CRP, ESR, PTT, CPK: All normal.
- CBC: Leucocytosis 18.600 with normal differential WBC. Hg 14 g/dl
- Troponin: ↑ 0.3 (N <0.01)

The patient is in congestive heart failure but what is the diagnosis?

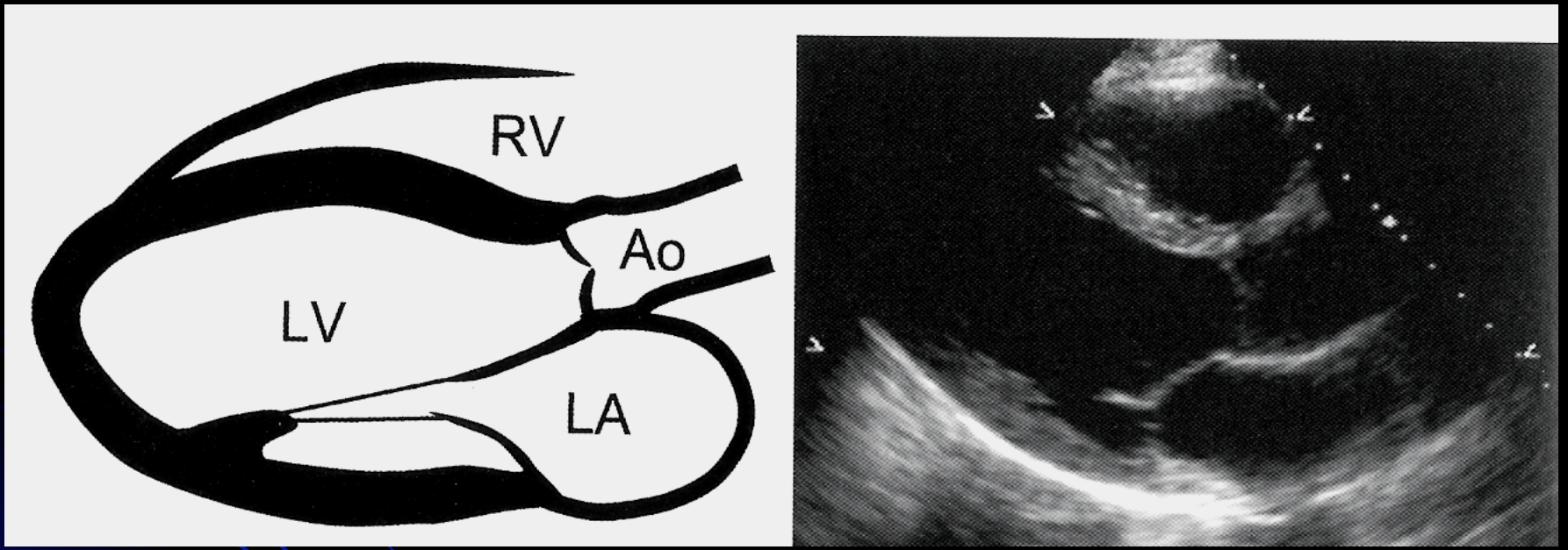
1. Atrial septal defect (ASD)?
2. Ventricular septal defect (VSD)?
3. Coarctation of the aorta?
4. Aortic regurgitation?
5. Ruptured sinus valsalva aneurysm? coronary syndrome?
6. Patent ductus arteriosus (PDA)?
7. Acute coronary syndrome?

Echocardiogram

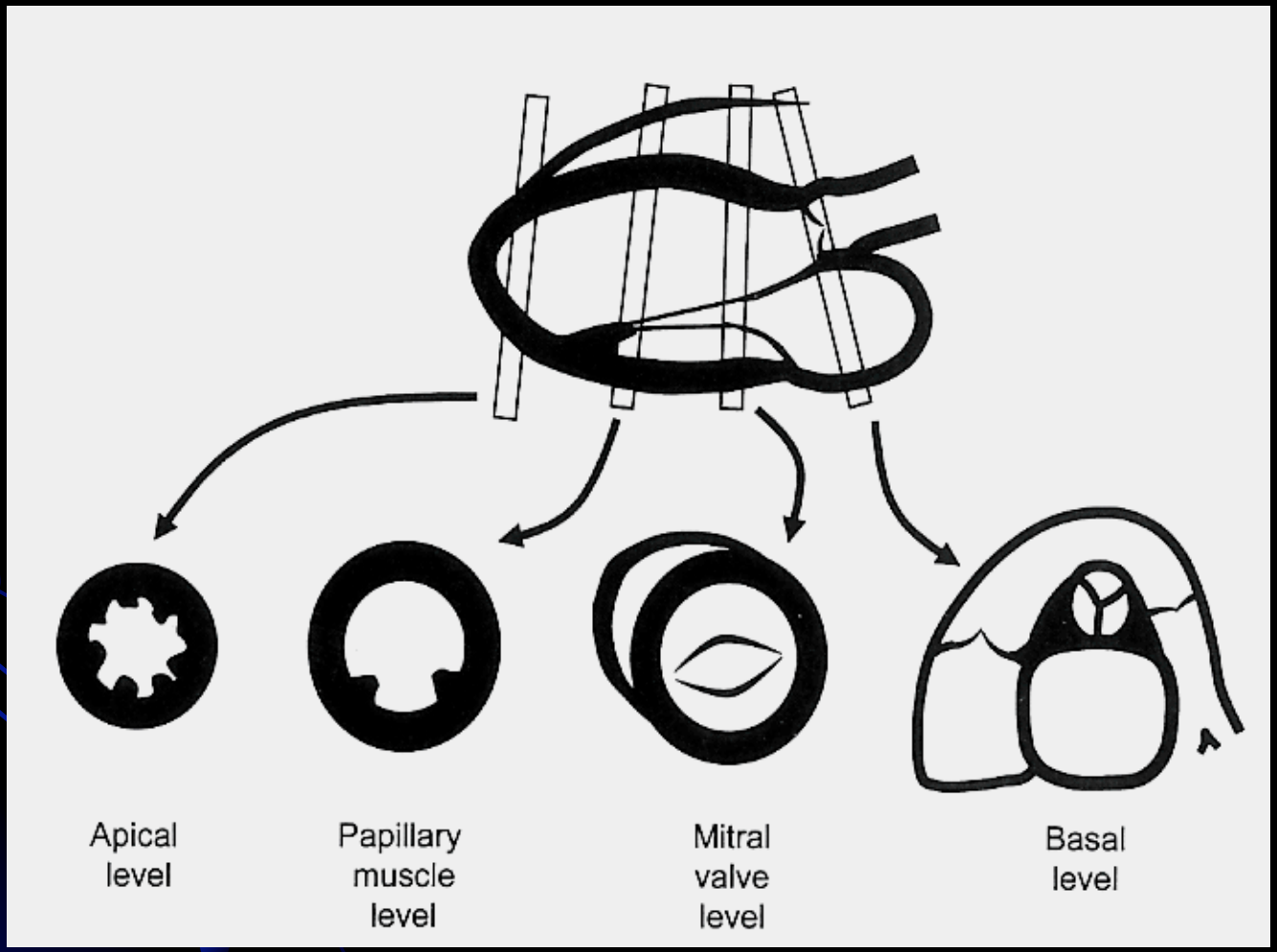
Echocardiographic views:



