Ultrasound in Critical Obstetric Situations: the Role of the Anesthesiologist



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INTRODUCTION

- **Anesthesiologists**: key role in high risk pregnancies
- Member of a multidisciplinary team
- ICU: 2-4/1000 deliveries

INTRODUCTION

- **Traditionally**: background of previous excellent health and large physiological reserve
- **Modern** maternal characteristics:
  - Increasing age
  - Morbid obesity
  - Congenital and acquired cardiac disease
  - Assisted reproduction

→ **Diagnostic dilemmas**

INTRODUCTION

- **Emergencies**: quick and accurate diagnostic tools
- **Ultrasound**:
  - Safe and easily accessible
  - Ease of use
  - Connectivity and data storage
  - Reduced size and weight

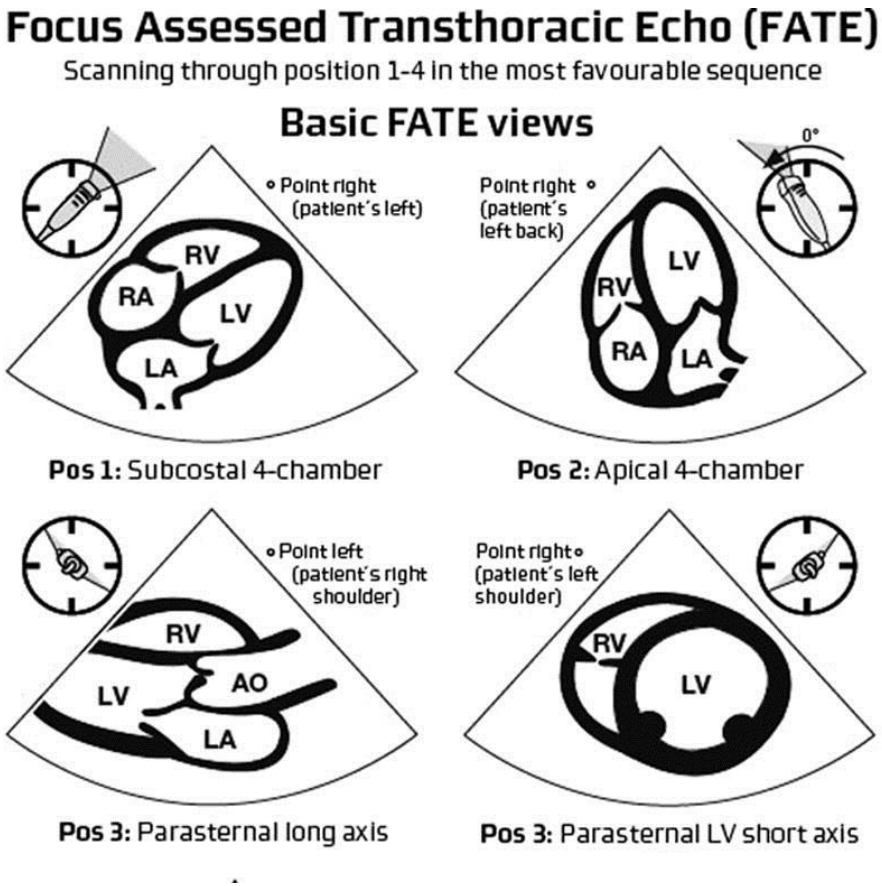
Ultrasound

- Routine locations:
  - Emergency Room
  - Delivery room
  - Operating Room
  - PACU
  - ICU

Echocardiography

- Provides volumetric and flow data
- Shows the functioning heart
- OB patient is the ideal subject:
  - Ant and left displacement of heart
  - Elevated diaphragm
- **Class I recommendation** according to American, British and European guidelines

The FATE Examination



Jensen MB et al, Eur J Anaesthesiol 2004; 21:700-707

The FATE Examination

Normal Subcostal 4-Chamber View

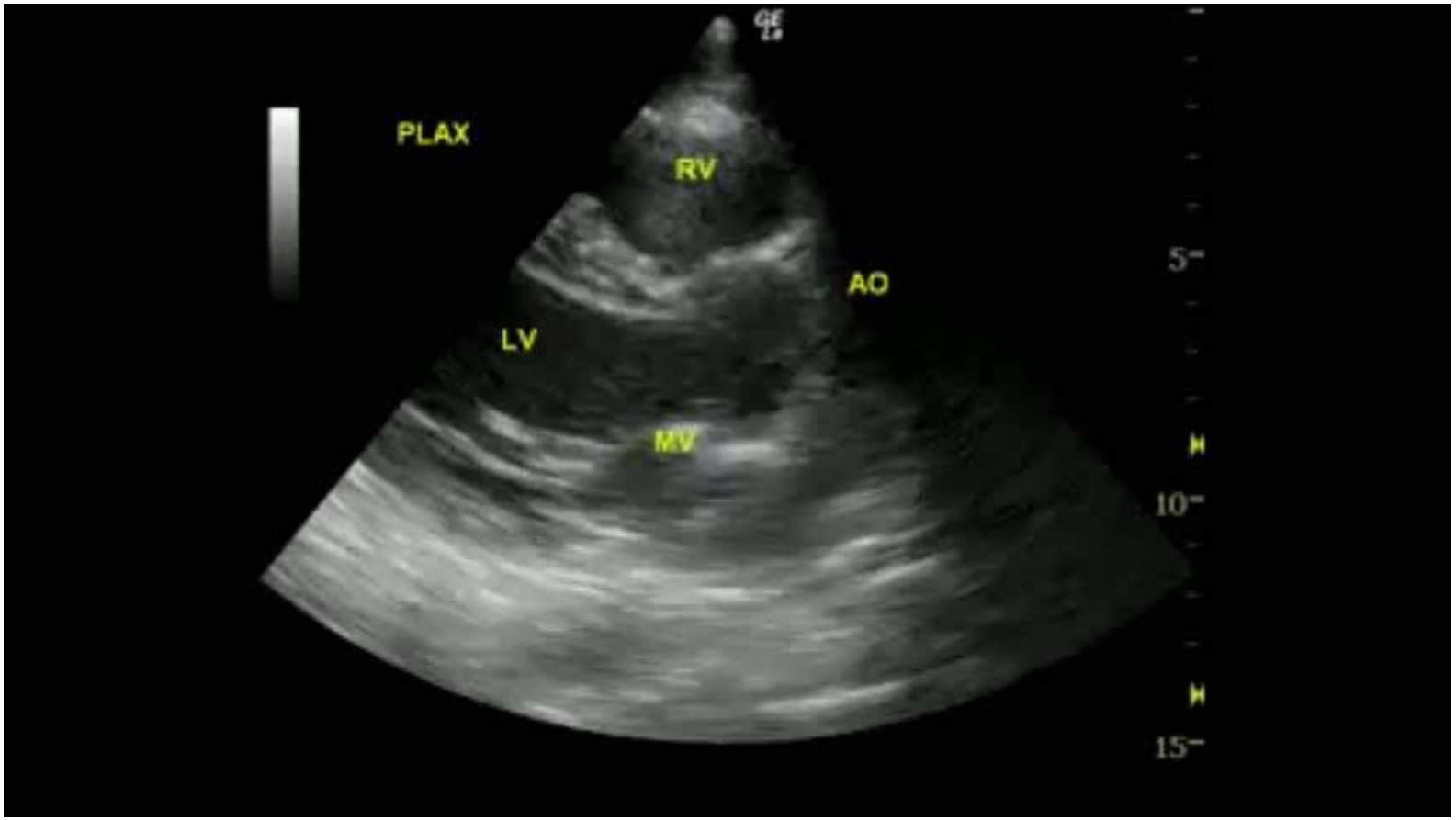


The FATE Examination
Normal Apical 4-Chamber View



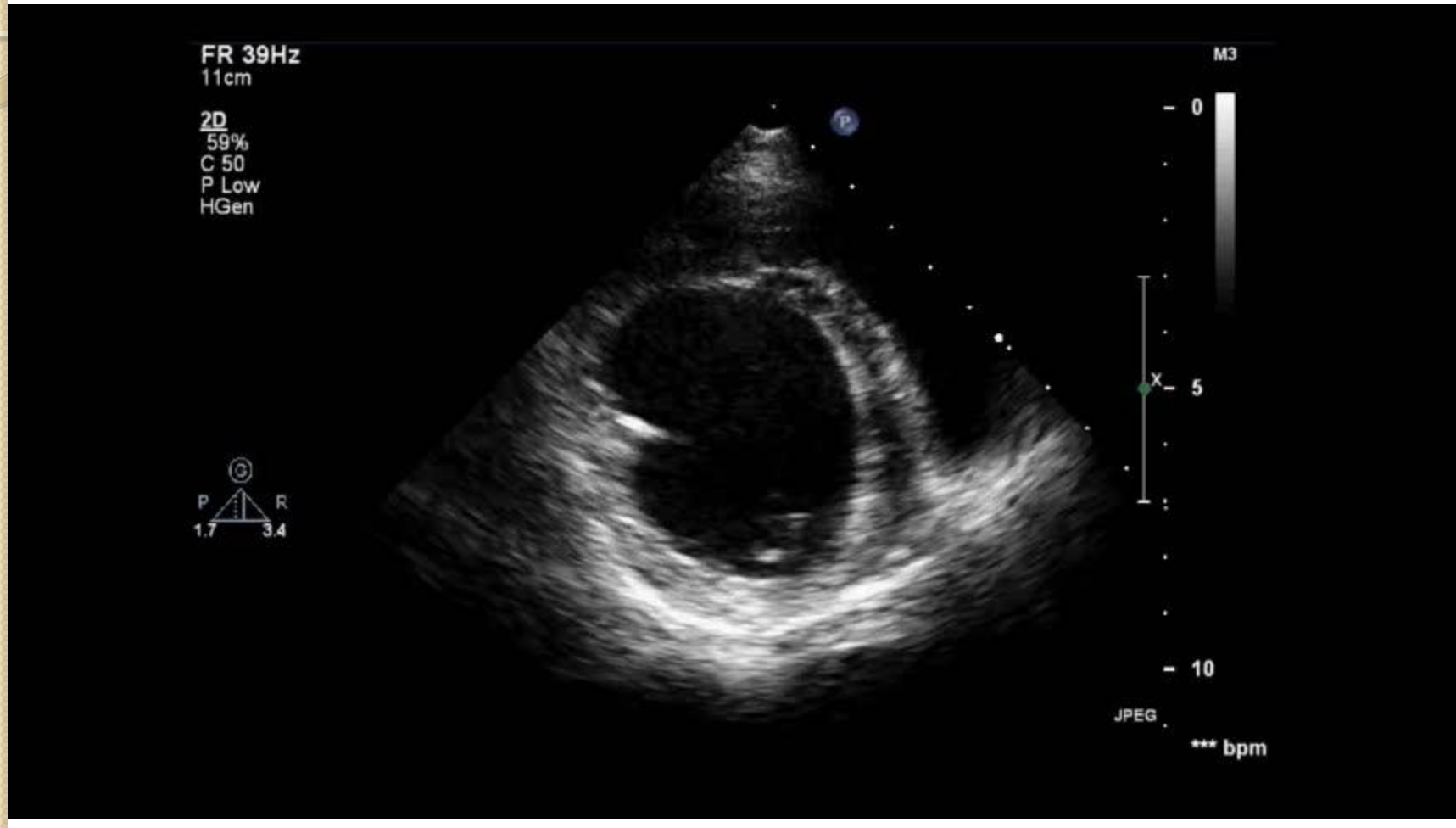
The FATE Examination

Parasternal Long Axis



The FATE Examination

Parasternal LV Short Axis



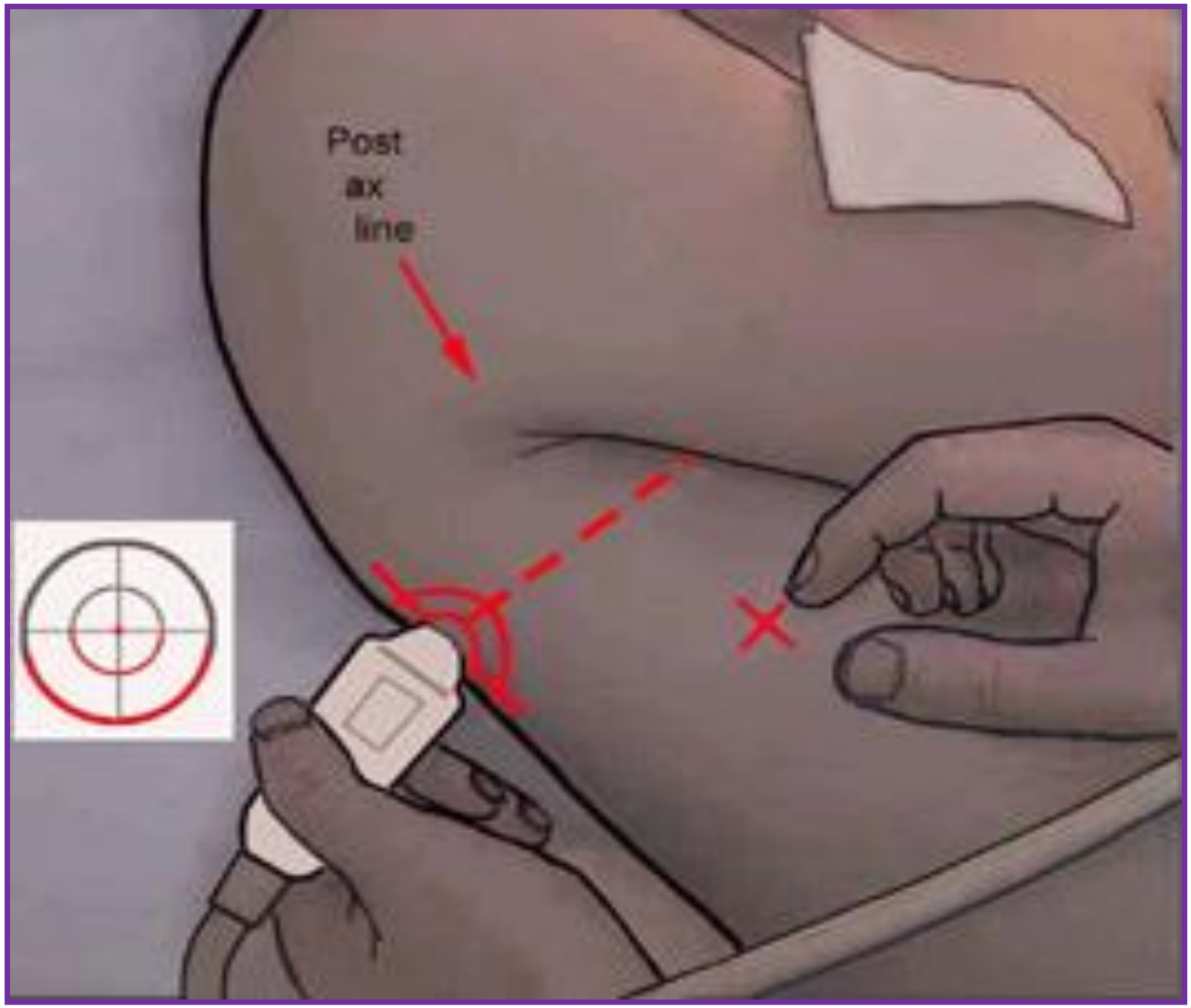
LUNG ULTRASOUND

- Acute respiratory failure: one of the most distressing situations
- Physical exam. and chest X-Ray: imperfect
- Need for sophisticated tests and delay management
- **Lung U/S**: standard tool in critical care

LUNG ULTRASOUND
BLUE-Protocol



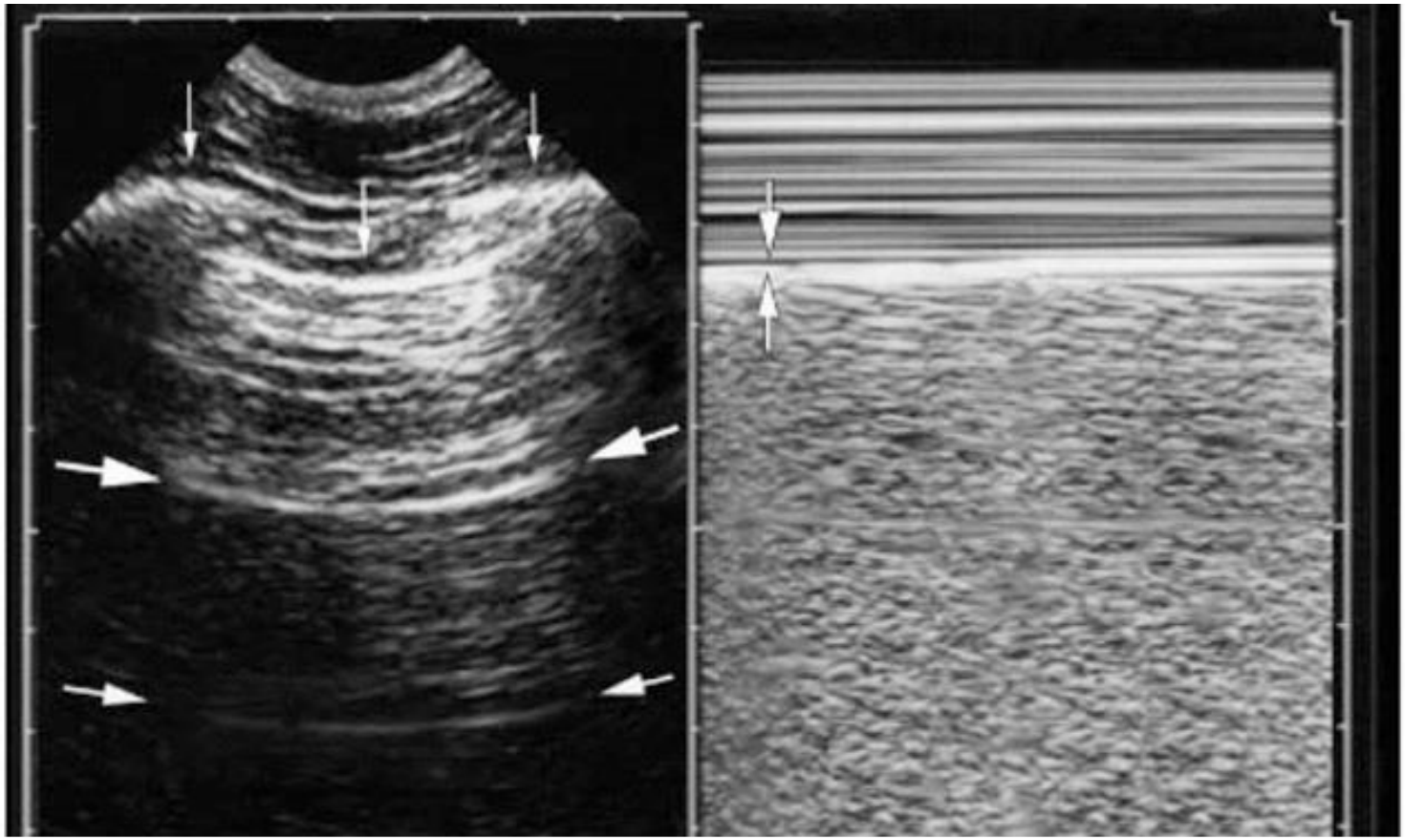
LUNG ULTRASOUND
BLUE-Protocol



LUNG ULTRASOUND
Normal Lung



LUNG ULTRASOUND
Normal Lung



Postpartum Hypotension

- 29-yr old primaparous
- No significant medical history
- