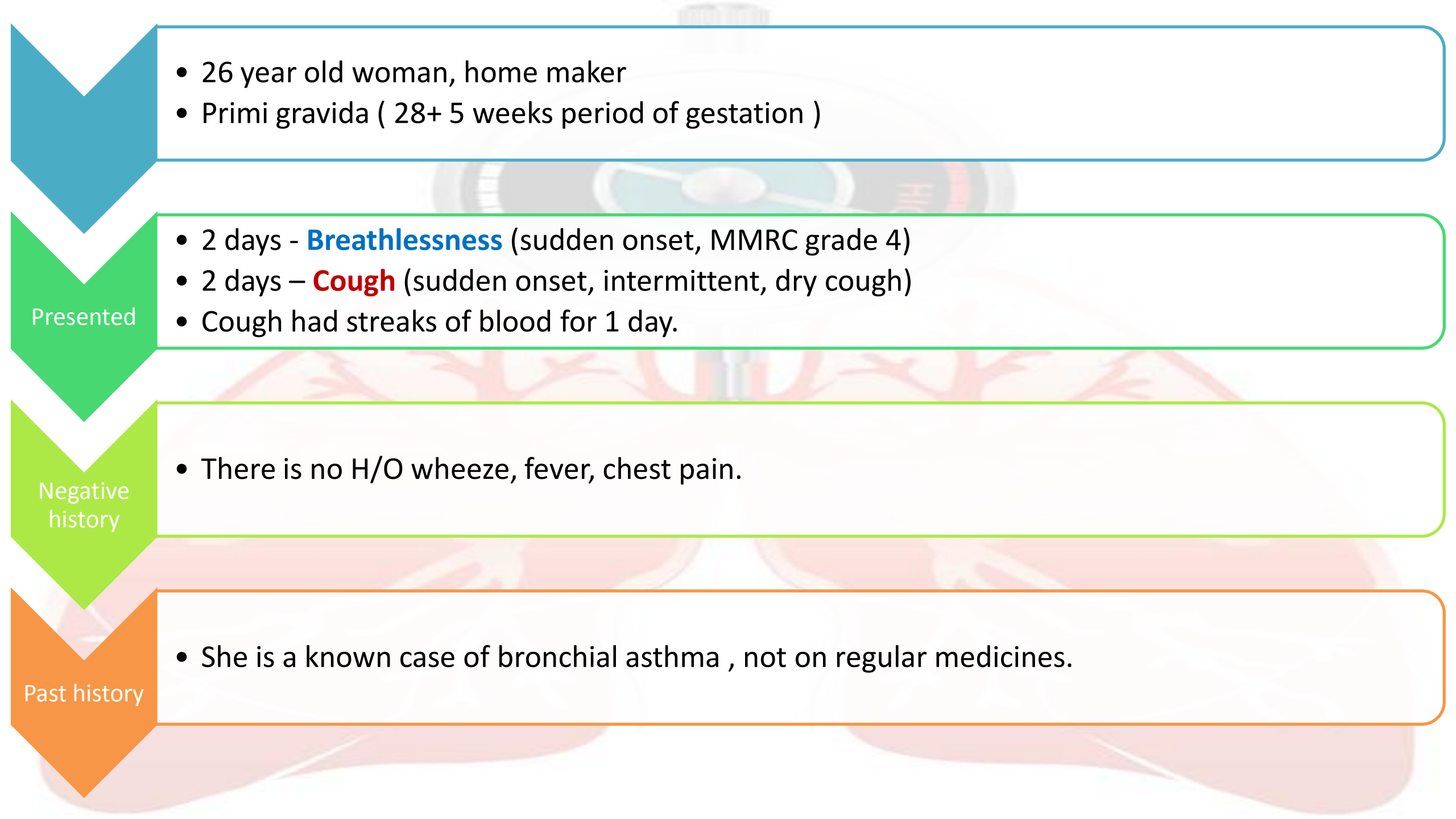




PULMONARY HYPERTENSION AND PREGNANCY.

DR KAUMUDI DEVI, DNB RESIDENT, RUBY HALL CLINIC, PUNE.

DR MAHAVIR MODI, CONSULTANT PULMONOLOGIST, RUBY HALL CLINIC, PUNE

- 
- 26 year old woman, home maker
 - Primi gravida (28+ 5 weeks period of gestation)

Presented

- 2 days - **Breathlessness** (sudden onset, MMRC grade 4)
- 2 days – **Cough** (sudden onset, intermittent, dry cough)
- Cough had streaks of blood for 1 day.

Negative history

- There is no H/O wheeze, fever, chest pain.

Past history

- She is a known case of bronchial asthma , not on regular medicines.

On examination

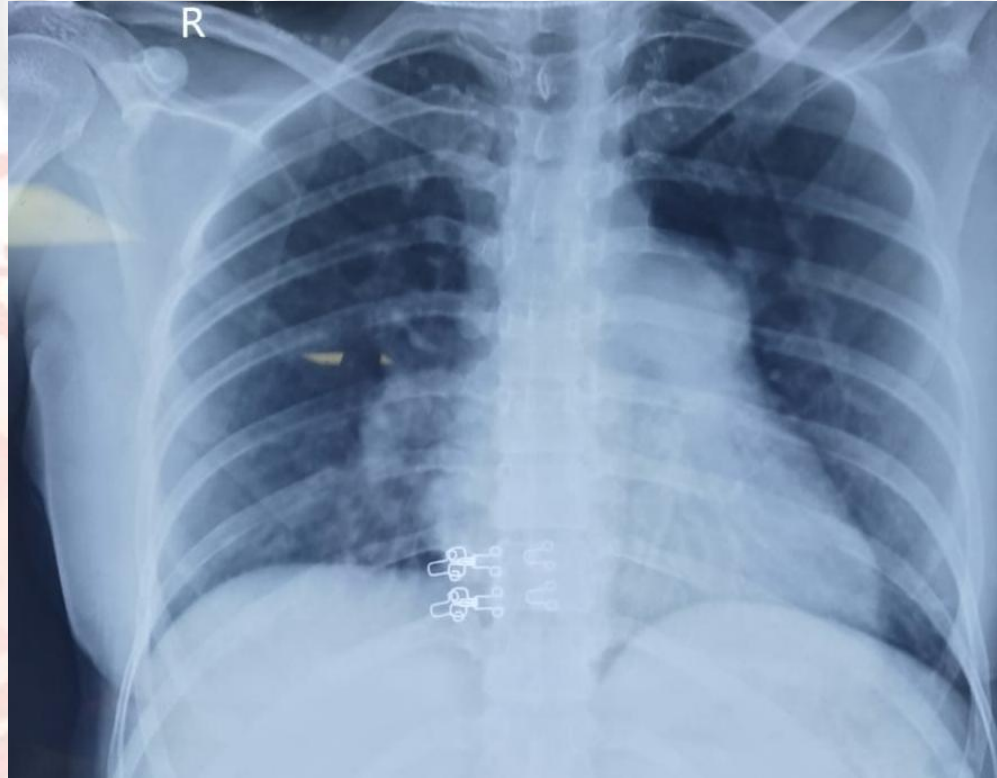
- Pulse rate - 115 / min
- Blood pressure - 110/70 mmhg, right arm supine position
- Respiratory rate - 28 cycles /min
- Spo2 - 88 % room air.
- Afebrile.
- Pallor present.
- No pedal edema.

Covid antigen negative.

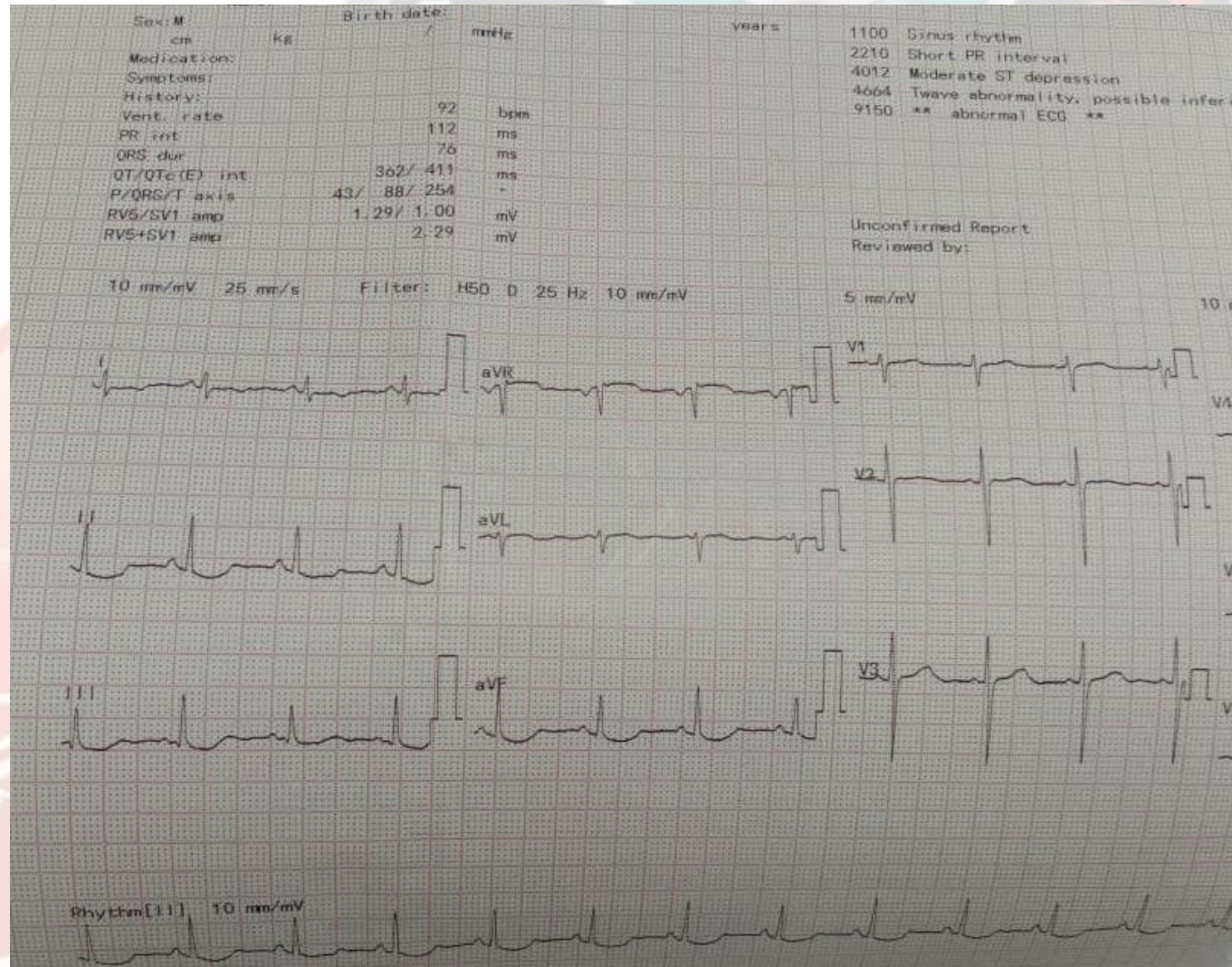
started on oxygen via venturi mask ,
50 % fio2, 12 L o2, saturation
improved to 96 %.

admitted as covid suspect in ICU.

CHEST RADIOGRAPH

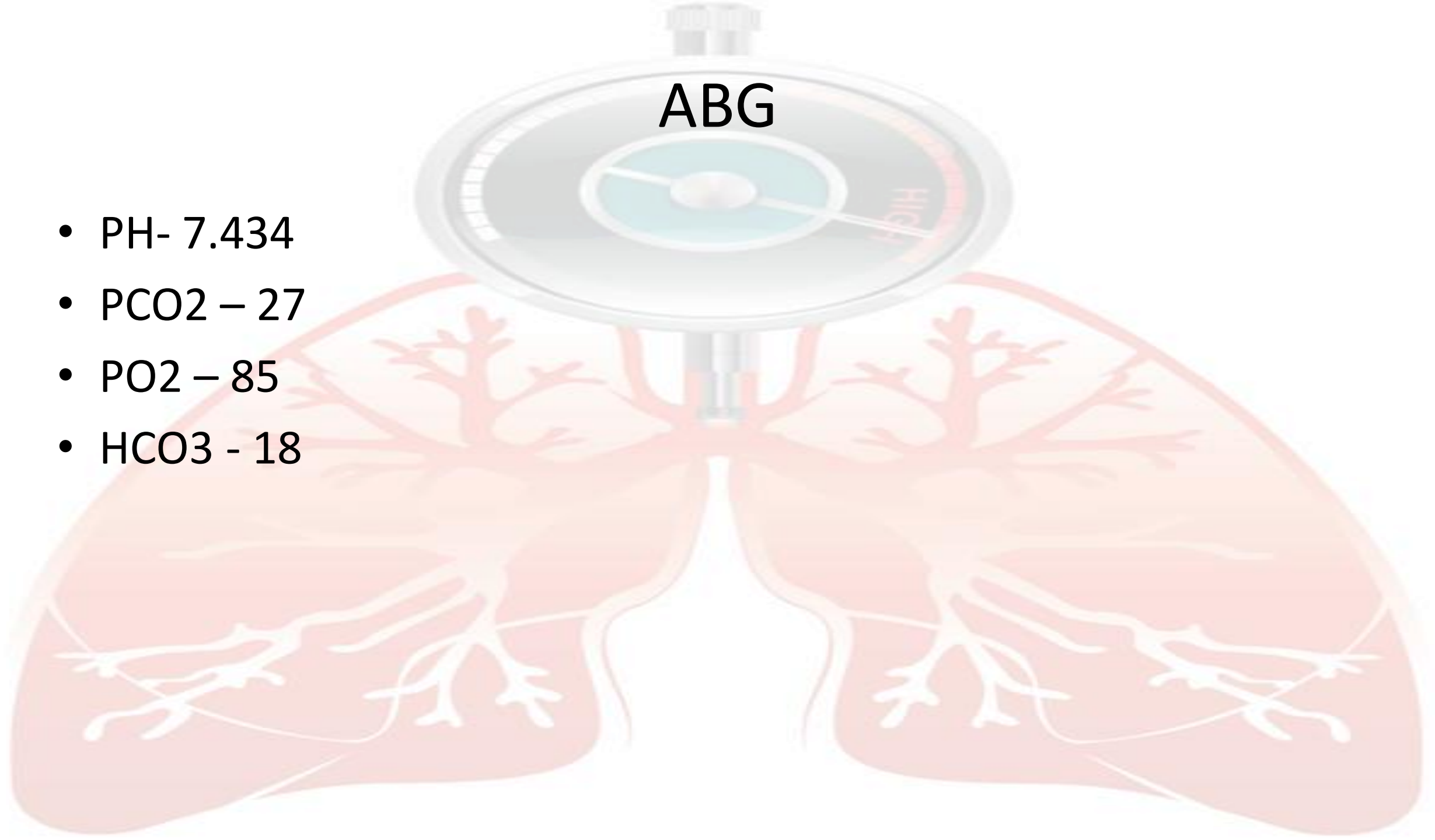


ECG



ABG

- PH- 7.434
- PCO₂ – 27
- PO₂ – 85
- HCO₃ - 18





TC - 12600

Hb - 10.7

PLT - 167000

Urea - 7

Creatinine - 0.6

D dimer - 761

PT - 12.7

INR 1.07

DIFFERENTIAL DIAGNOSIS

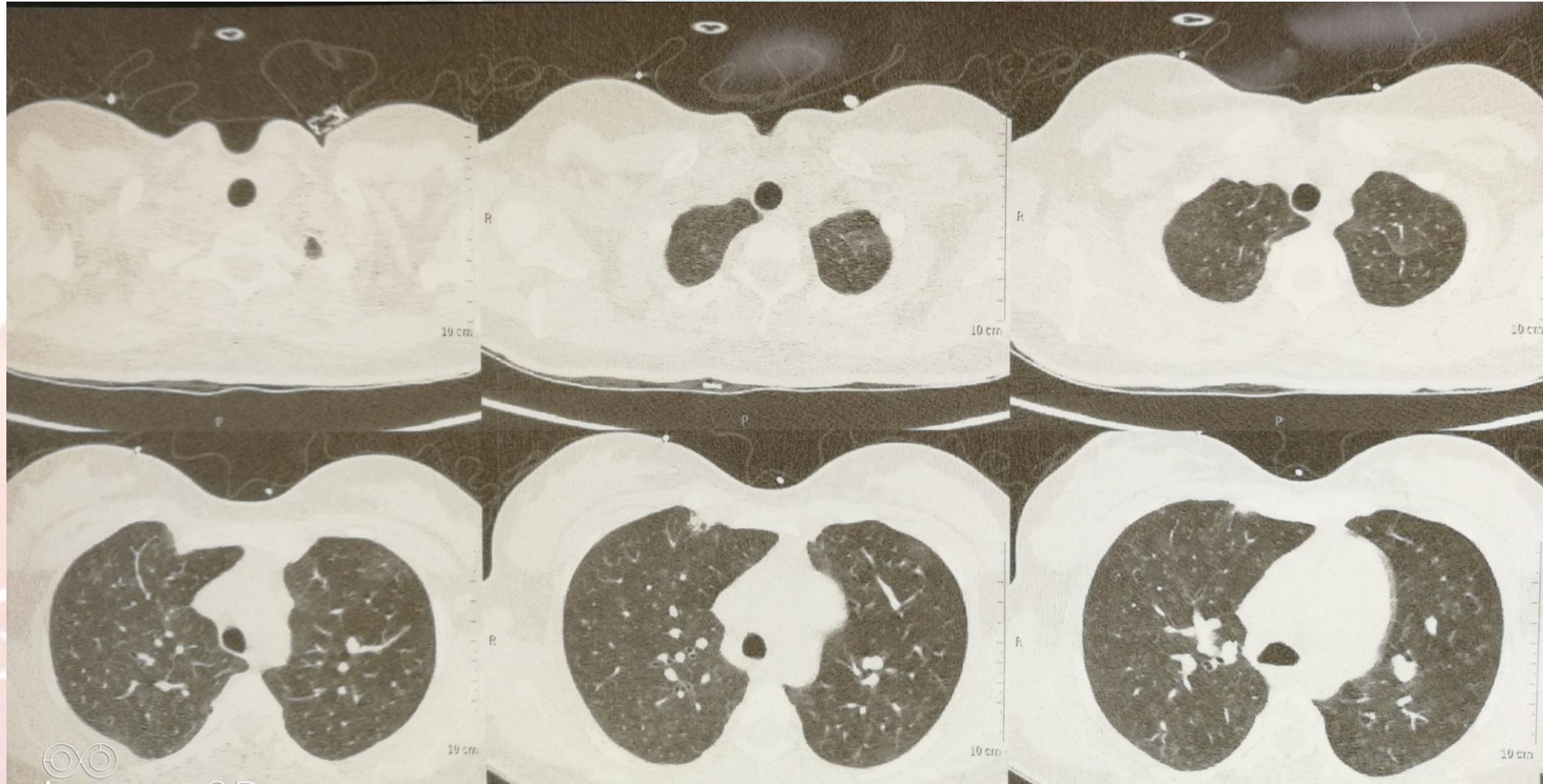
The background of the slide features a faint, stylized illustration of a human torso from the chest down to the waist. The lungs are depicted in a light pinkish-red color with white branching bronchial structures. A silver stethoscope is positioned over the upper chest area, with its chest piece resting on the left lung and its tubing extending downwards. The overall image is semi-transparent, allowing the text and shapes to be clearly visible.

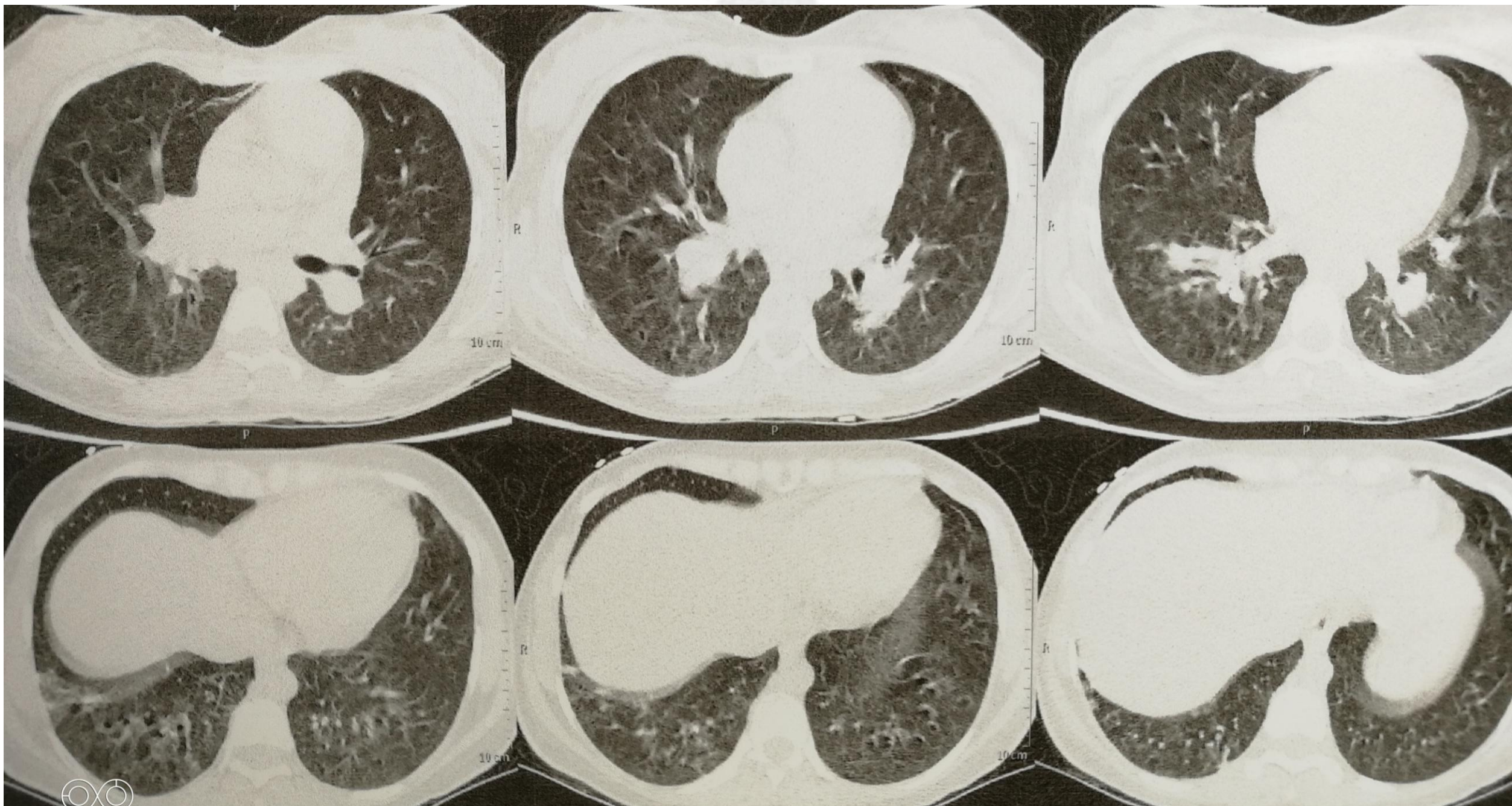
Acute
Pulmonary
Embolism.

Covid – 19
pneumonia

Acute Asthma
exacerbation

HRCT thorax done which showed subpleural consolidation and GGO in right lower lobe, GGO in bilateral upperlobe along with dilated pulmonary artery.





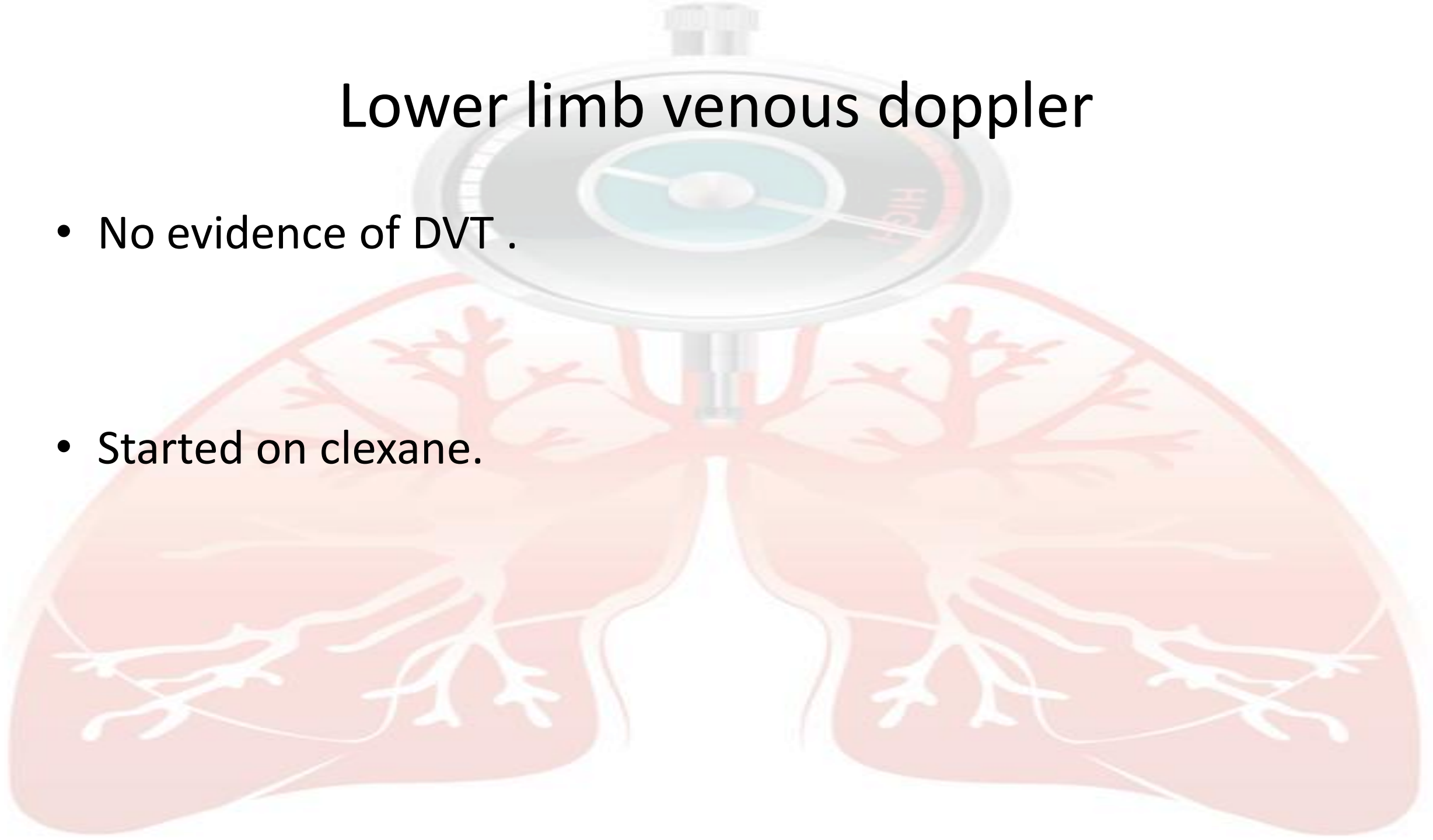
2-D ECHO

- LVEF - 60 %.
- **PASP 90-100 mmhg.**
- **RA / RV grossly dilated.**
- **RV hypertrophy present.**
- No evidence of clot/ embolism.
- No valvular abnormality.

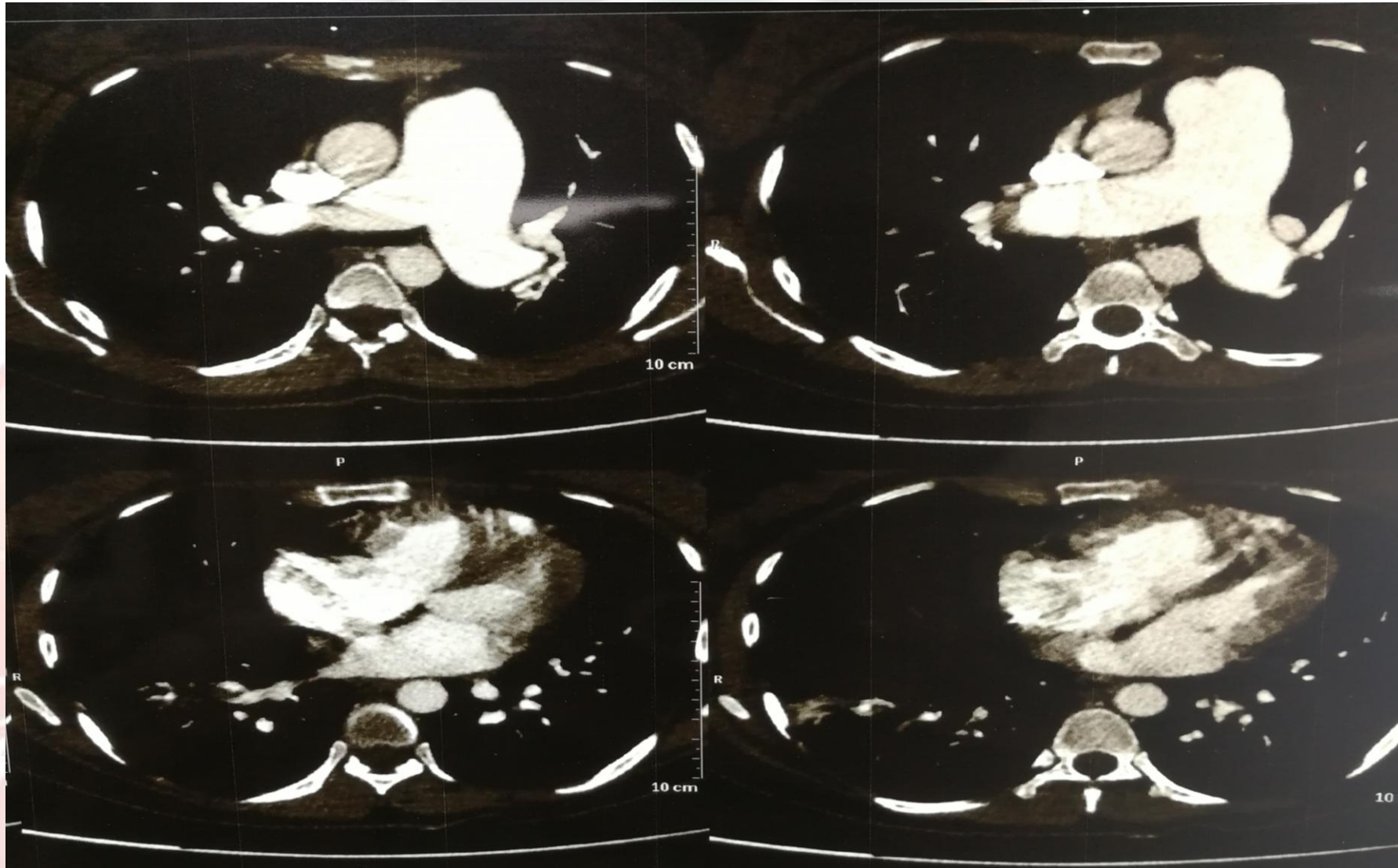


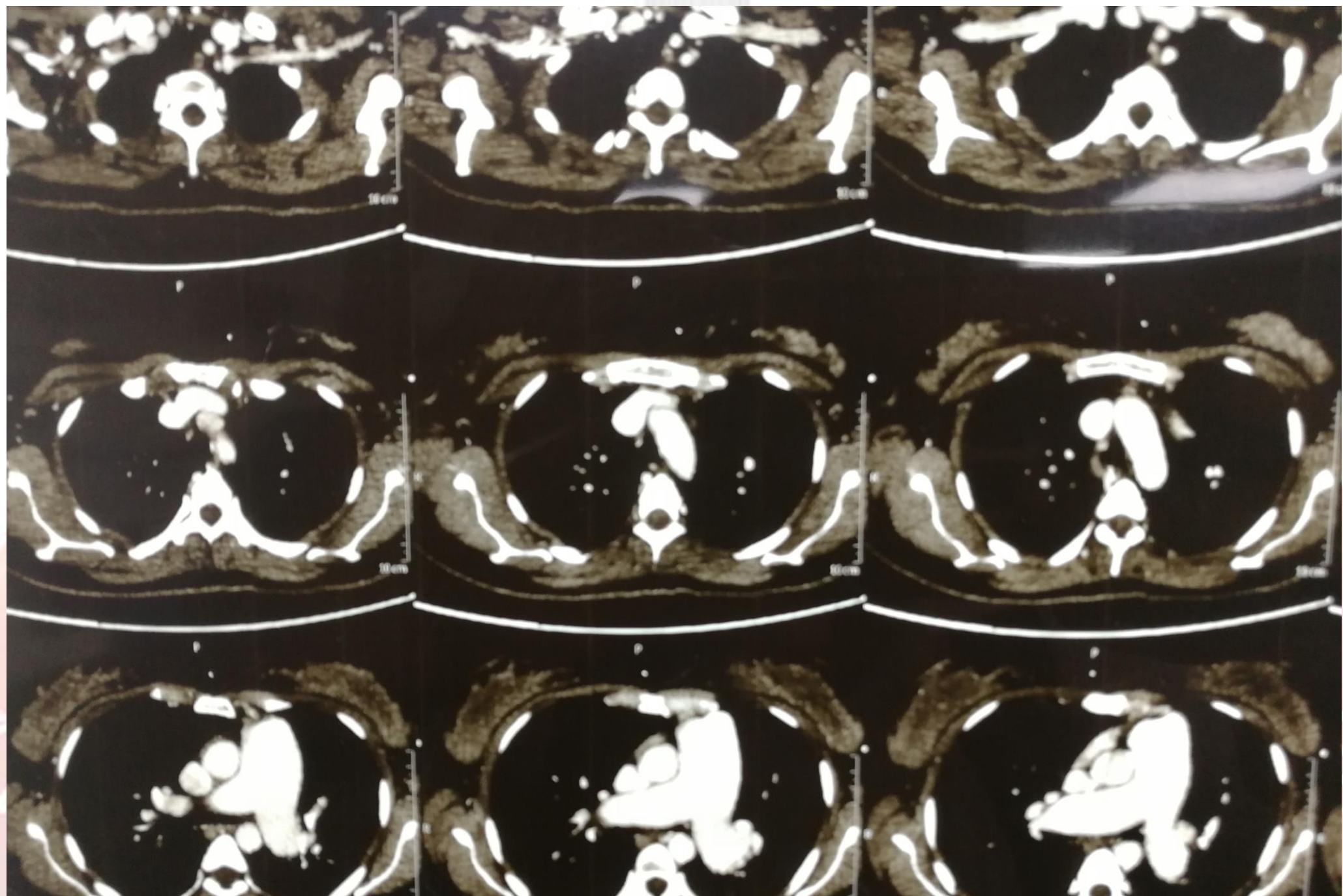
Lower limb venous doppler

- No evidence of DVT .
- Started on clexane.



CTPA - no evidence of pulmonary embolism.

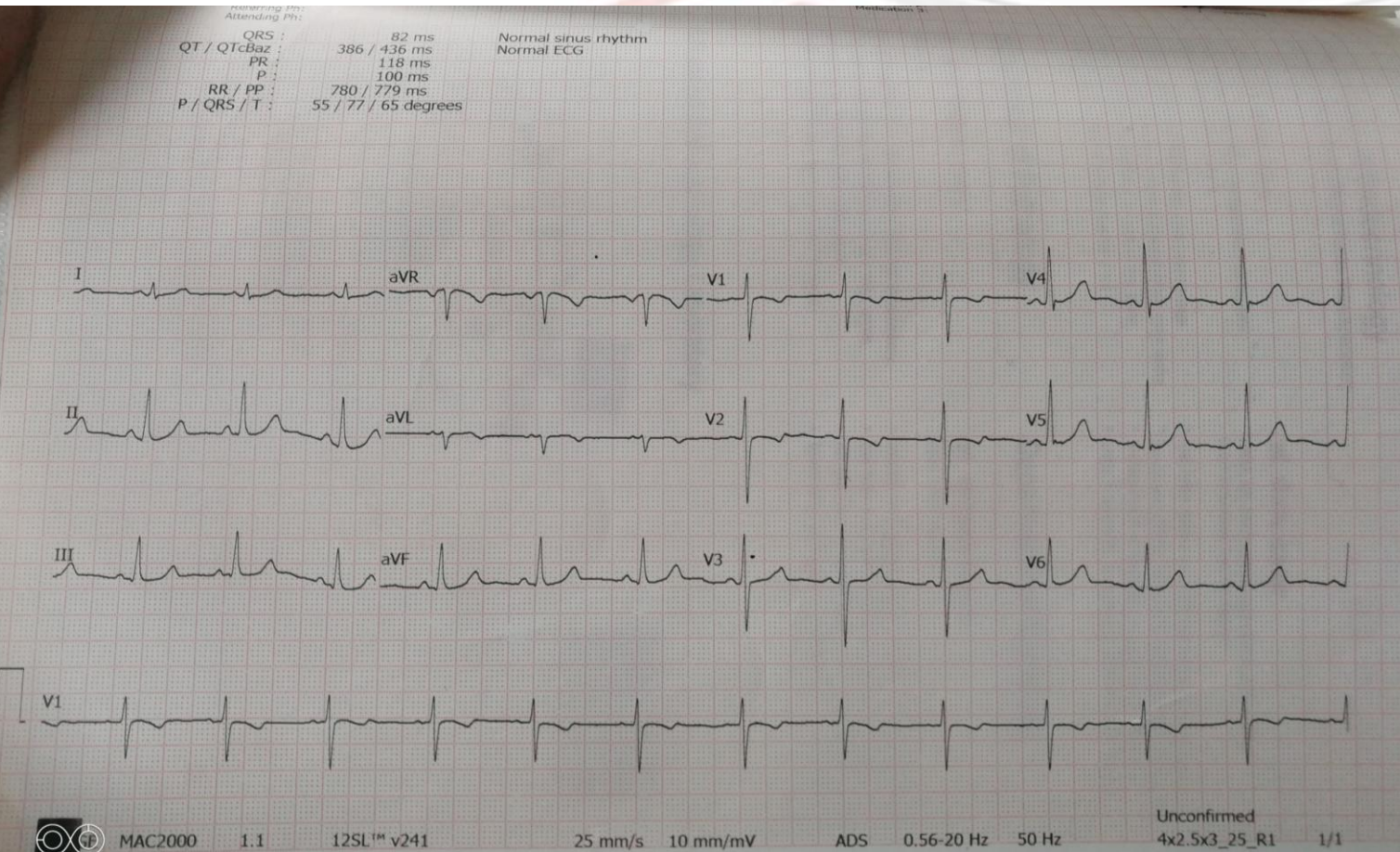




Palpitations : 2nd month of pregnancy

2D ECHO

ECG



2D ECHO & COLOR DOPPLER

Levocardia, viscero-atrial situs solitus
Intact interatrial and Interventricular septum
Normally related great vessels
Normal pulmonary and systemic venous drainage
All cardiac chambers are normal sized
Normal Diastolic filling patterns
No regional wall motion abnormality
Mitral, Aortic, Tricuspid and pulmonary valves are structurally and functionally normal
No pulmonary hypertension
Left sided Aortic Arch / No COA
Normal pericardium

MEASUREMENTS

M MODE

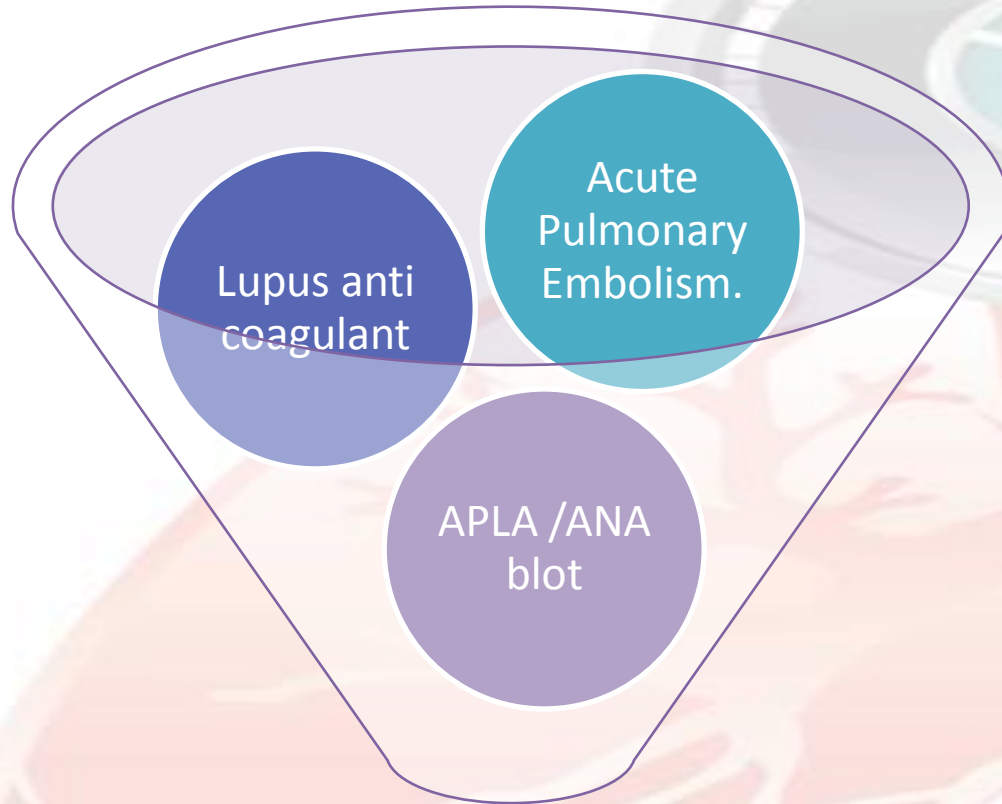
Ao Diam	2.3 cm
LA Diam	2.6 cm
LA/Ao	1.15
Ao/LA	0.87
IVSd	0.8 cm
LVIDd	3.5 cm
EDV(Teich)	52 ml
LVPWd	0.7 cm
IVSs	1.1 cm
LVIDs	2.4 cm
ESV(Teich)	20 ml
EF(Teich)	62 %
%FS	32 %
LVPWs	1.1 cm

DOPPLER

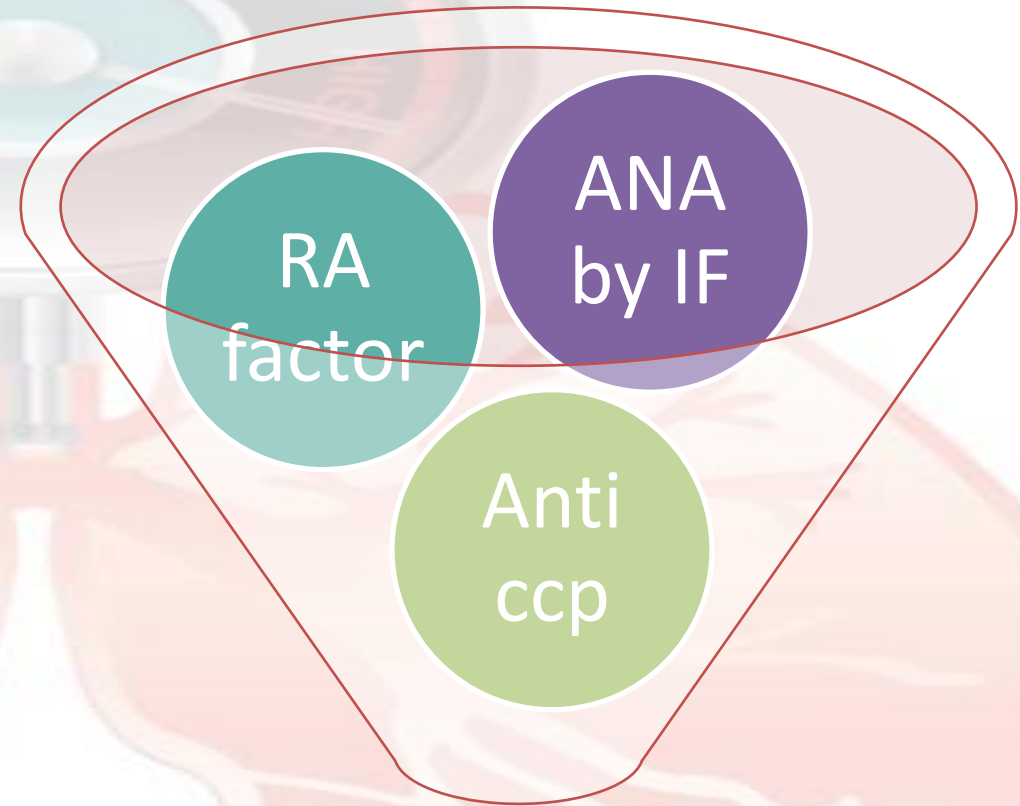
IMPRESSION

All cardiac chambers are normal sized
Normal diastolic filling patterns
No regional wall motion abnormality
Normal valves
Normal Biventricular function
No pericardial effusion/clots/vegetations
No pulmonary hypertension

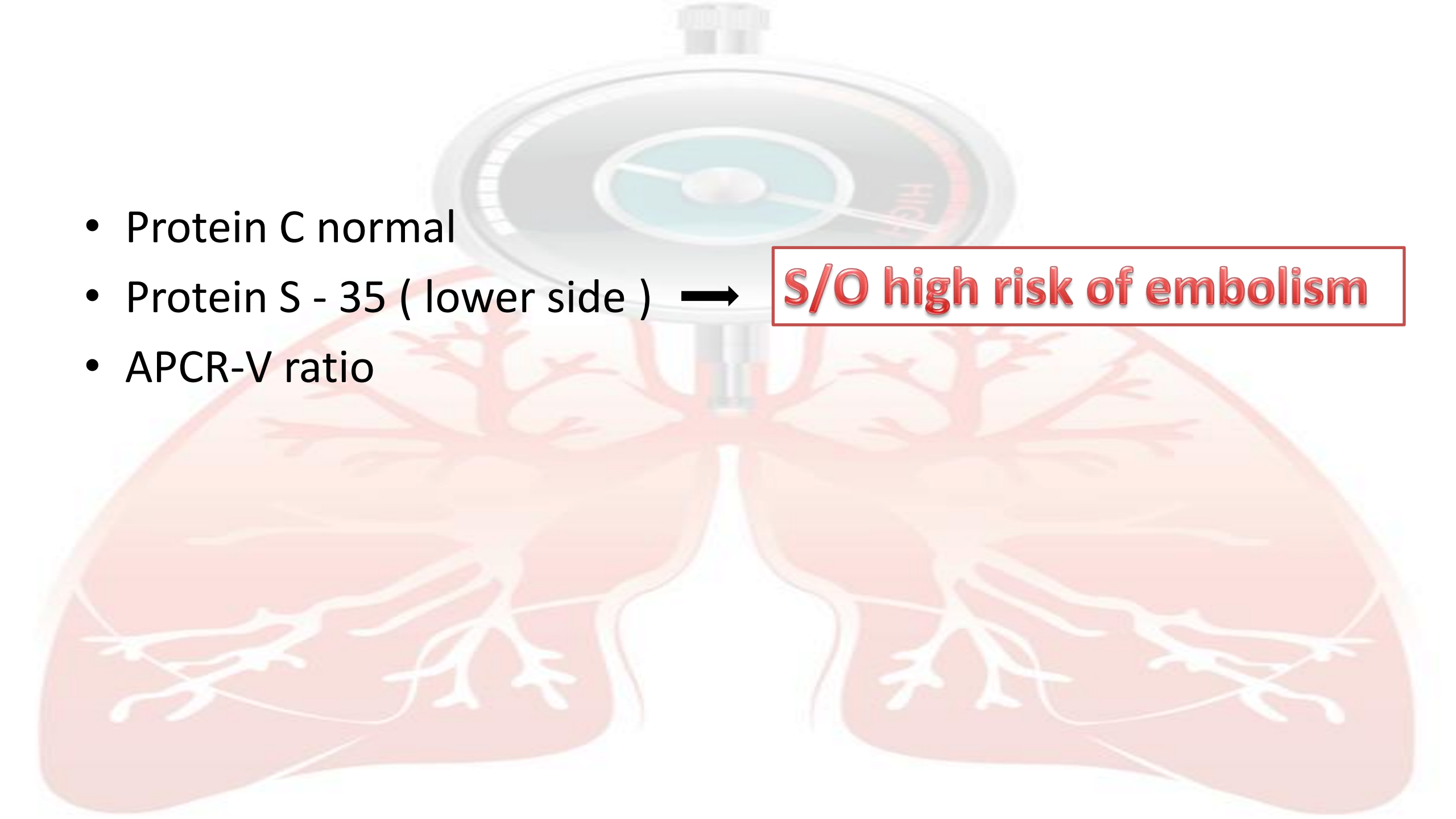
Connective tissue workup



Negative



Negative

- 
- The background of the slide features a faint, semi-transparent illustration. At the top, there is a medical monitor with a circular dial and a needle pointing towards the 'HIGH' mark. Below the monitor, a pair of human lungs is depicted in a light pinkish-red color, showing the branching network of bronchi and blood vessels.
- Protein C normal
 - Protein S - 35 (lower side) →
 - APCR-V ratio

S/O high risk of embolism

- No portal hypertension.

USG abdomen

- Not done :
severe
pulmonary
hypertension

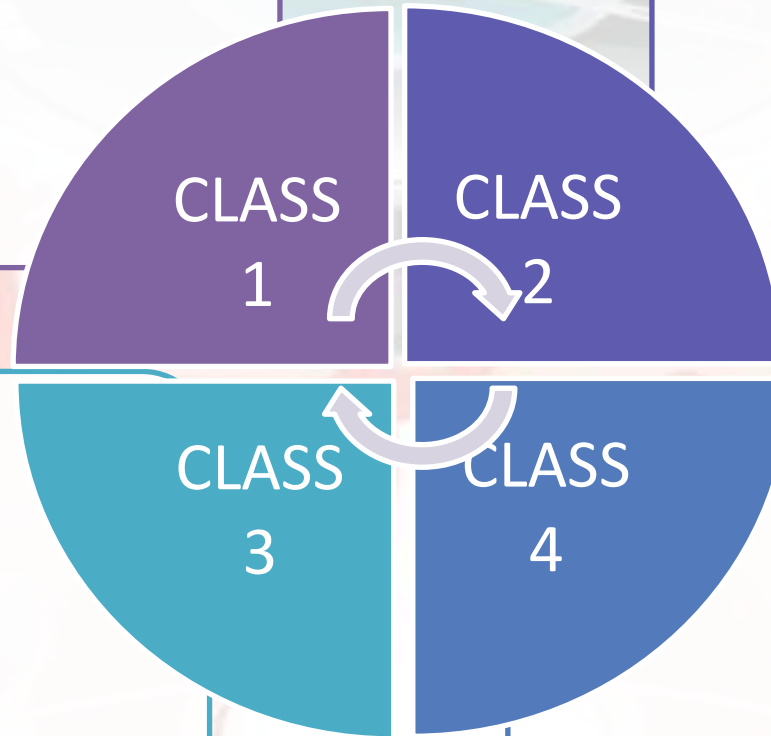
TEE

- Report
awaited

Genetic
mutation of
BMPR2

- BMPR2 , ALK -1, Endoglin mutation awaited.
- All CTD work up negative.
- HIV - non reactive
- No portal hypertension.
- No schistosomiasis.
- No signs of chronic hemolytic anemia

- to rule out ASD and other valvular heart disease.



- No evidence of any lung parenchymal disease

- No evidence of CTEPH .

The background of the image features a faint, stylized illustration of human lungs in a light pinkish-red hue. Overlaid on the upper portion of the image is a circular medical scale, similar to a dial on a piece of equipment, with a needle pointing towards the 'HIGH' mark. Five colored circles are arranged in a circular pattern, each containing a specific medical criterion.

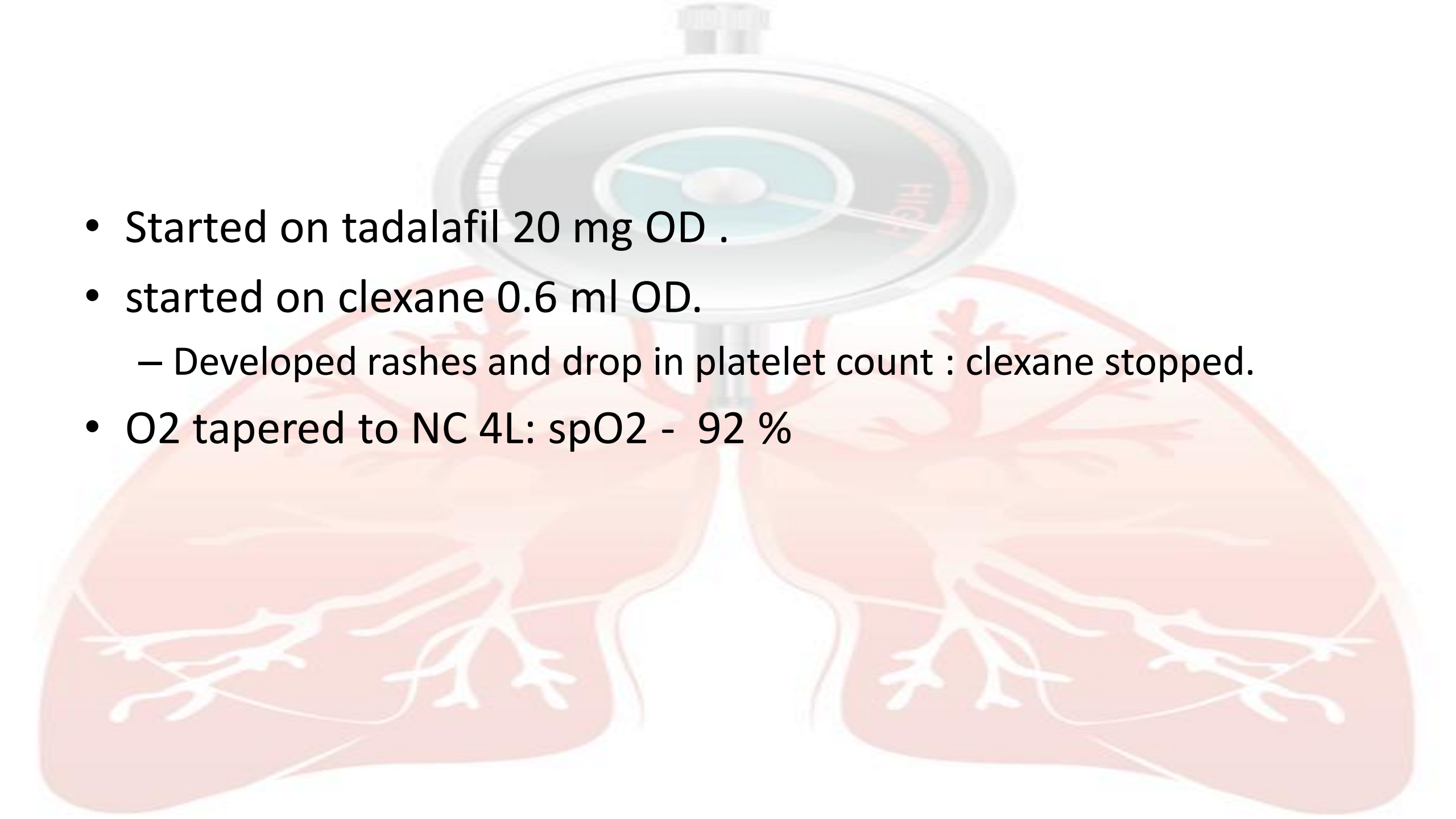
**No
splenectomy**

**thyroid
status
normal**

miscellaneous

**no evidence
of tumour**

**no evidence
of vasculitis**

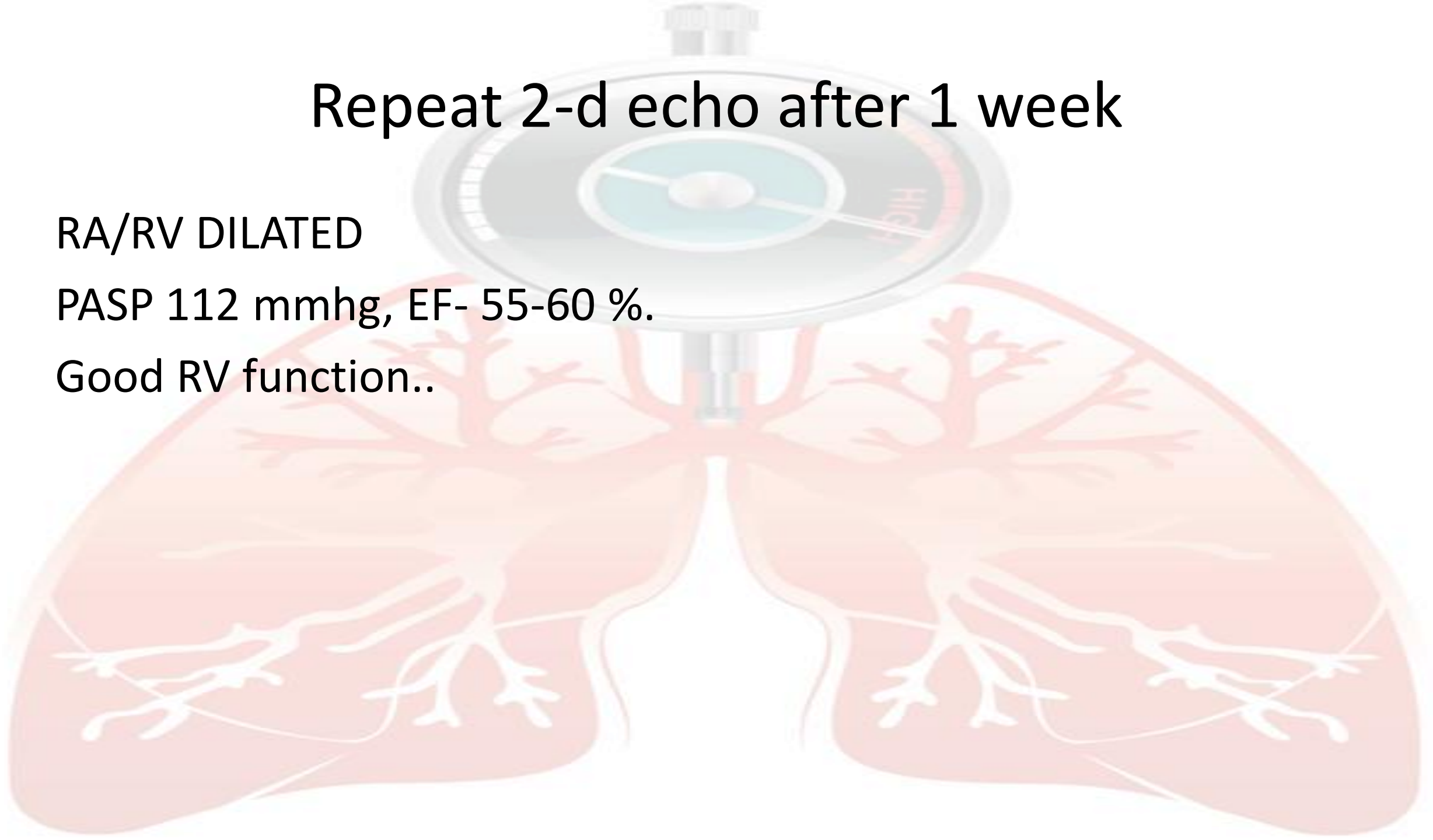
- 
- A medical illustration featuring a pair of human lungs in a light pinkish-red color, showing the bronchial tree. A stethoscope is positioned over the top of the lungs, with its chest piece resting on the upper part of the trachea. The background is white.
- Started on tadalafil 20 mg OD .
 - started on clexane 0.6 ml OD.
 - Developed rashes and drop in platelet count : clexane stopped.
 - O2 tapered to NC 4L: spO2 - 92 %

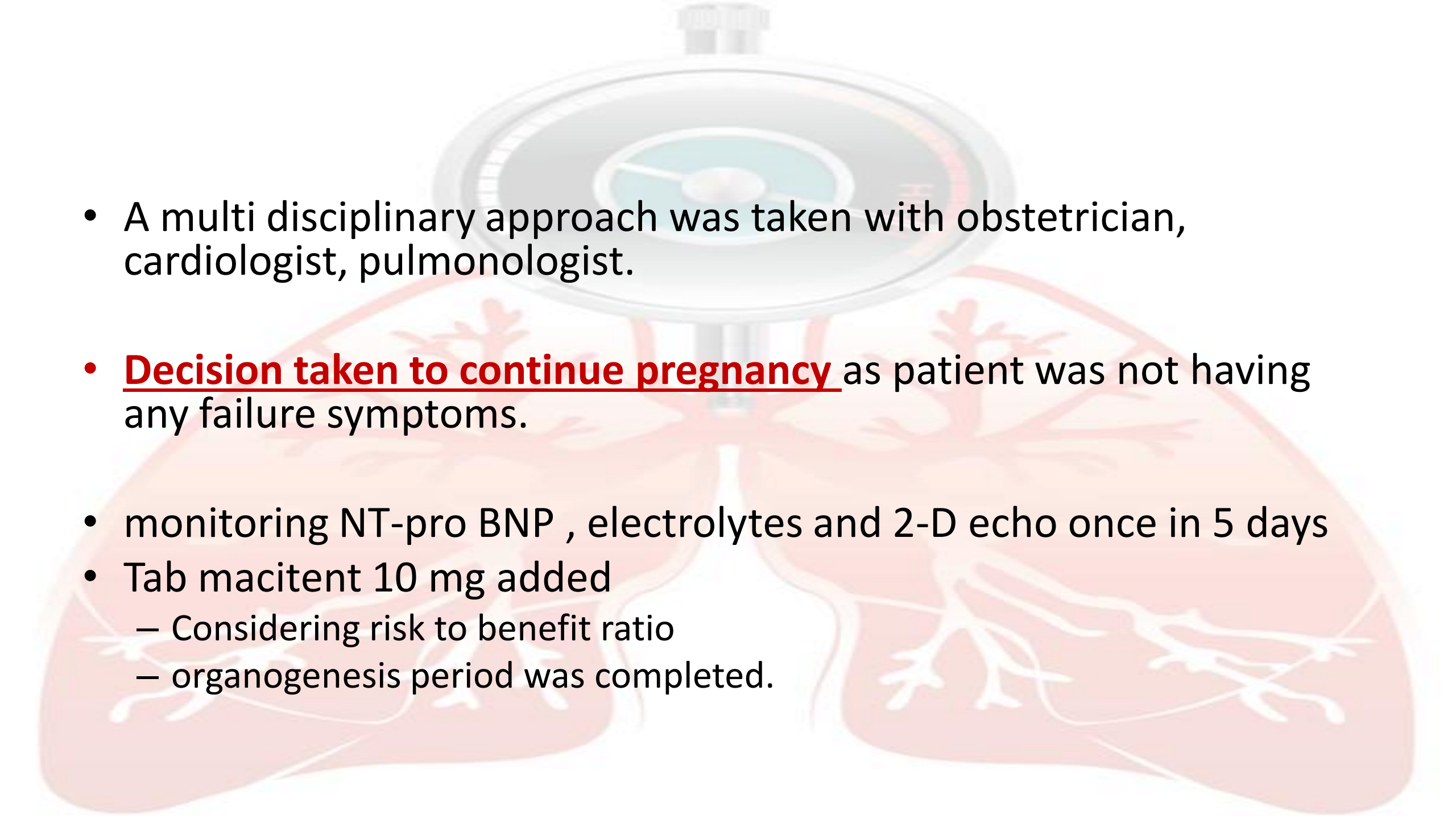
Repeat 2-d echo after 1 week

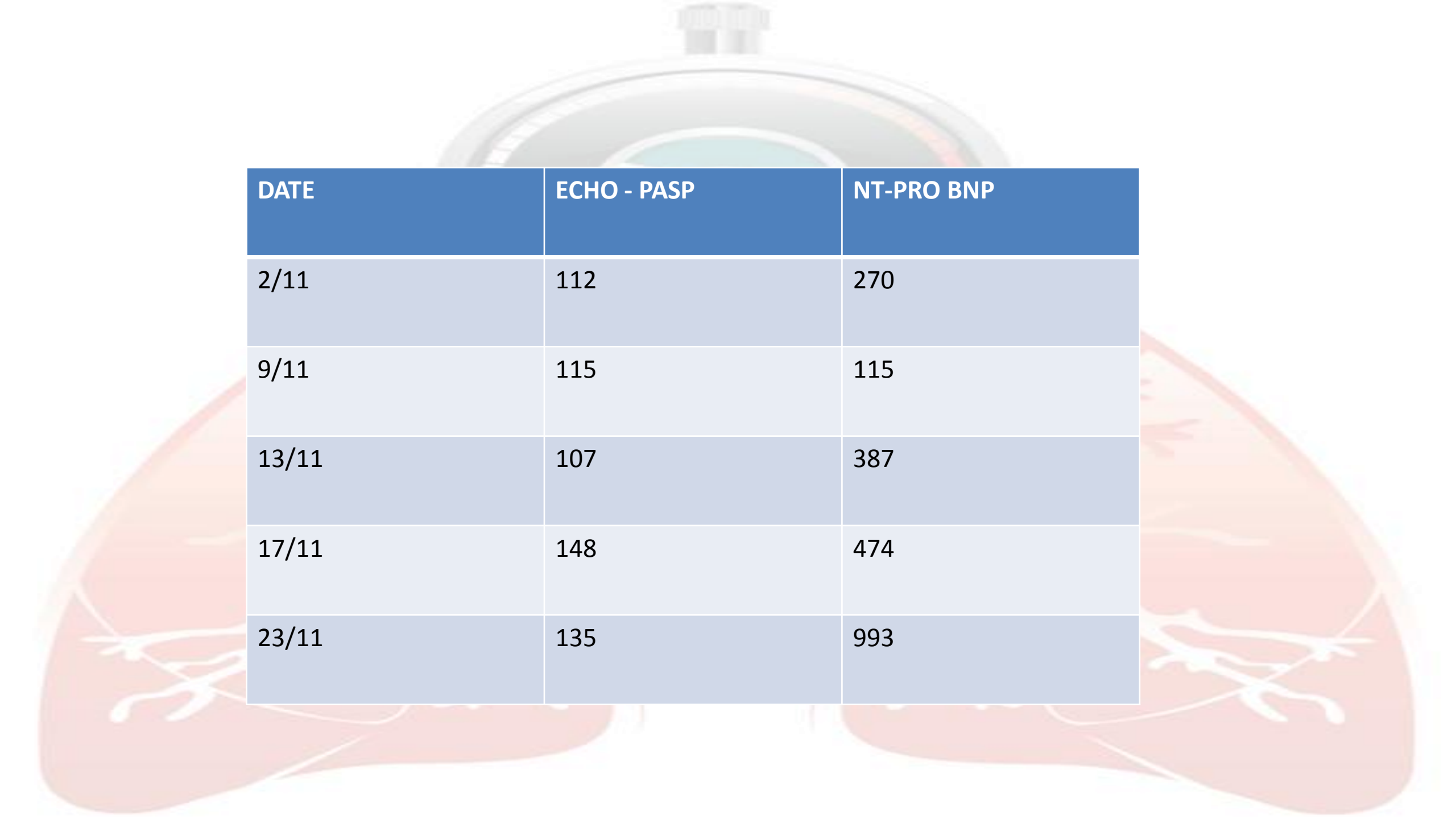
RA/RV DILATED

PASP 112 mmhg, EF- 55-60 %.

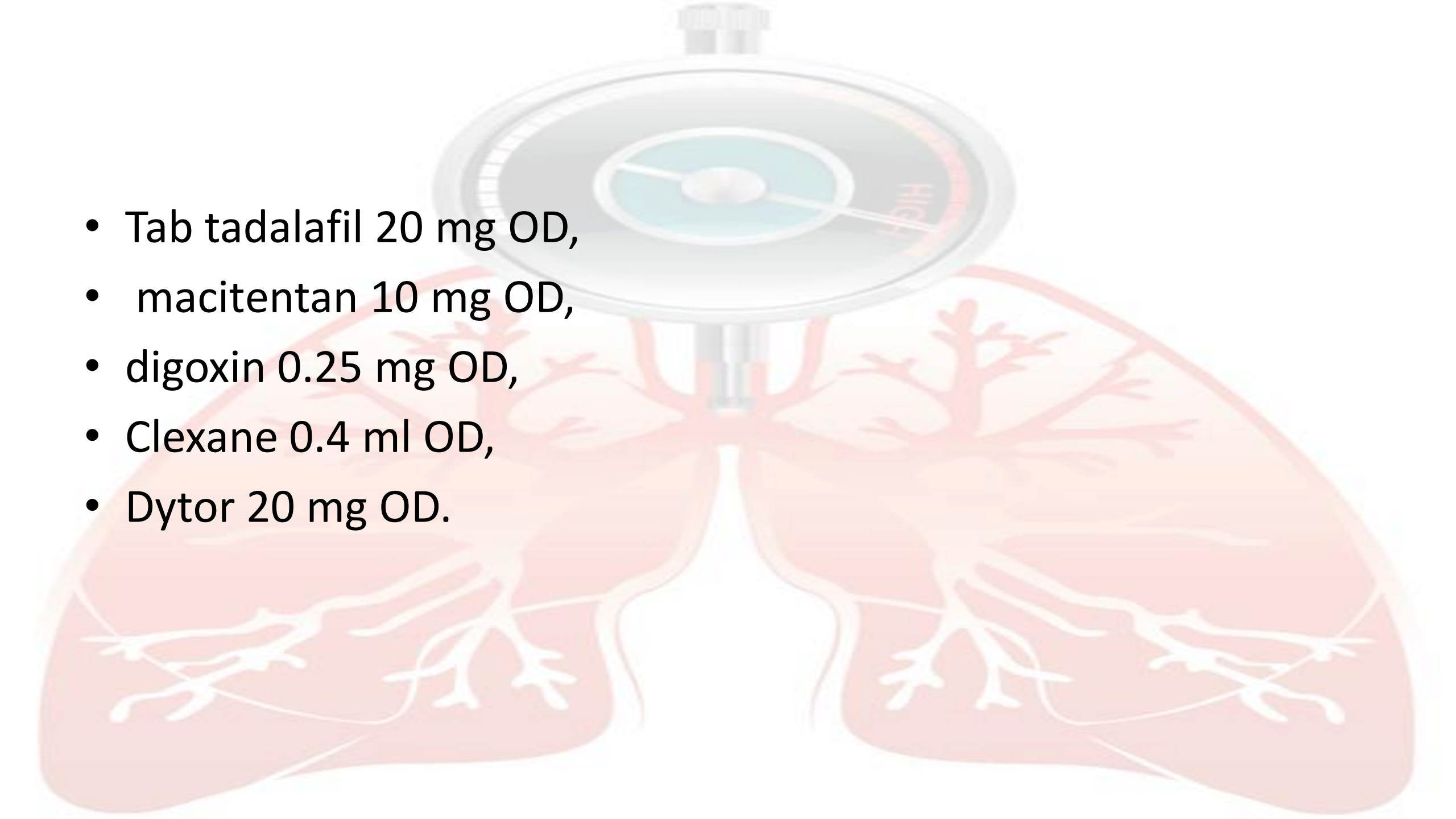
Good RV function..



- 
- The background of the slide features a faint, stylized illustration. At the top, a stethoscope is shown with its chest piece resting on a pair of human lungs. The lungs are depicted in a light red color with white branching bronchial structures. The stethoscope has a silver-colored body and a circular chest piece with a blue and white pattern.
- A multi disciplinary approach was taken with obstetrician, cardiologist, pulmonologist.
 - **Decision taken to continue pregnancy** as patient was not having any failure symptoms.
 - monitoring NT-pro BNP , electrolytes and 2-D echo once in 5 days
 - Tab macitent 10 mg added
 - Considering risk to benefit ratio
 - organogenesis period was completed.



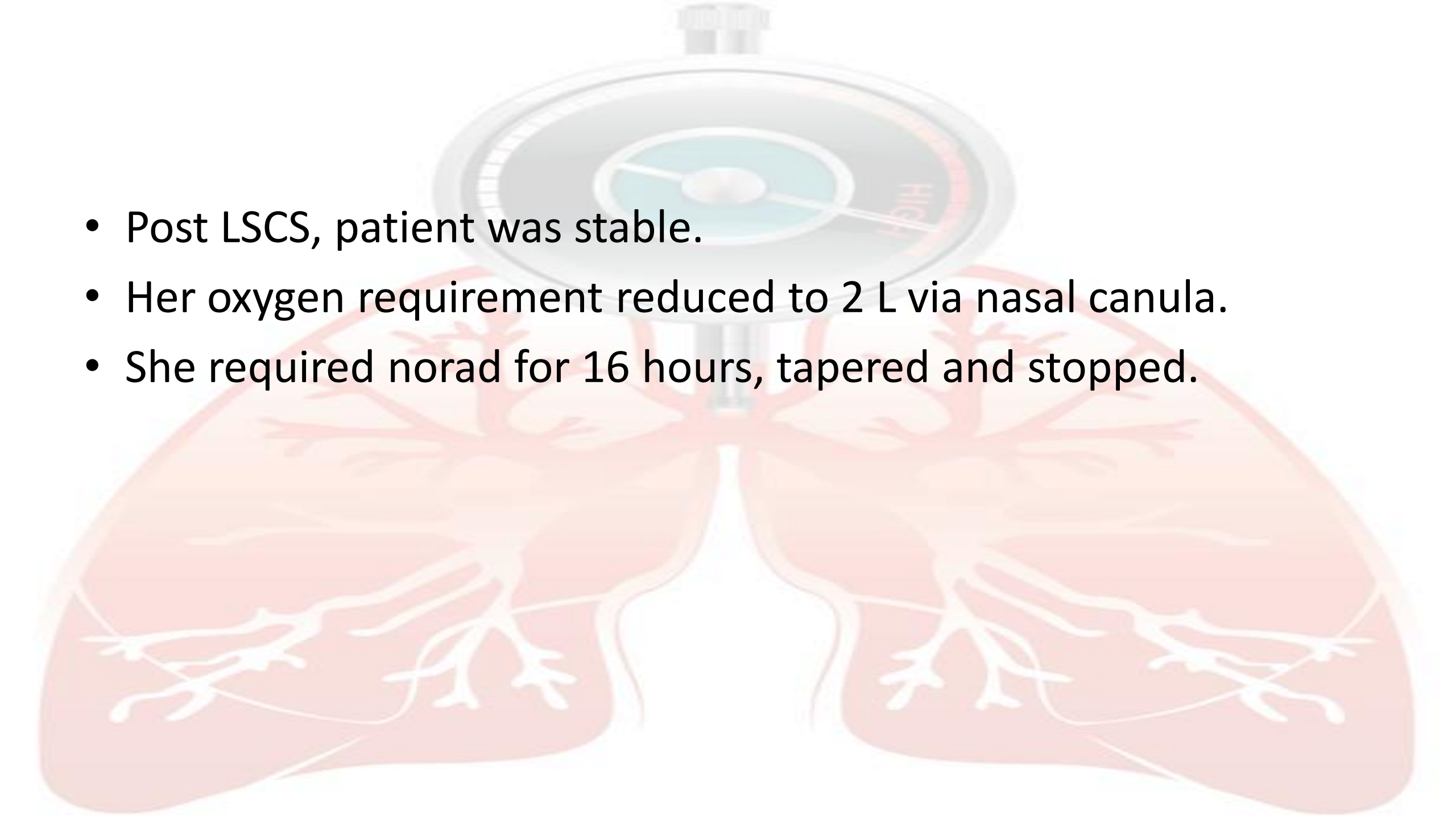
DATE	ECHO - PASP	NT-PRO BNP
2/11	112	270
9/11	115	115
13/11	107	387
17/11	148	474
23/11	135	993

- 
- Tab tadalafil 20 mg OD,
 - macitentan 10 mg OD,
 - digoxin 0.25 mg OD,
 - Clexane 0.4 ml OD,
 - Dytor 20 mg OD.

- 
- The background of the slide features a faint, stylized illustration. At the top, there is a fetal heart rate monitor with a circular display and a central probe. Below the monitor, a pair of human lungs is depicted in a light pinkish-red color, showing the bronchial tree. The overall theme is medical and neonatal.
- Hemoptysis again at 32 weeks of gestation.
 - O2 requirement increased to 15 L via venturi mask 50 %.

Hence decided to plan for LSCS

- Explained the risk of sudden drop in PASP, pulmonary edema
- SOS need for ECMO.

- 
- A medical illustration featuring a pair of human lungs in a light pinkish-red color, showing the bronchial tree in white. Positioned above the lungs is a mechanical ventilator with a circular dial and a central tube. The dial has a scale with a red needle pointing towards the 'HIGH' mark. The entire scene is set against a plain white background.
- Post LSCS, patient was stable.
 - Her oxygen requirement reduced to 2 L via nasal canula.
 - She required norad for 16 hours, tapered and stopped.

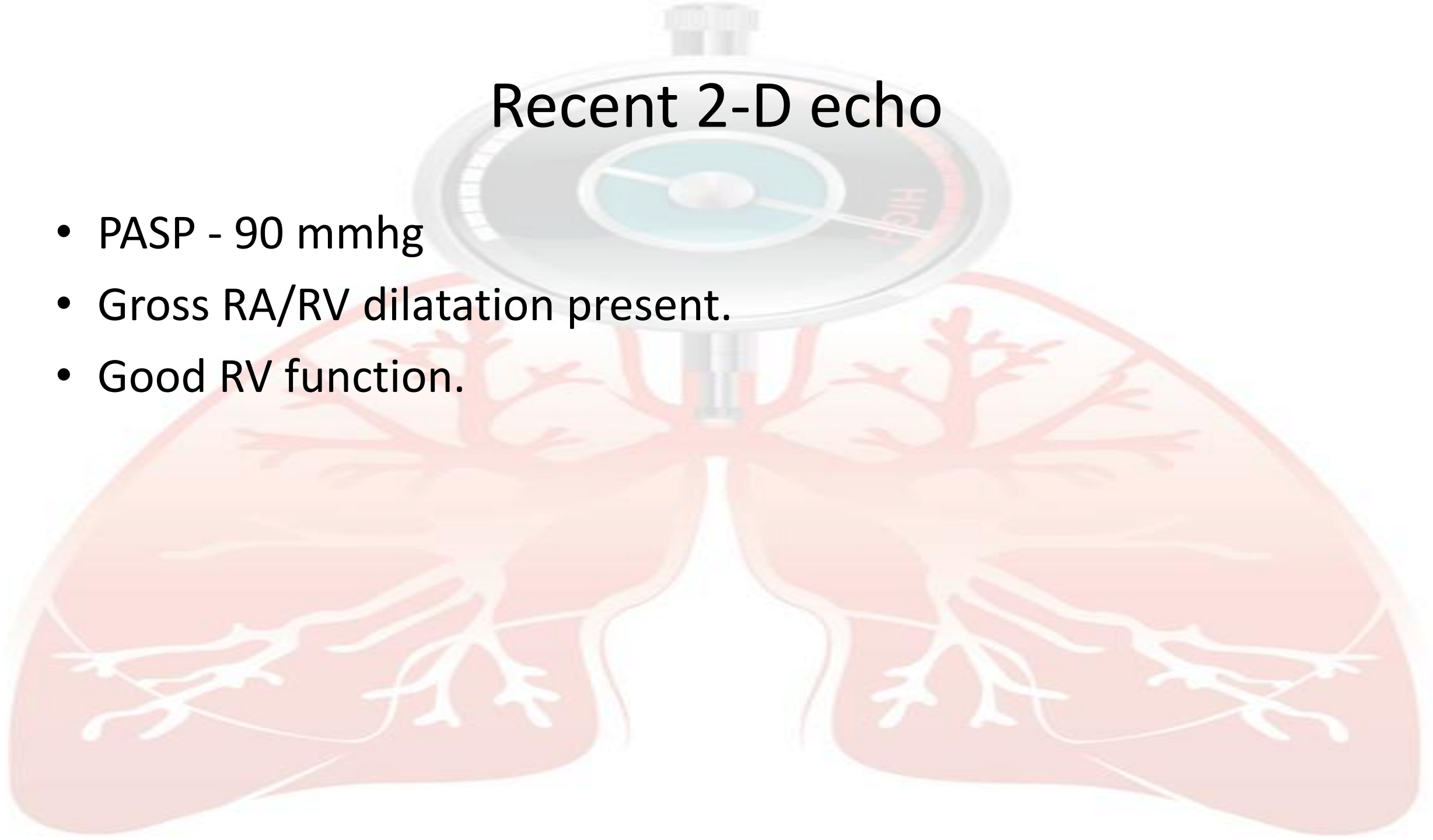


Post LSCS,

- V/Q scan showed low probability of embolism.
- Riociguat started
 - After cardiac opinion
- **Tab selexipag 400 mg od**, followed by 800mg tablet OD

Recent 2-D echo

- PASP - 90 mmhg
- Gross RA/RV dilatation present.
- Good RV function.



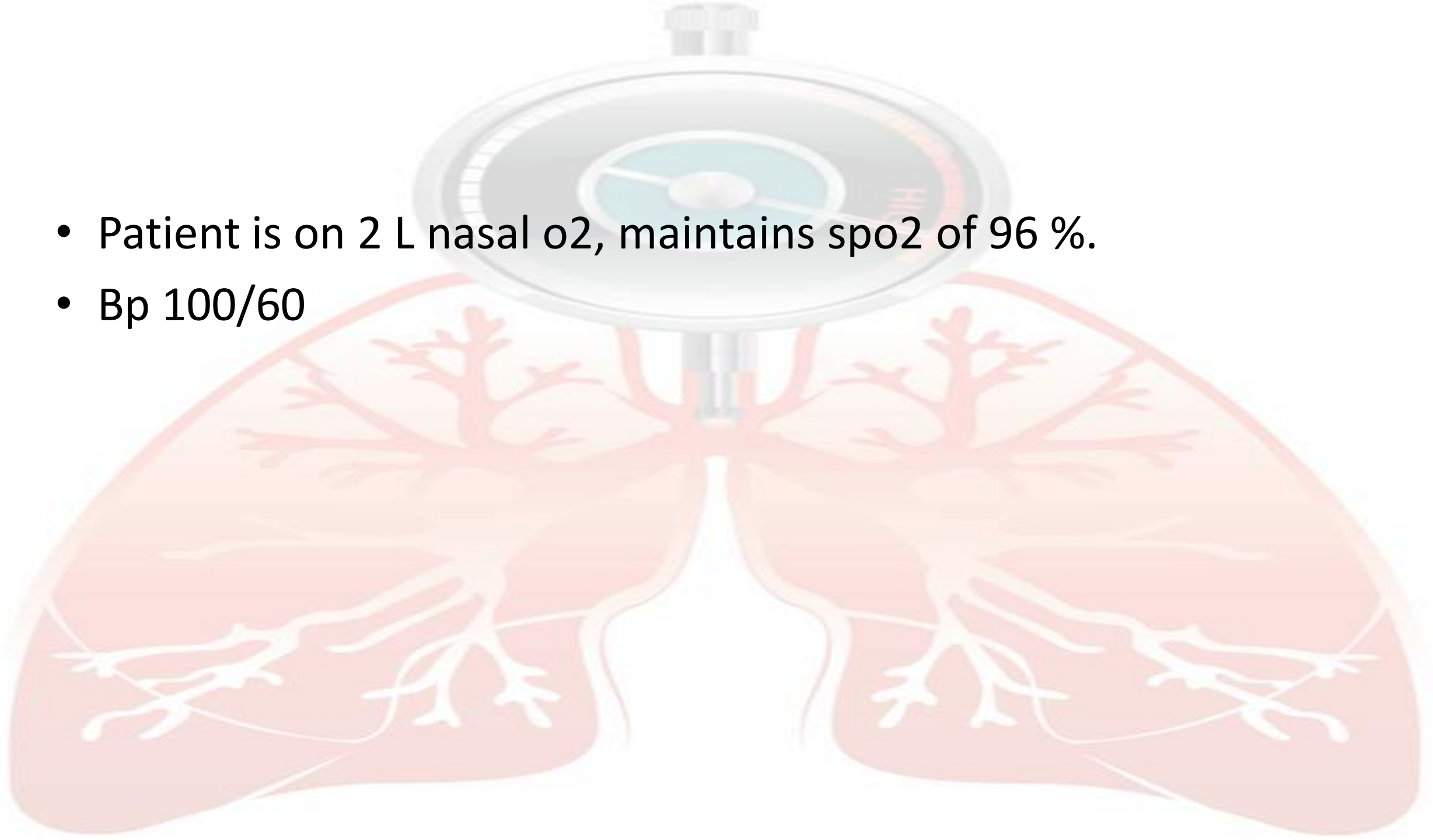
Baby details.

complete white out lungs, intubated, given surfactant, and extubated within 2 days, maintained on bottle CPAP for 1.5 weeks, followed by reducing FiO2 continuously and progressively, taken on room air on 14 th day .

Baby had PDA , advised medical closure with sildenafil.

After 2 weeks, PDA closure done.

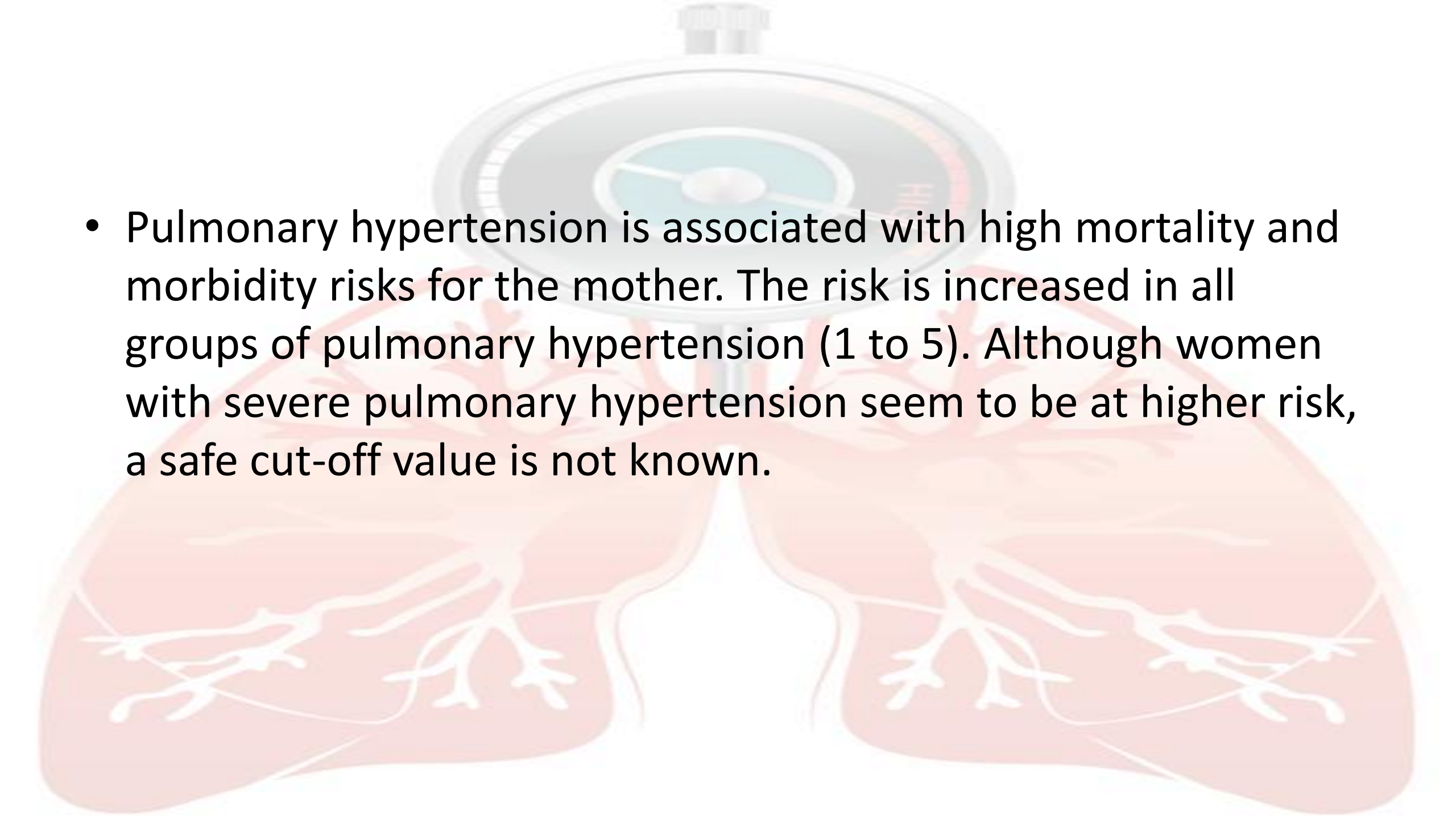
- Patient is on 2 L nasal o₂, maintains spo₂ of 96 %.
- Bp 100/60

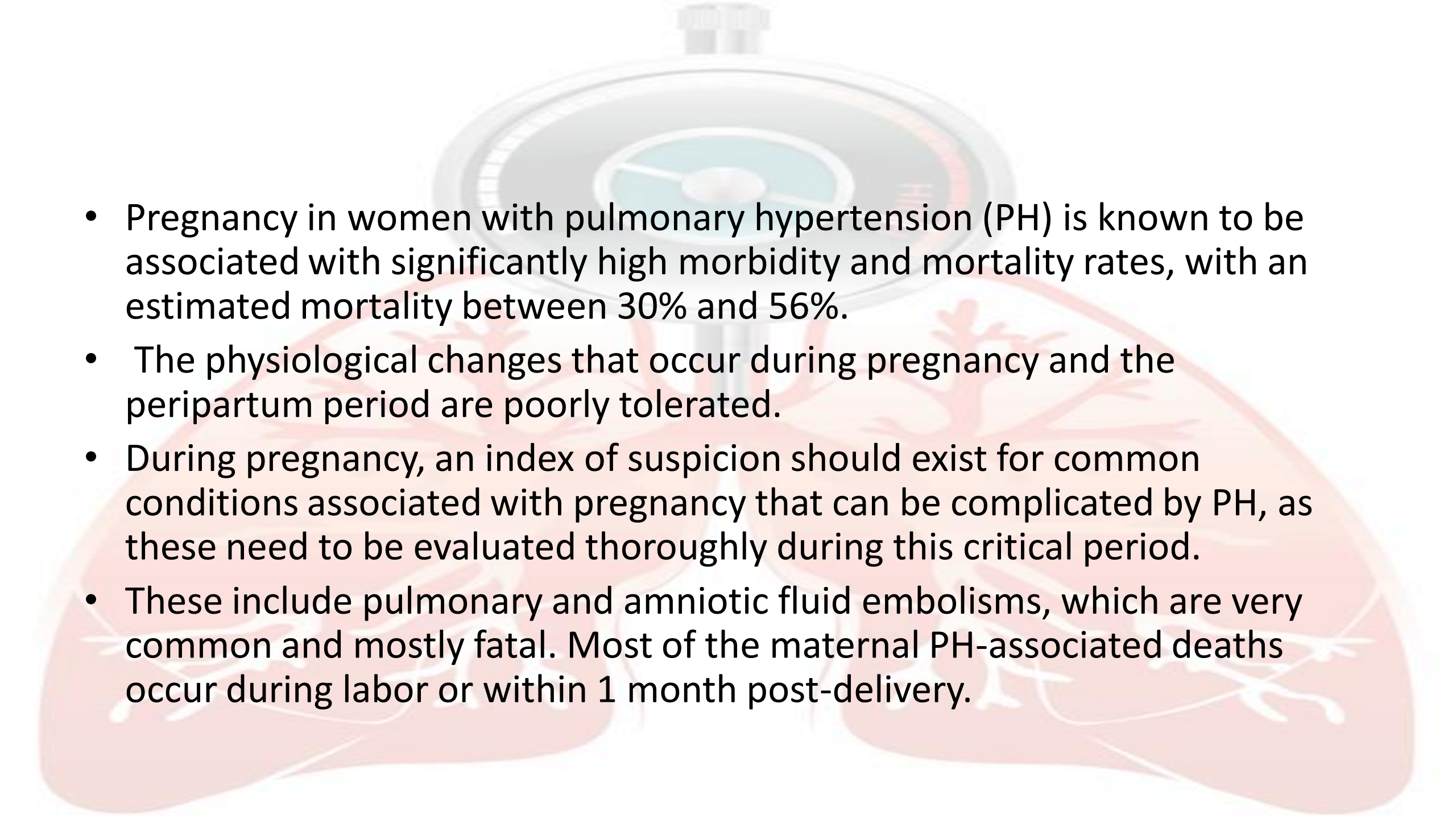


LINE OF TREATMENT

A faint background illustration featuring a pair of human lungs in a reddish-pink hue. A medical stethoscope is positioned over the upper part of the lungs, with its chest piece resting on the left lung and its tubing extending downwards. The stethoscope's dial is visible, showing a scale with a needle pointing towards the 'HIGH' mark.

- Oxygen , 1-2 L /minute.
- Diuretics - dytor 20 mg OD.
- Macitentan 10 mg OD.
- Selexipag 800 mg OD
- Riociguat 2mg TDS.
- Lanoxin 0.25 mg 1/2 OD for 6 days in a week.
- Ivabrad 5 mg 1/2 BD.
- Xarelto 15 mg OD.

- 
- The background of the slide features a faint, stylized illustration. At the top, a stethoscope is shown with its chest piece and tubing. Below it, a pair of human lungs is depicted in a light pinkish-red color, with white branching lines representing the bronchial tree. The overall image is semi-transparent, allowing the text to be clearly visible.
- Pulmonary hypertension is associated with high mortality and morbidity risks for the mother. The risk is increased in all groups of pulmonary hypertension (1 to 5). Although women with severe pulmonary hypertension seem to be at higher risk, a safe cut-off value is not known.

- 
- The background features a faint, stylized illustration of a medical monitor at the top center, with a circular display and a needle. Below the monitor, a pair of human lungs is depicted in a light red color, showing the bronchial tree and major blood vessels. The overall theme is medical and respiratory.
- Pregnancy in women with pulmonary hypertension (PH) is known to be associated with significantly high morbidity and mortality rates, with an estimated mortality between 30% and 56%.
 - The physiological changes that occur during pregnancy and the peripartum period are poorly tolerated.
 - During pregnancy, an index of suspicion should exist for common conditions associated with pregnancy that can be complicated by PH, as these need to be evaluated thoroughly during this critical period.
 - These include pulmonary and amniotic fluid embolisms, which are very common and mostly fatal. Most of the maternal PH-associated deaths occur during labor or within 1 month post-delivery.