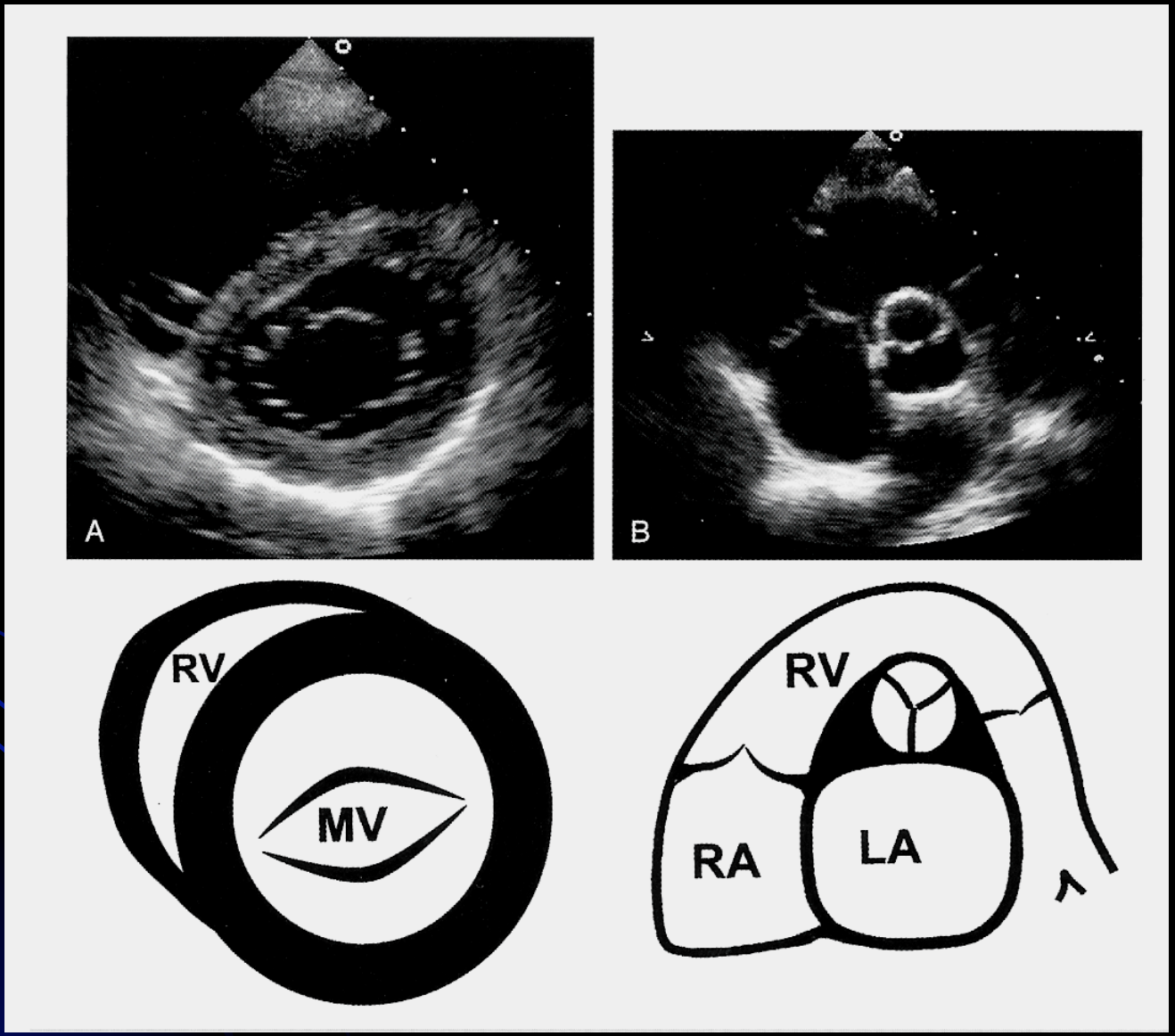
Echocardiogram: Long axis view

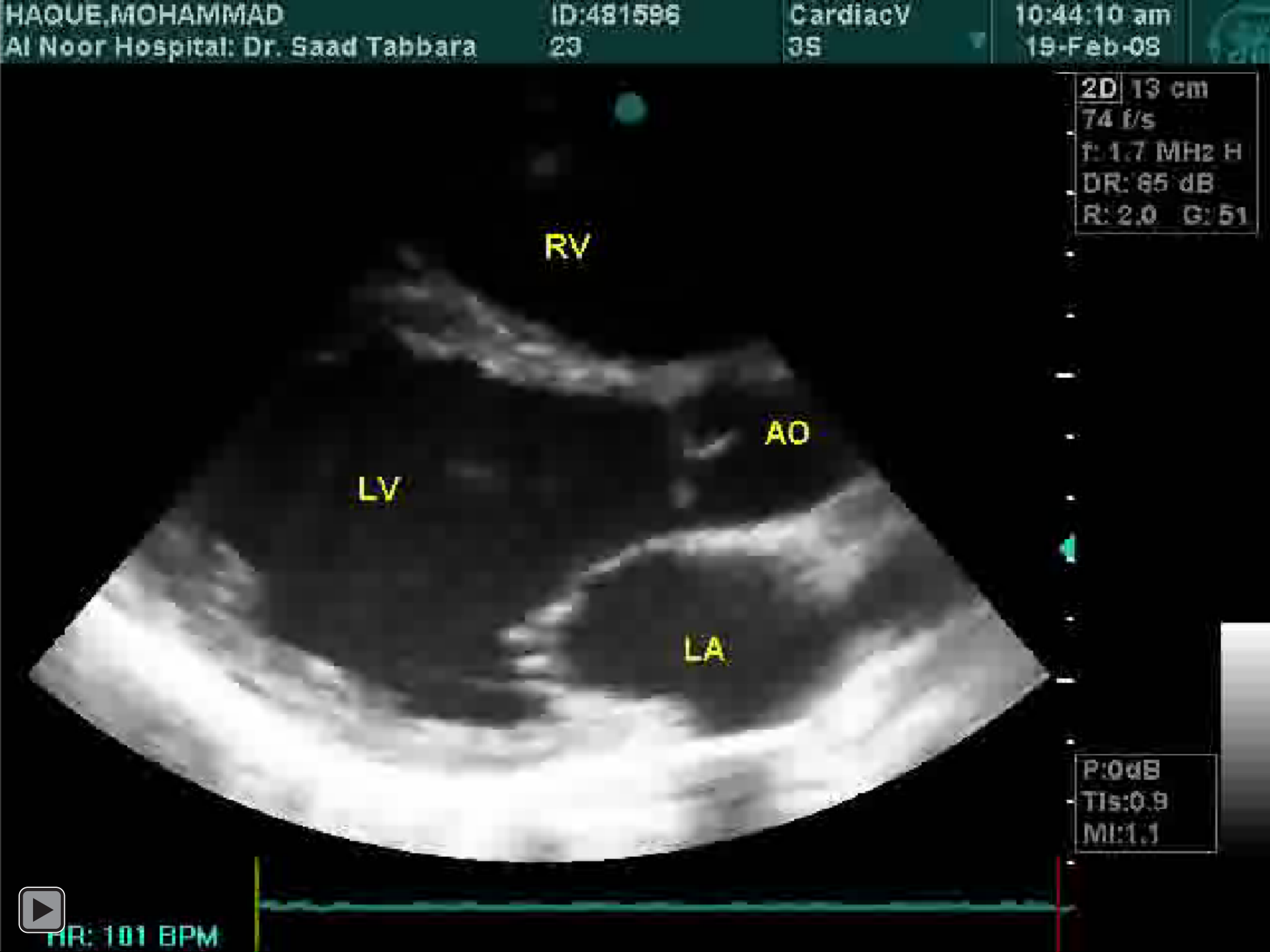


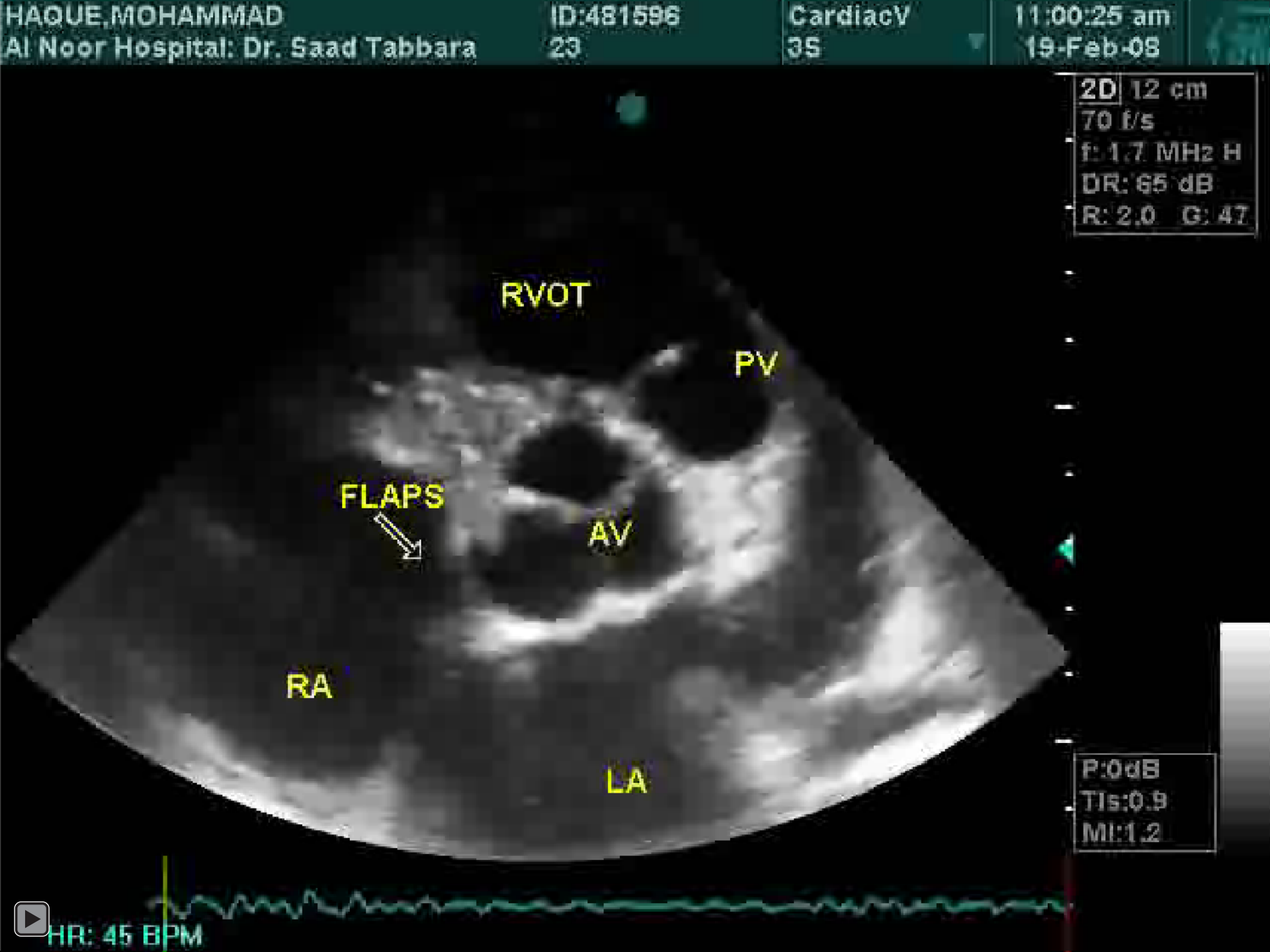
Echocardiogram: Short axis view planes



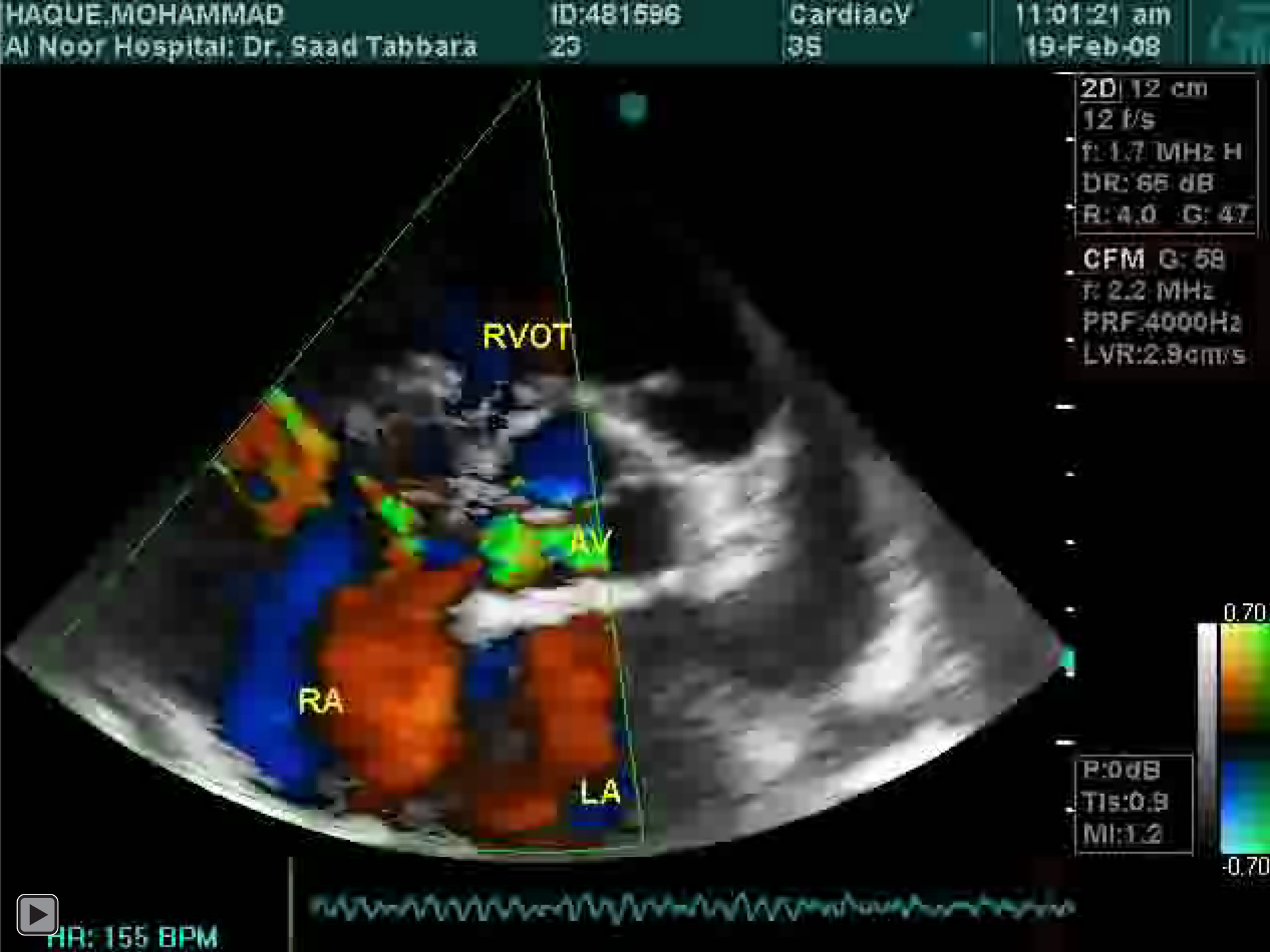
Echocardiogram: Short axis view planes

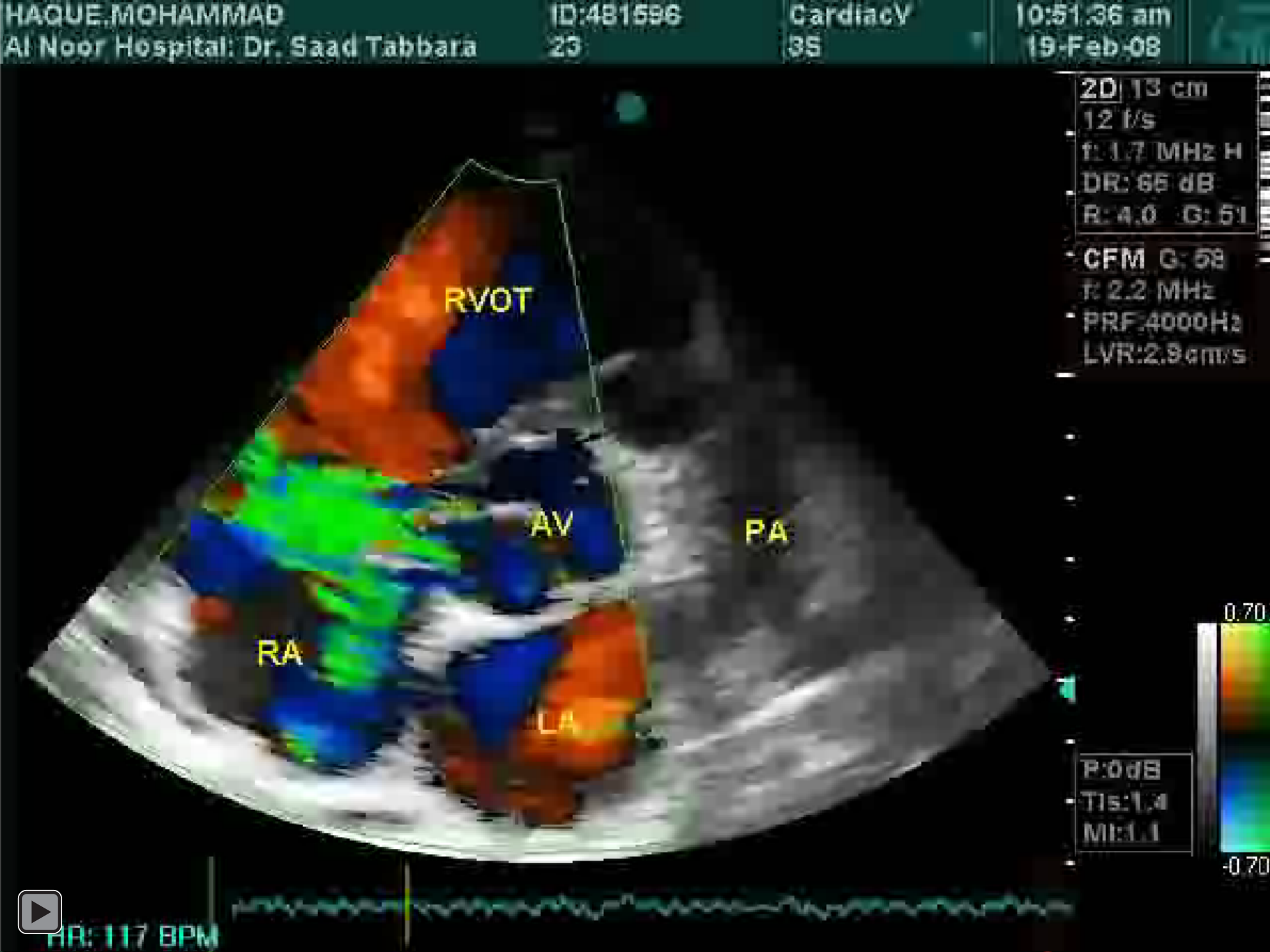



HAQUE,MOHAMMAD
ID:481596
CardiacV
10:44:10 am
Al Noor Hospital: Dr. Saad Tabbara
23
3S
19-Feb-08
2D 13 cm
74 f/s
f: 1.7 MHz H
DR: 65 dB
R: 2.0 G: 51
RV
AO
LV
LA
P:0dB
TIs:0.9
MI:1.1
HR: 101 BPM


HAQUE,MOHAMMAD
ID:481596
CardiacV
11:00:25 am
Al Noor Hospital: Dr. Saad Tabbara
23
3S
19-Feb-08
2D 12 cm
70 f/s
f: 1.7 MHz H
DR: 65 dB
R: 2.0 G: 47
RVOT
PV
FLAPS
AV
RA
LA
P:0dB
TIs:0.9
MI:1.2
HR: 45 BPM


HAQUE,MOHAMMAD
ID:481596
CardiacV
11:03:03 am
Al Noor Hospital: Dr. Saad Tabbara
23
3S
19-Feb-08
1 Distance= 0.65 cm
2D 12 cm
70 f/s
f: 1.7 MHz H
DR: 65 dB
R: 2.0 G: 47
RVOT
TV
AV
RA
LA
P:0dB
TIs:0.3
MI:1.2


HAQUE,MOHAMMAD
ID:481596
CardiacV
11:01:21 am
Al Noor Hospital: Dr. Saad Tabbara
23
35
19-Feb-08
2D 12 cm
12 f/s
f: 1.7 MHz H
DR: 65 dB
R: 4.0 G: 47
CFM G: 58
f: 2.2 MHz
PRF:4000Hz
LVR:2.9cm/s
RVOT
AV
RA
LA
0.70
-0.70
P:0dB
TIs:0.9
MI:1.2
HR: 155 BPM


HAQUE,MOHAMMAD
ID:481596
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10:51:36 am
Al Noor Hospital: Dr. Saad Tabbara
23
3S
19-Feb-08
2D 13 cm
12 f/s
f: 1.7 MHz H
DR: 66 dB
R: 4.0 G: 51
CFM G: 68
f: 2.2 MHz
PRF:4000Hz
LVR:2.9cm/s
RVOT
AV
PA
RA
LA
0.70
-0.70
P:0dB
TIs:1.4
MI:1.1
HR: 117 BPM

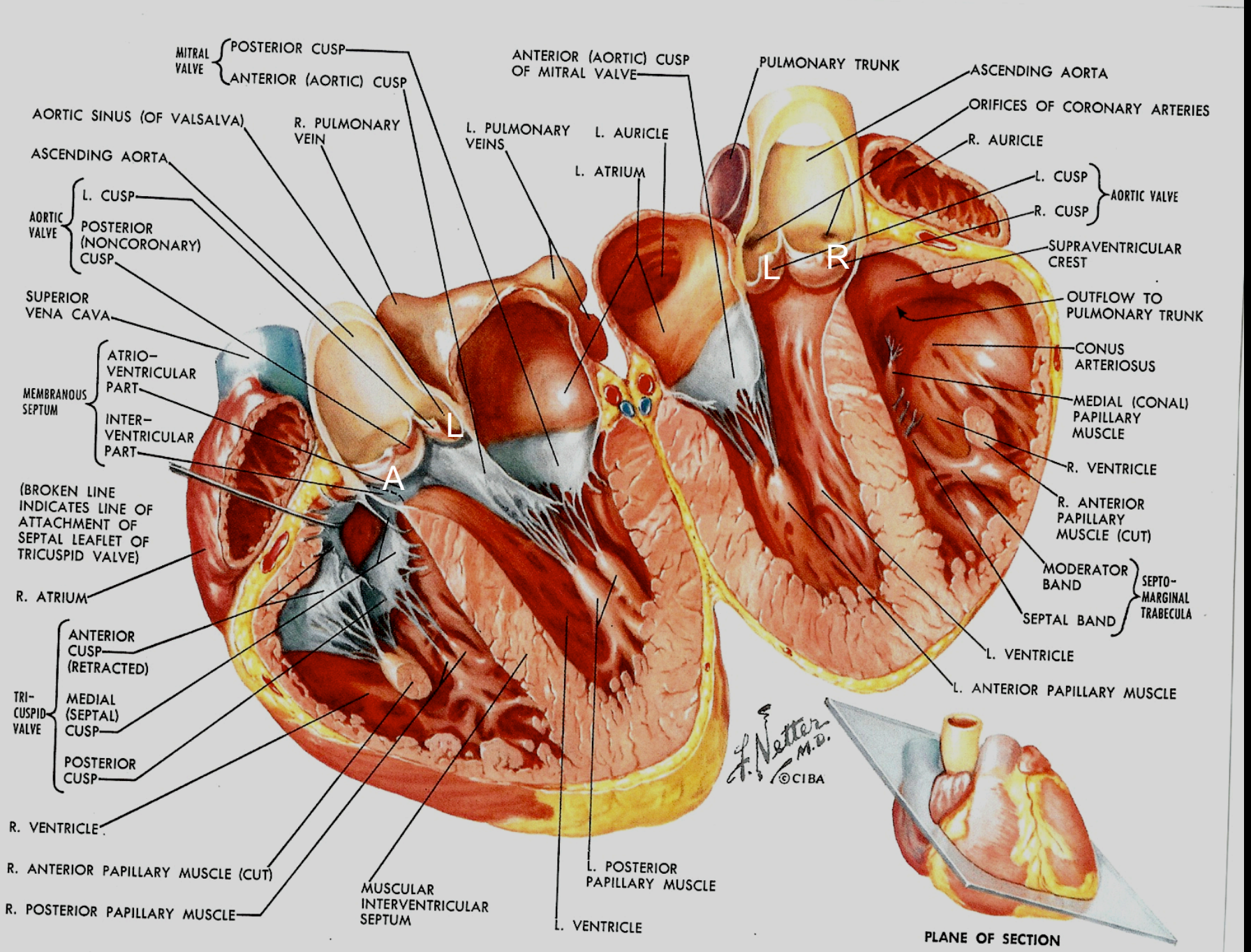
Diagnosis:

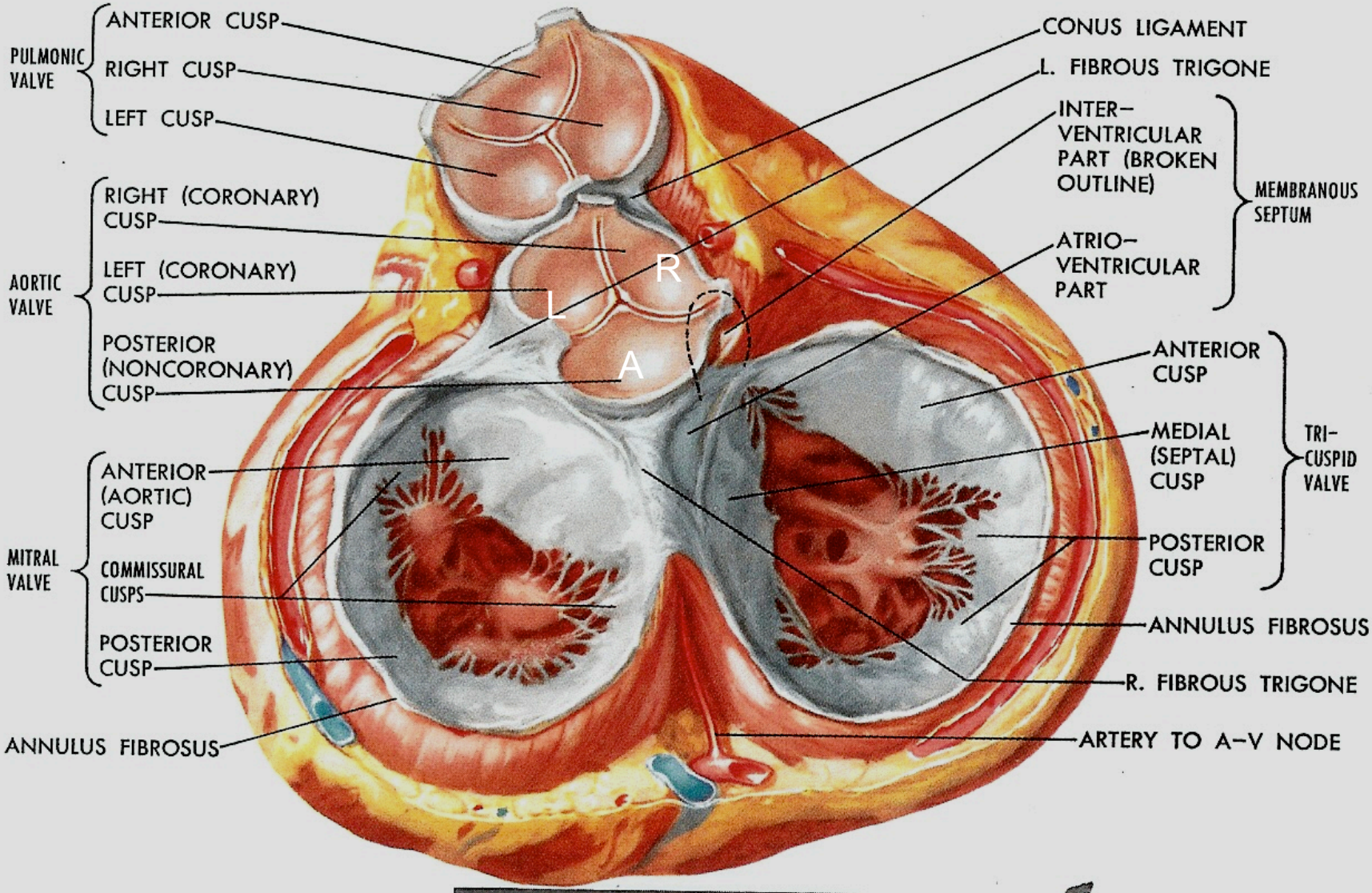
Ruptured aneurysm of the acoronary sinus of Valsalva into the right atrium

What is a sinus Valsalva aneurysm ?

What are sinuses of Valsalva?

- Normal dilatations of the aortic root immediately above the aortic cusps.
- These 3 sinuses are named according to their relation to the coronary arteries:
  - Left coronary sinus.
  - Right coronary sinus.
  - Acoronary sinus.
- A marked focal bulging of the sinus is called an aneurysm of the sinus Valsalva.


MITRAL VALVE
POSTERIOR CUSP
ANTERIOR (AORTIC) CUSP
AORTIC SINUS (OF VALSALVA)
R. PULMONARY VEIN
ANTERIOR (AORTIC) CUSP OF MITRAL VALVE
L. PULMONARY VEINS
L. AURICLE
L. ATRIUM
PULMONARY TRUNK
ASCENDING AORTA
ORIFICES OF CORONARY ARTERIES
R. AURICLE
ASCENDING AORTA
AORTIC VALVE
L. CUSP
POSTERIOR (NONCORONARY) CUSP
L. CUSP
R. CUSP
AORTIC VALVE
SUPRAVENTRICULAR CREST
L
R
SUPERIOR VENA CAVA
OUTFLOW TO PULMONARY TRUNK
MEMBRANOUS SEPTUM
ATRIO-VENTRICULAR PART
INTER-VENTRICULAR PART
CONUS ARTERIOSUS
MEDIAL (CONAL) PAPILLARY MUSCLE
L
A
R. VENTRICLE
(BROKEN LINE INDICATES LINE OF ATTACHMENT OF SEPTAL LEAFLET OF TRICUSPID VALVE)
R. ANTERIOR PAPILLARY MUSCLE (CUT)
R. ATRIUM
MODERATOR BAND
SEPTO-MARGINAL TRABECULA
SEPTAL BAND
L. VENTRICLE
L. ANTERIOR PAPILLARY MUSCLE
TRI-CUSPID VALVE
ANTERIOR CUSP (RETRACTED)
MEDIAL (SEPTAL) CUSP
POSTERIOR CUSP
R. VENTRICLE
R. ANTERIOR PAPILLARY MUSCLE (CUT)
R. POSTERIOR PAPILLARY MUSCLE
MUSCULAR INTERVENTRICULAR SEPTUM
L. POSTERIOR PAPILLARY MUSCLE
L. VENTRICLE
F. Netter M.D.
©CIBA
PLANE OF SECTION



THE HEART IN DIASTOLE: VIEWED FROM BASE WITH ATRIA REMOVED

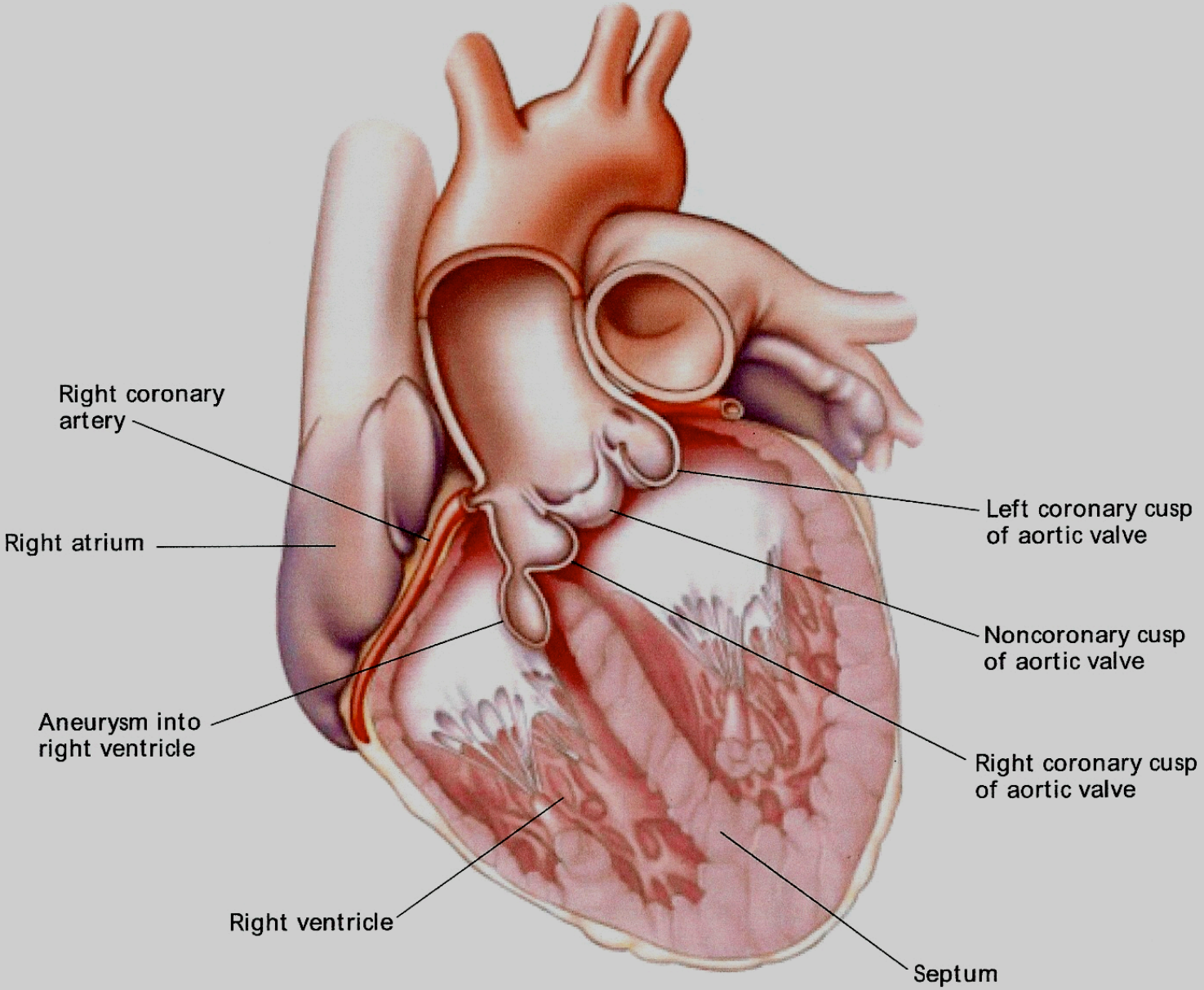
F. Netter M.D.

What is the cause a sinus Valsalva aneurysm ?

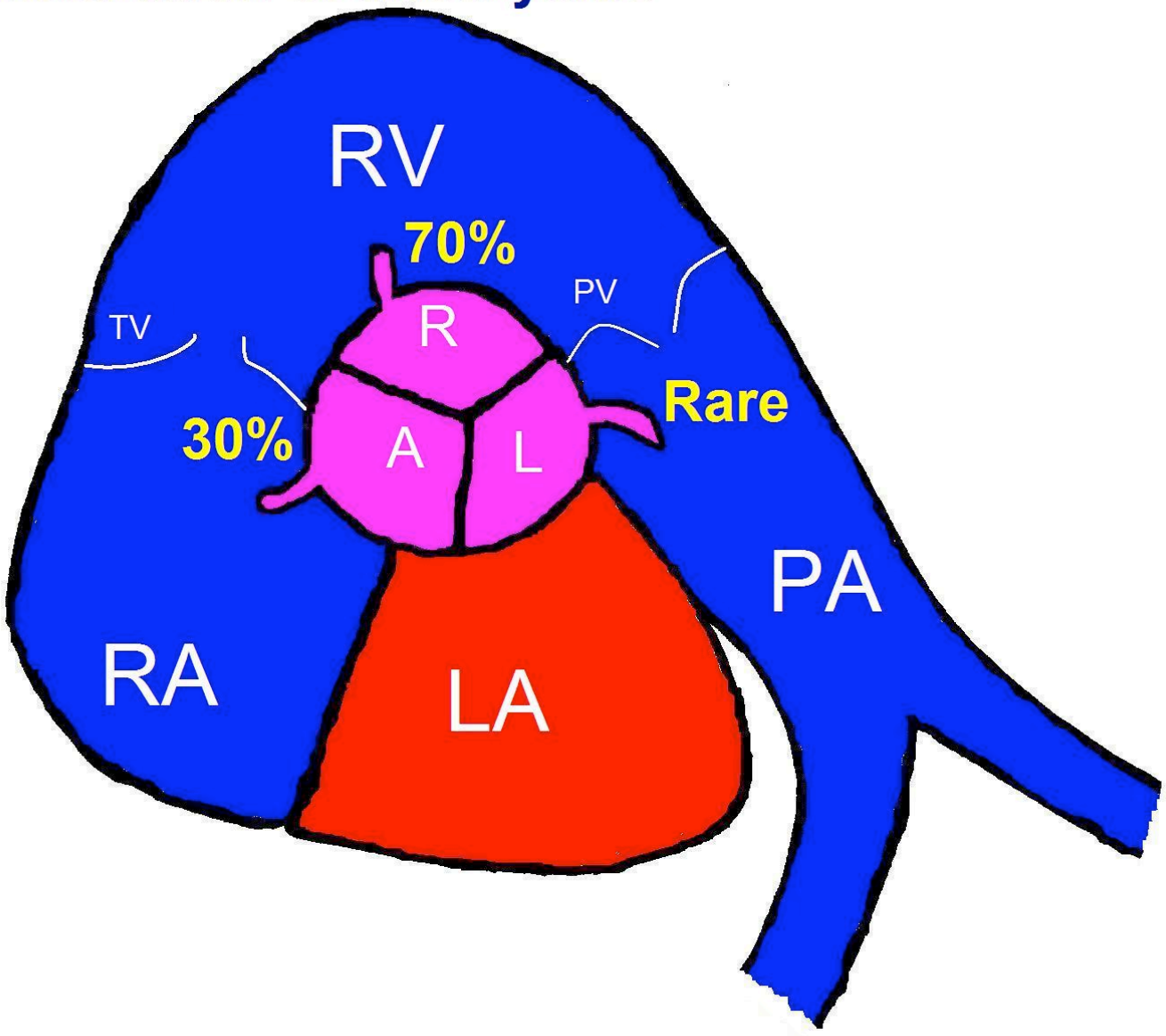
It is only congenital:

- A localized area in the aortic wall lacking a media layer (Absence of elastic fibers), causing a localized wall weakness.
- The weak area gives way to aortic pressure to form an aneurysm which extends like a „windsock“ into an adjacent heart chamber.
- The Aneurysm may rupture either spontaneously or in reponse to a heavy isometric effort, causing an *aorto-cardiac fistula*.
- 3 Times more common in men than in women.
- Occurs in second and third decade of life.

Aneurysm of the sinus of Valsalva



Origines and sites of perforation of aneurysms



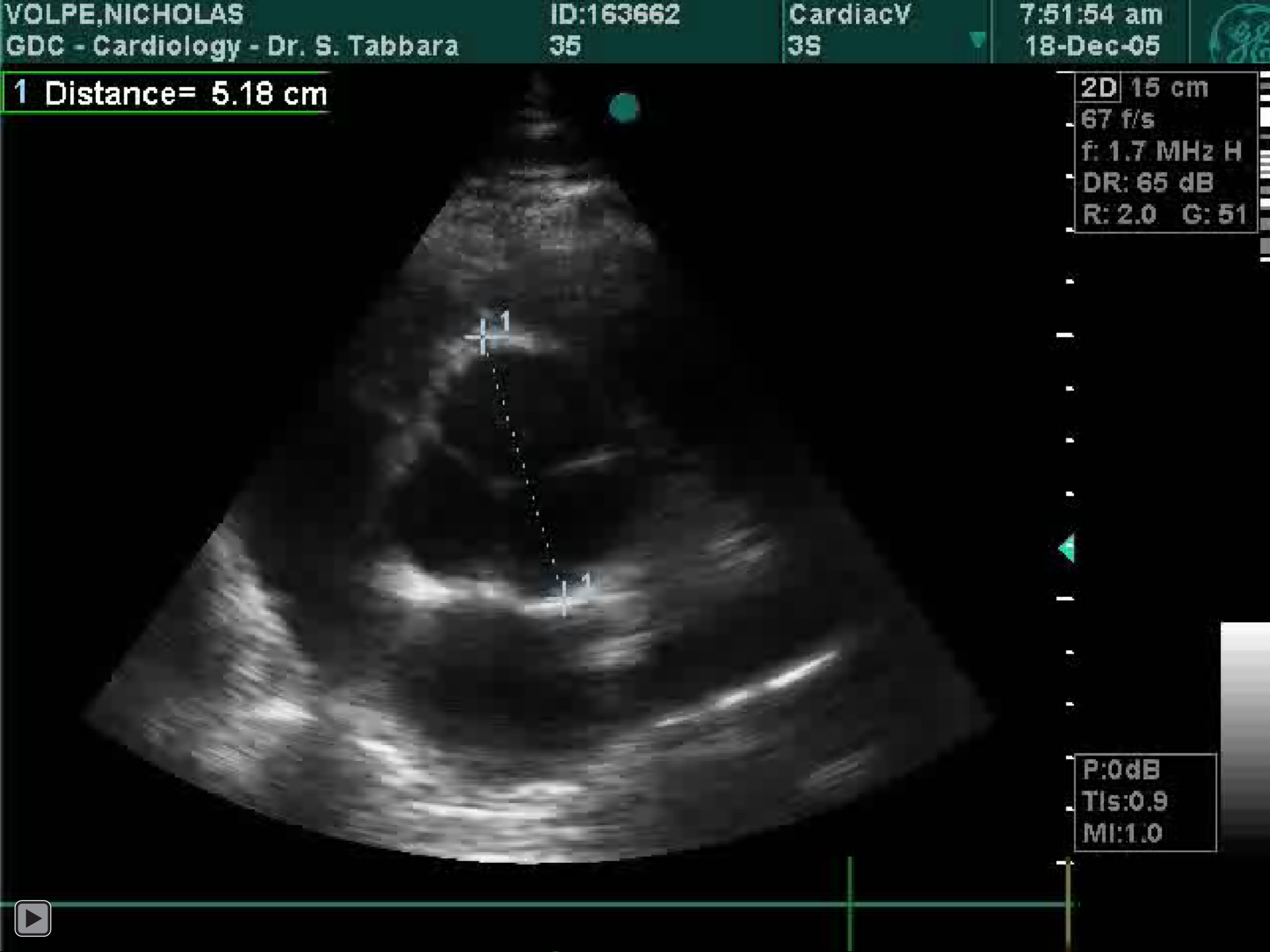
Clinical presentations

- **If unruptured:**
  - No symptoms.
  - Or local compression: AV node
    Coronary artery
  - Aortic valve regurgitation.
- **If small perforation:**
  Small shunt with no symptoms.
- **If acute large rupture:**
  Large acute L-R shunt with CHF.

Differential Diagnosis

Diffuse dilatation of all 3 sinuses of valsalva:

- **It is a separate, also congenital clinical entity.**
- **Usually all 3 sinuses are diffusely dilated.**
- **Is associated with connective tissue disorder, such as Marfan Syndrome.**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ID:163662
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7:51:54 am
GDC - Cardiology - Dr. S. Tabbara
35
3S
18-Dec-05
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2D 15 cm
67 f/s
f: 1.7 MHz H
DR: 65 dB
R: 2.0 G: 51
P:0dB
TIs:0.9
MI:1.0

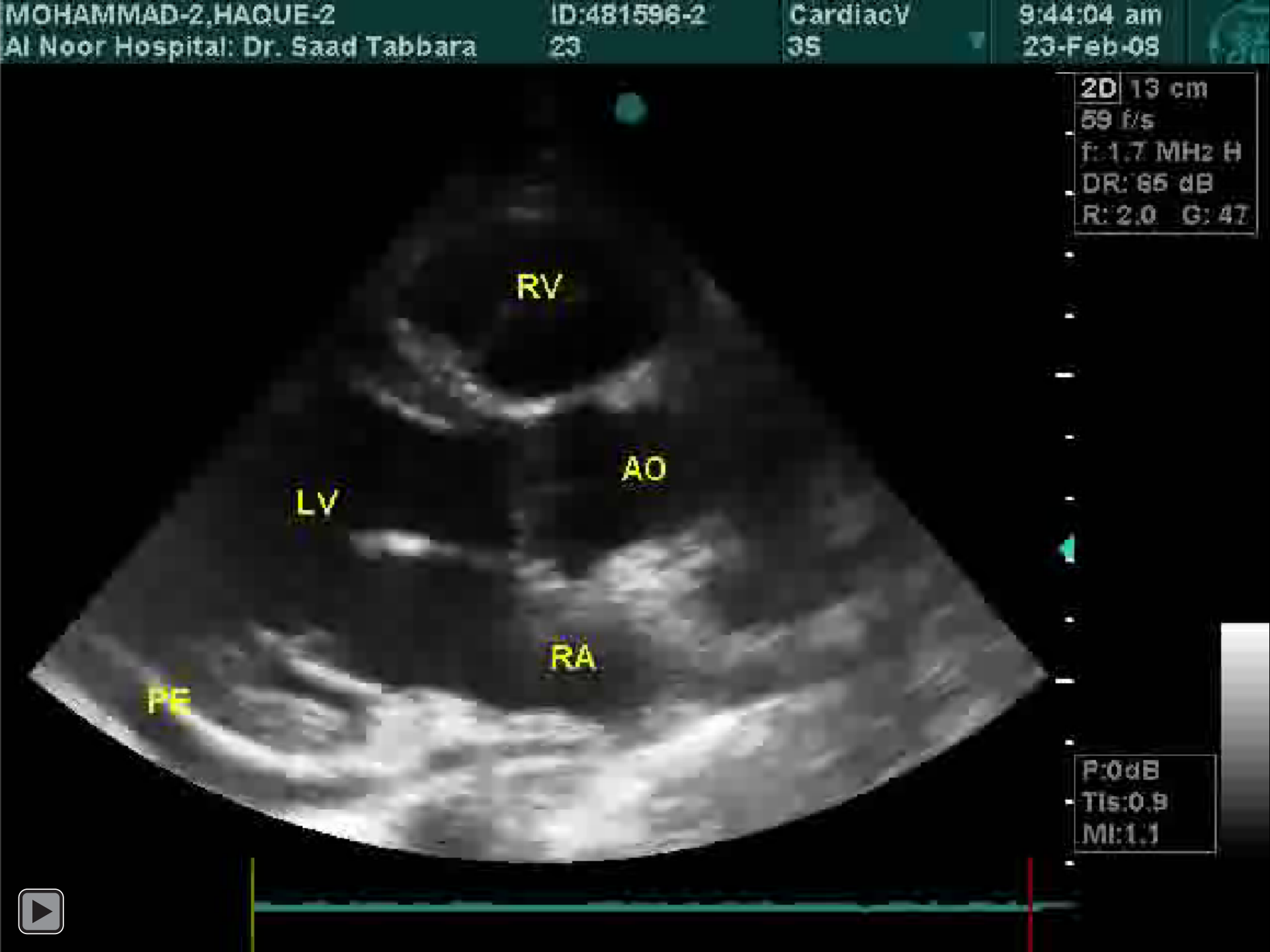

VOLPE,NICHOLAS
ID:163662
CardiacV
7:50:40 am
GDC - Cardiology - Dr. S. Tabbara
35
3S
18-Dec-05
2D 16 cm
67 f/s
f: 1.7 MHz H
DR: 65 dB
R: 2.0 G: 51
P:0dB
TIs:0.9
MI:1.0

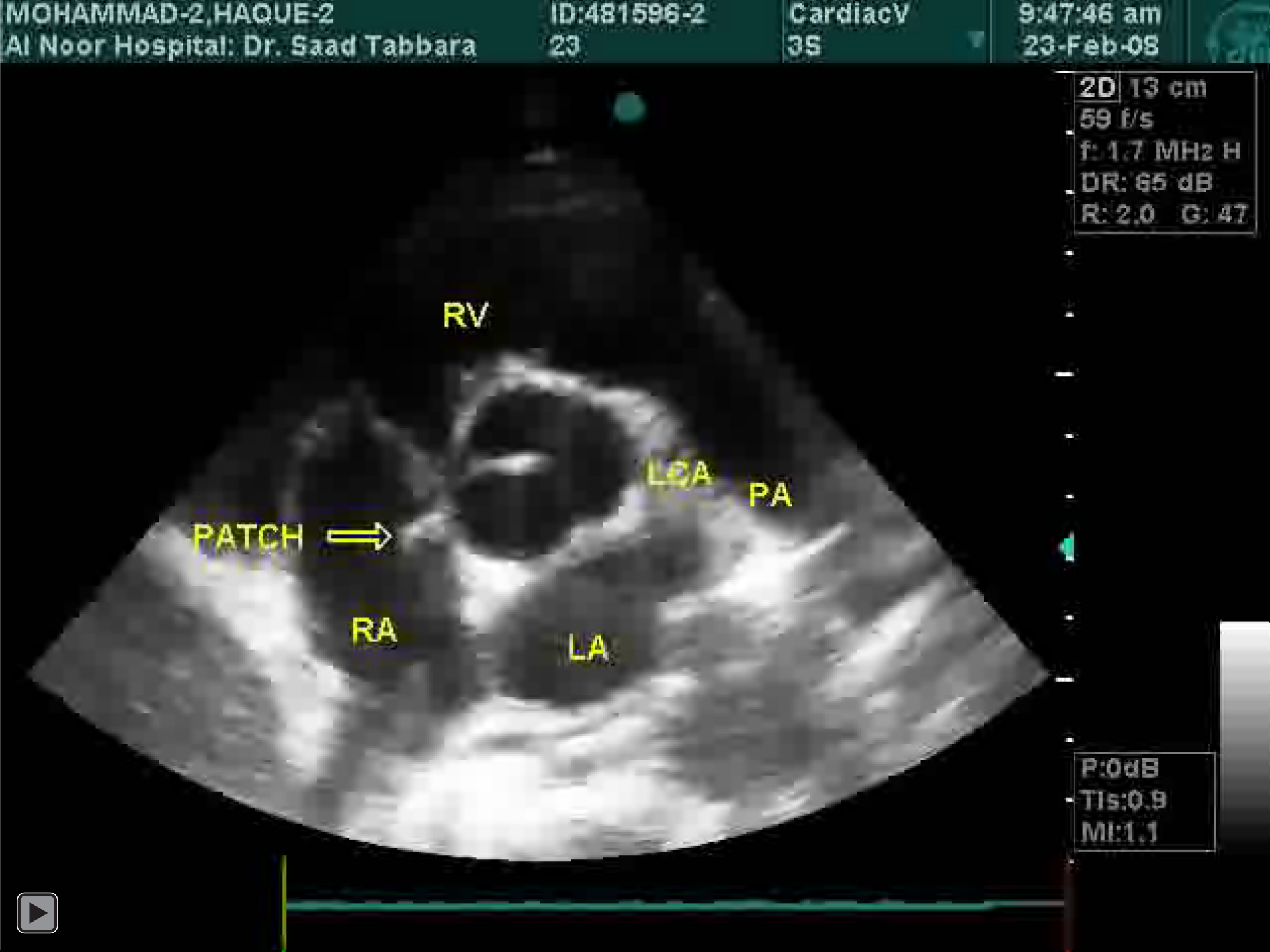
Surgical treatment

The patient was subjected to urgent surgical correction.

- Trimming of the aneurysm.
- Direct closure by stitching.
- Goretex patch suture.


PORTABLE
Post-operative


MOHAMMAD-2,HAQUE-2
ID:481596-2
CardiacV
9:44:04 am
Al Noor Hospital: Dr. Saad Tabbara
23
3S
23-Feb-08
2D 13 cm
59 f/s
f: 1.7 MHz H
DR: 65 dB
R: 2.0 G: 47
RV
AO
LV
RA
PE
P:0dB
TIs:0.9
MI:1.1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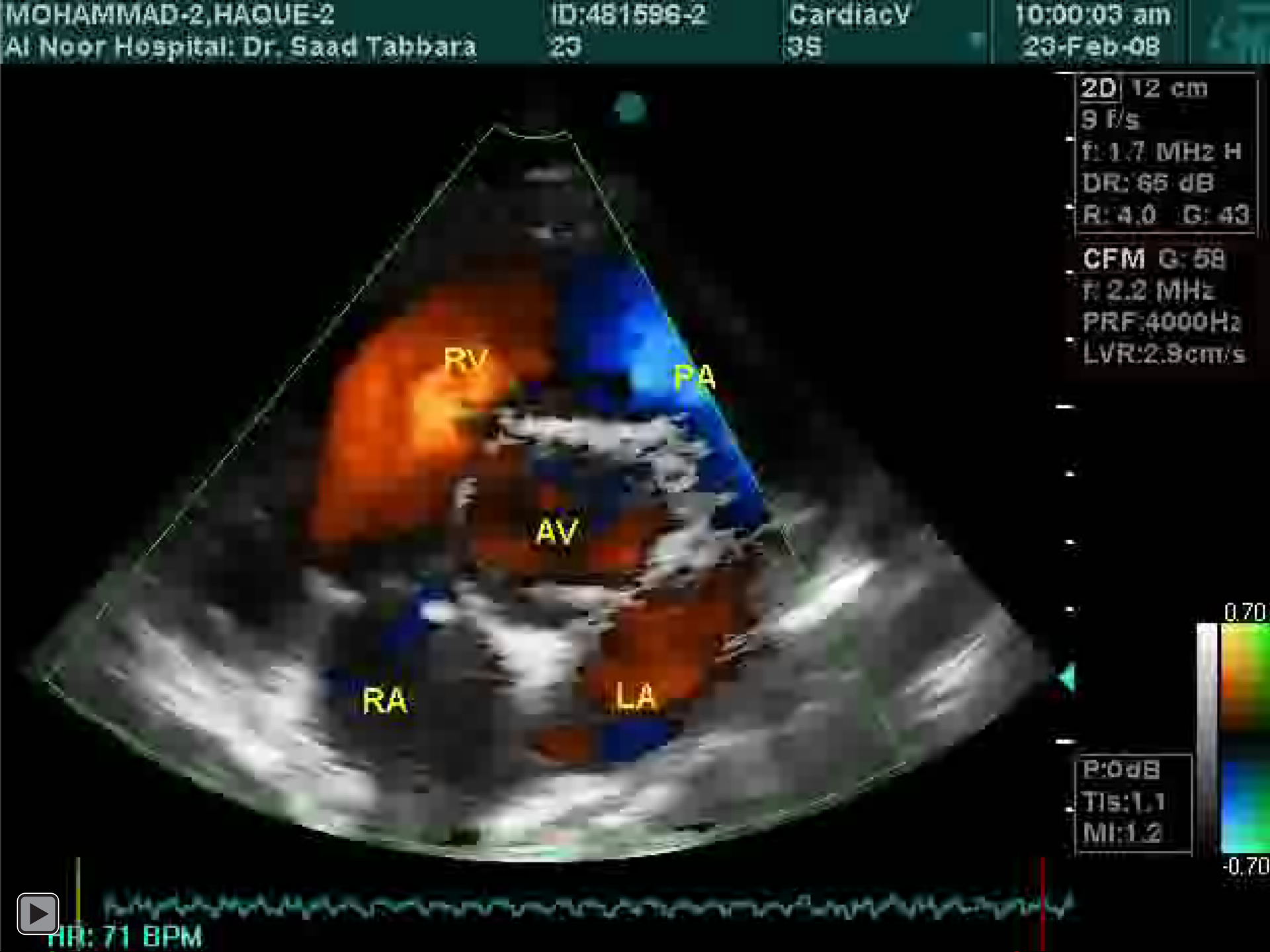
ID:481596-2
CardiacV
9:47:46 am
Al Noor Hospital: Dr. Saad Tabbara
23
3S
23-Feb-08
2D 13 cm
59 f/s
f: 1.7 MHz H
DR: 65 dB
R: 2.0 G: 47
RV
LCA
PA
PATCH
RA
LA
P:0dB
TIs:0.9
MI:1.1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ID:481596-2
CardiacV
10:00:03 am
Al Noor Hospital: Dr. Saad Tabbara
23
3S
23-Feb-08
2D 12 cm
9 f/s
f: 1.7 MHz H
DR: 65 dB
R: 4.0 G: 43
CFM G: 58
f: 2.2 MHz
PRF:4000Hz
LVR:2.9cm/s
RV
PA
AV
RA
LA
0.70
-0.70
P:0dB
TIs:1.1
MI:1.2
HR: 71 BPM

Case 2

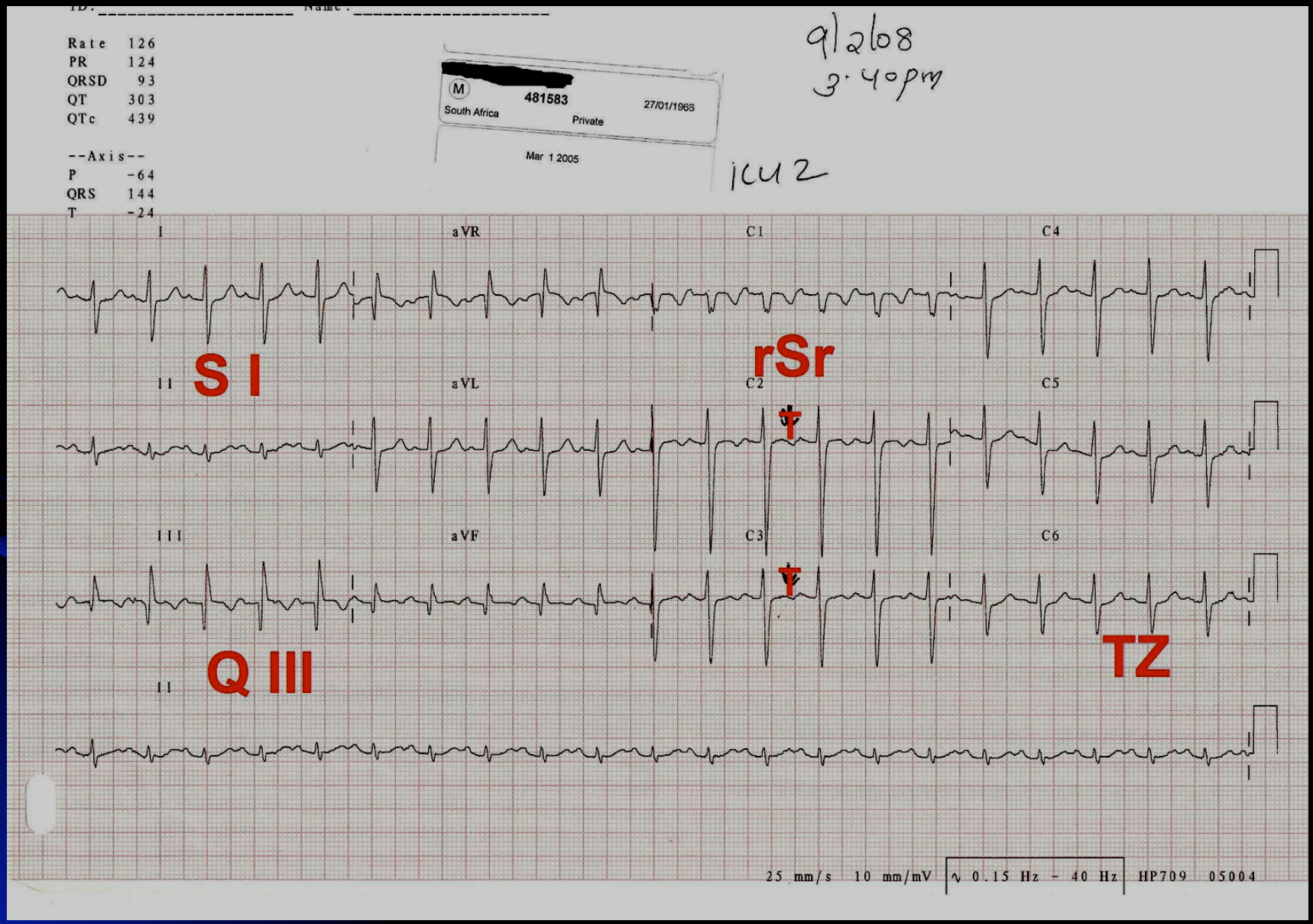
A 42-year-old man with 4th heart sound

- A 42-year-old caucasian engineer presented for progressive effort induced shortness of breath since about 4 months.
- He had consulted several physicians for his complaint and he was repeatedly diagnosed with chest infection and treated as such, with no improvement.
- Upon presentation SOB had progressed to resting dyspnea and was associated with palpitation and perspiration.
- He denied chest pain, limb pain and peripheral edema.

Physical examination

- Patient appeared ill, short of breath.
- BP 110/70 mmHg, HR 120 BPM, Temp. 36.7 C, Transdermal O2 sat. 89-90%. Weight 120 kg at a height of 189 cm.
- Chest was clear.
- No recognizable jugular vein congestion.
- Cardiac asucultation revealed a loud 4th heart sound, over the left lower sternal border. No murmurs.
- No hepatomegaly, no peripheral edema.

ECG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Rate 126
PR 124
QRSD 93
QT 303
QTc 439
--Axis--
P -64
QRS 144
T -24
[redacted]
M
481583
South Africa
Private
27/01/1966
Mar 1 2005
9/2/08
3.40pm
ICU 2
I
aVR
C1
C4
II
S I
aVL
C2
rSr
C5
III
aVF
C3
C6
II
Q III
TZ
25 mm/s 10 mm/mV
0.15 Hz - 40 Hz
HP709 05004

ECG

- **Right ventricular hypertrophy and pressure overload.**
  - **SI-QIII so-called McGuinn-White sign.**
  - **T inversion in right precordial leads.**
  - **Transitional zone (TZ) shift to V6.**

Chest X-Ray

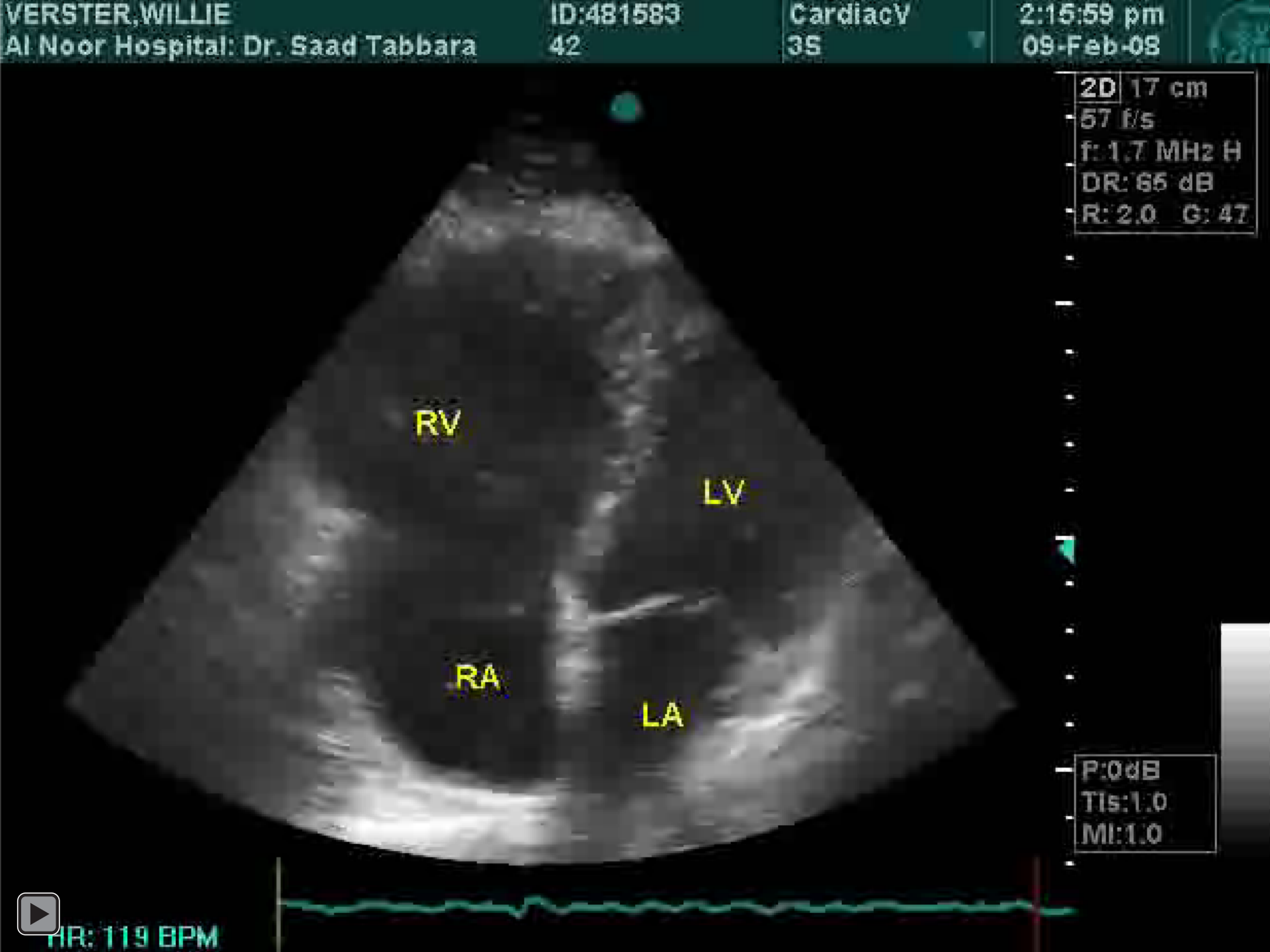
Chest X-Ray

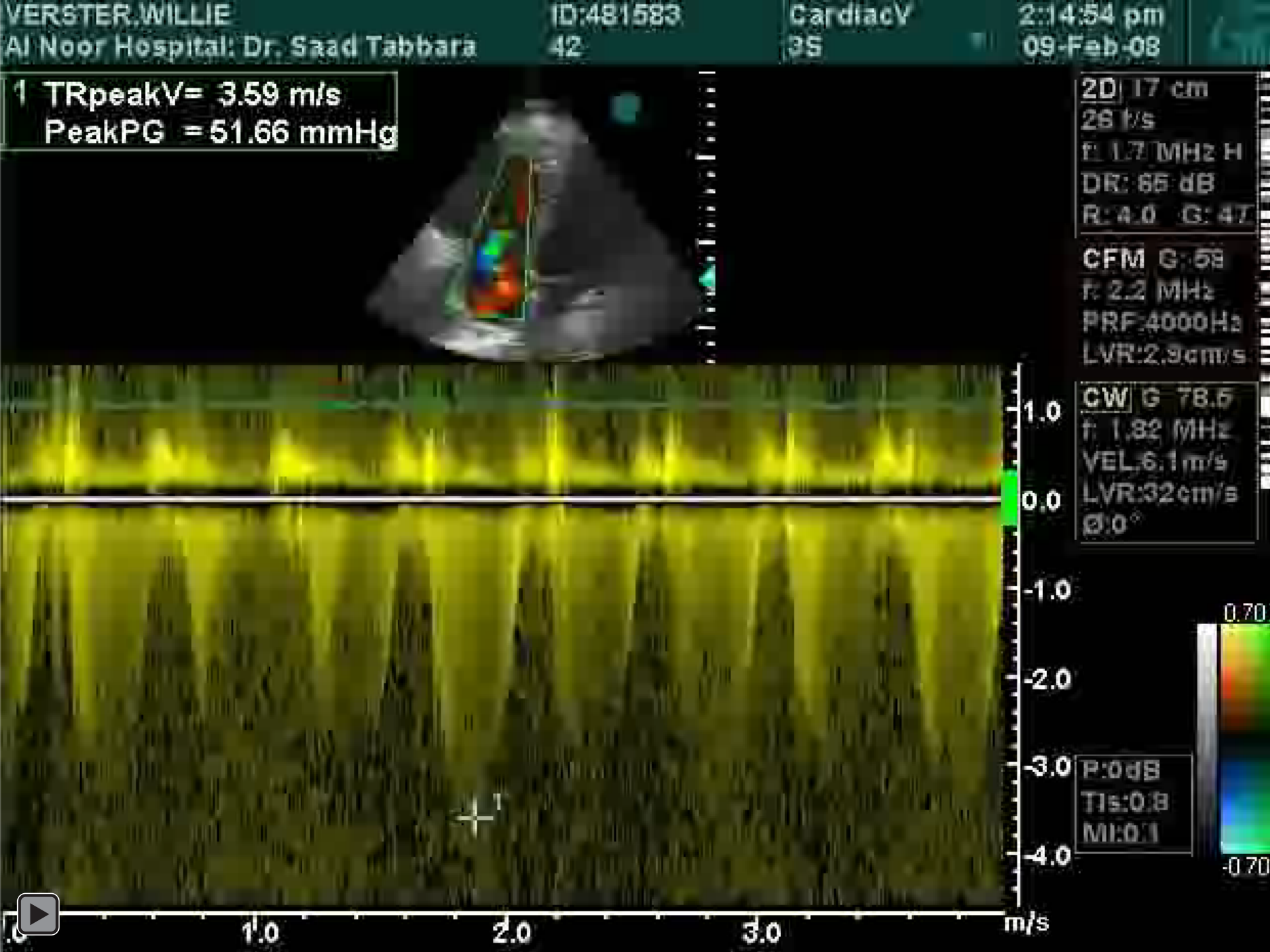
- Bulging of the right heart edge indicating possibility of right atrial dilation.

Lab tests

- CBC, E´lytes, blood sugar, creat., urea, PTT and PT-INR: All normal.
- Uric acid: ↑10.2 mg/dl (7.0).
- LDH: ↑ 627 U/L (240).
- CPK: ↑ 227 U/L (170), with normal CKmB.
- Troponin: ↑ 0.4 (0.01).
- D-Dimer: ↑↑ 7 ‘543 ng/ml (< 500).

Echocardiogram


VERSTER,WILLIE
ID:481583
CardiacV
2:15:59 pm
Al Noor Hospital: Dr. Saad Tabbara
42
3S
09-Feb-08
2D 17 cm
57 f/s
f: 1.7 MH2 H
DR: 65 dB
R: 2.0 G: 47
RV
LV
RA
LA
P:0dB
TIs:1.0
MI:1.0
HR: 119 BPM


VERSTER,WILLIE
Al Noor Hospital: Dr. Saad Tabbara
ID:481583
42
CardiacV
3S
2:14:54 pm
09-Feb-08
1 TRpeakV= 3.59 m/s
PeakPG = 51.66 mmHg
2D 17 cm
26 f/s
f: 1.7 MHz H
DR: 65 dB
R: 4.0 G: 47
CFM G: 58
f: 2.2 MHz
PRF:4000Hz
LVR:2.9cm/s
CW G 78.5
f: 1.82 MHz
VEL:6.1m/s
LVR:32cm/s
Ø:0°
1.0
0.0
-1.0
-2.0
-3.0
-4.0
P:0dB
TIs:0.8
MI:0.1
0.70
-0.70
1.0
2.0
3.0
m/s

Echocardiogram

- Dilation of right ventricle and right atrium with compression of left chambers.
- Reduced contractility of right ventricle.
- Tricuspid regurgitation.
- Elevation of pulmonary pressure to 55-60 mmHg.

Right ventricular failure due to pressure overload

Doppler Ultrasound of venous system of both legs

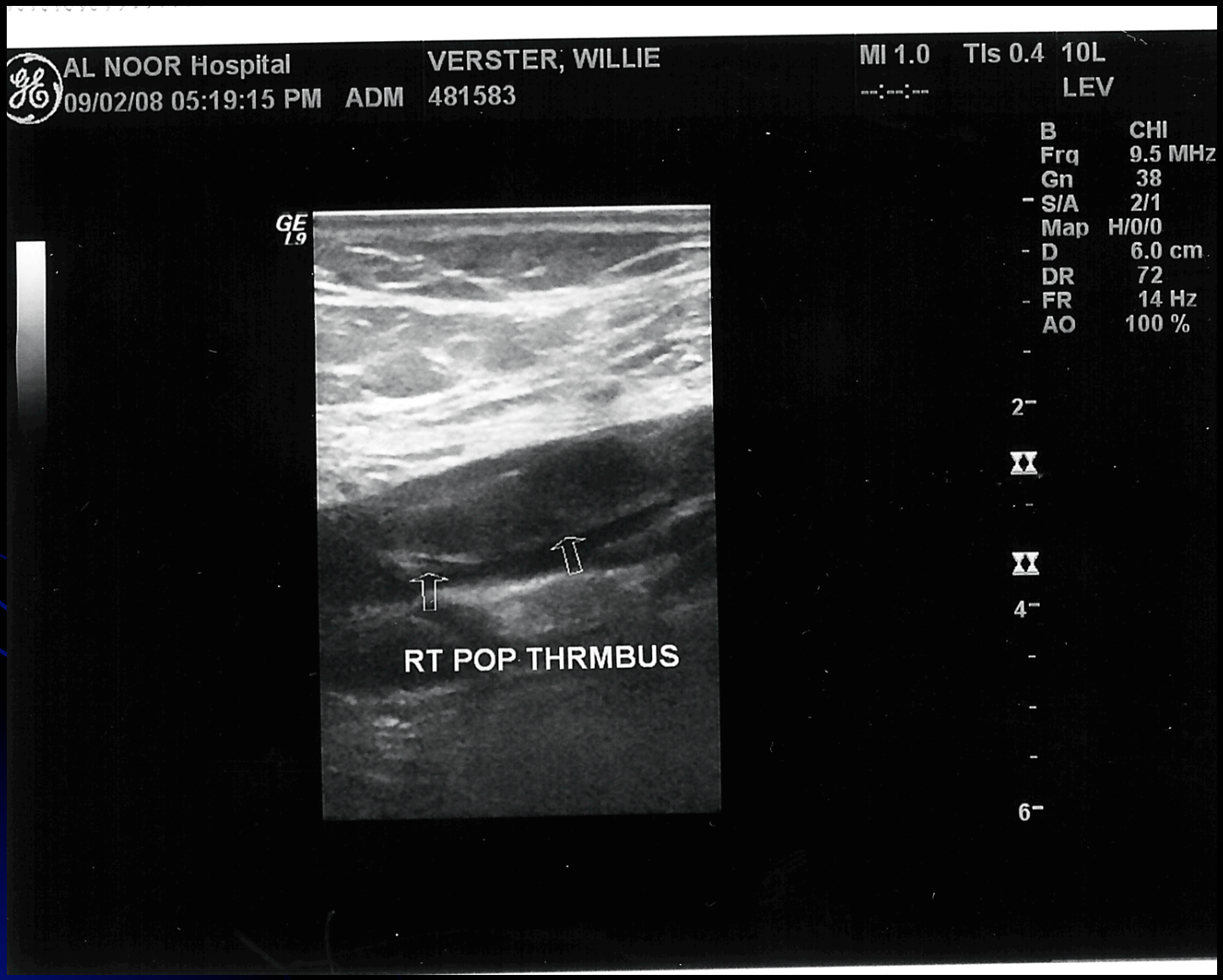
Doppler Ultrasound of venous system of both legs

- Venous system of left leg: Normal.
- Venous system of right leg:

  - Large thrombus of right popliteal vein extending caudally to the deep calf veins, with residual eccentric lumen and increased closure pressure.

  Findings corresponding to chronic partially recanalized DVT.

Doppler study of venous system of right leg



Chest CT-scan

- Ruled out large significant thrombi in the large and segmental pulmonary arteries.
- Assessment of small pulmonary artery branches is only possible with a high resolution CT scan.

Diagnosis:

Chronic (micro)thrombo-embolic pulmonary hypertension

CTEPH

Treatment:

Admission to ICU.

- O2 4L/min, bedrest.
- Overlapping anticoagulation with Enoxaparin (Clexane®) 1mg/kg s.c. BD. and Warfarin.
- Spironolactone 50 mg p.o. OD
- Allopurinol 300 mg p.o. OD.

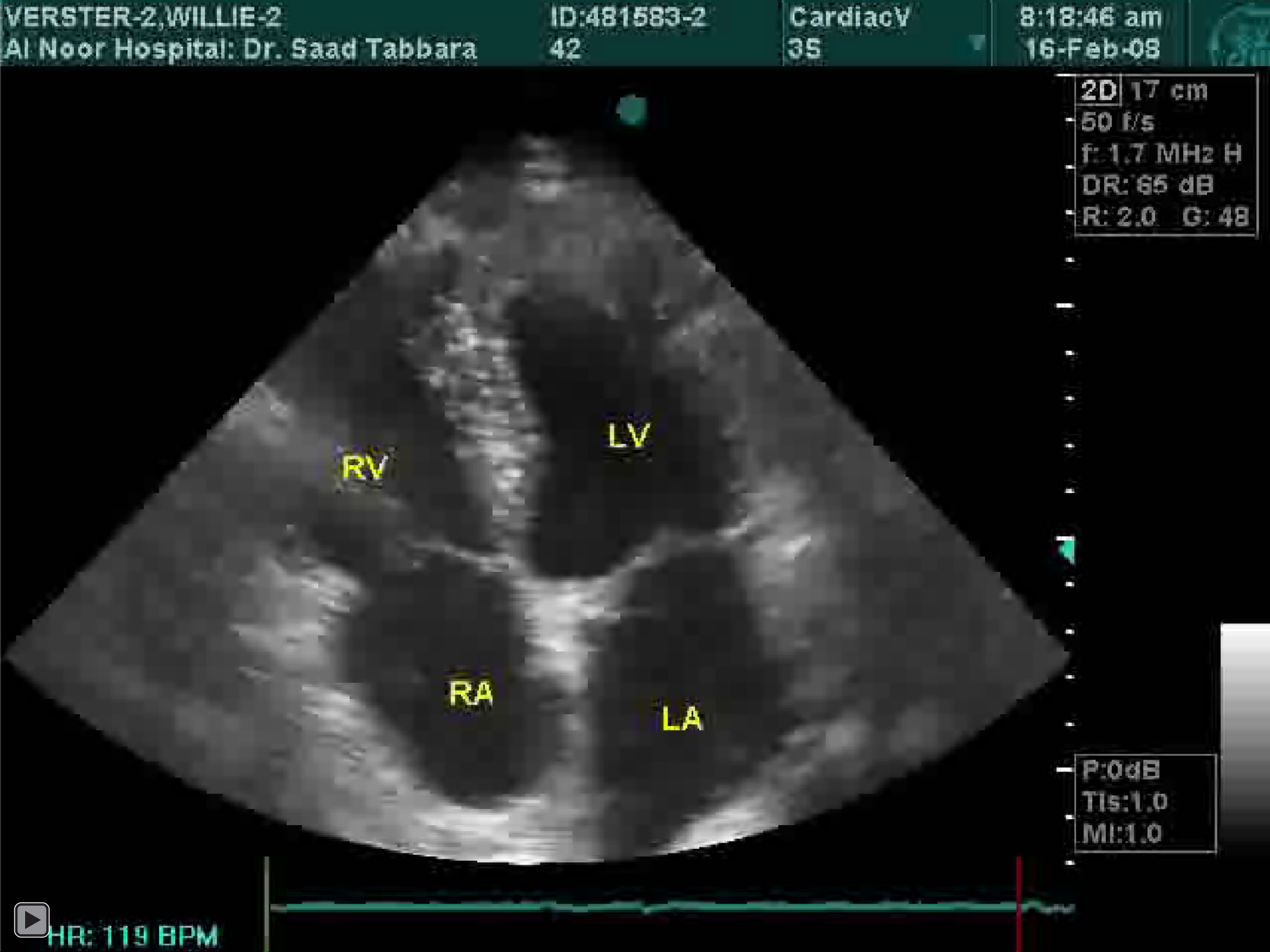
Clinical course

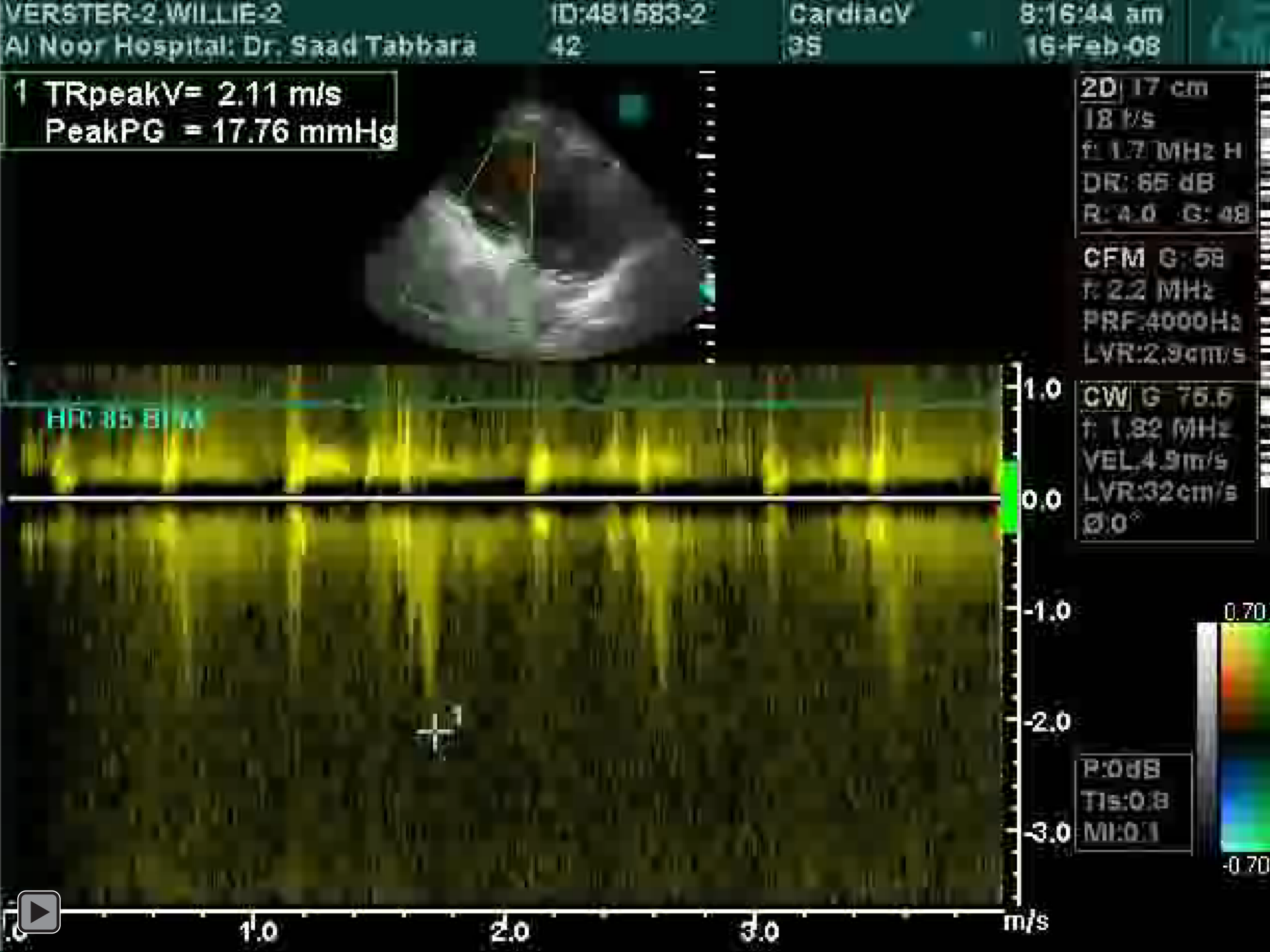
After 8 days of hospitalization:

- **Impressive subjective clinical improvement with gradual normalization of O2 saturation.**
- **Disappearance of rightventricular 4th heart sound.**
- **Normalization of pulmonary pressure in echocardiogram.**
- **Normalization of chest X-Ray.**

5 days after discharge:

- **Repeat Ultrasound of venous system of left leg: Complete elimination of DVT.**


VERSTER-2,WILLIE-2
ID:481583-2
CardiacV
8:18:46 am
Al Noor Hospital: Dr. Saad Tabbara
42
35
16-Feb-08
2D 17 cm
50 f/s
f: 1.7 MHz H
DR: 65 dB
R: 2.0 G: 48
RV
LV
RA
LA
P:0dB
TIs:1.0
MI:1.0
HR: 119 BPM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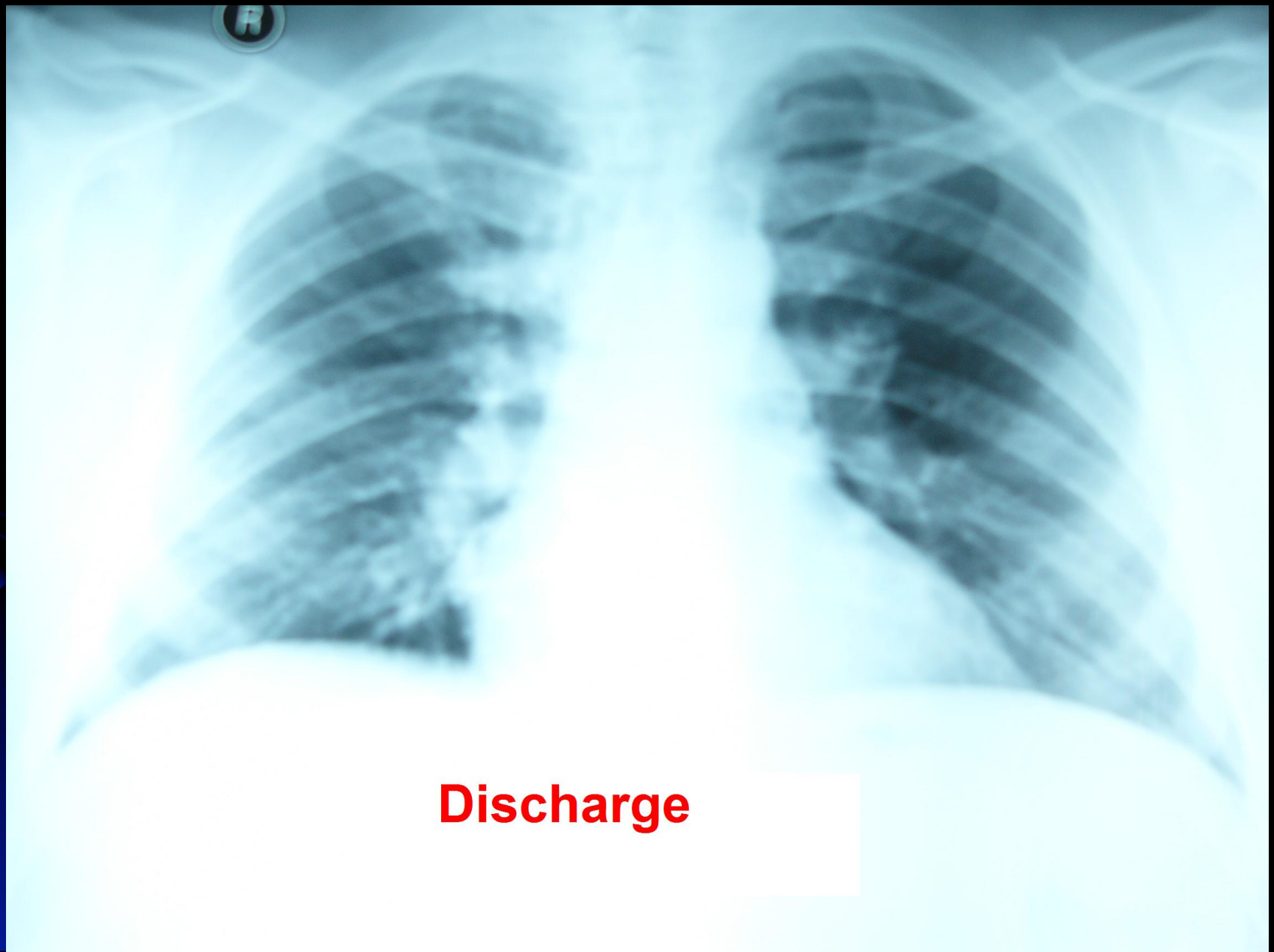
Al Noor Hospital: Dr. Saad Tabbara
42
3S
16-Feb-08
1 TRpeakV= 2.11 m/s
PeakPG = 17.76 mmHg
2D 17 cm
18 f/s
f: 1.7 MHz H
DR: 65 dB
R: 4.0 G: 48
CFM G: 58
f: 2.2 MHz
PRF:4000Hz
LVR:2.9cm/s
CW G 76.6
f: 1.82 MHz
VEL:4.9m/s
LVR:32cm/s
Ø:0°
HR: 85 BPM
1.0
0.0
-1.0
-2.0
-3.0
P:0dB
TIs:0.8
MI:0.1
0.70
-0.70
1.0
2.0
3.0
m/s

Chest film



Additional lab invetigations performed for underlying thrombophilic conditions

- Protein C deficiency.
- Protein S deficiency.
- Anti thrombin III deficiency.
- Factor V Leiden mutation.
- Antiphospholipid antibodies.

Additional lab invetigations for underlying thrombophilic conditions

- AT III, Protein C, Protein S, Factor V mutation: All normal.
- Antiphospholipid antibodies (Anticardiolipin antibodies)

  - IgG: ↑ 39.9 (N:< 10)

  - IgM: ↑ 12.4 (N:< 7.0)

  Both sginficantly elevated corresponding to:

Hughes Syndrome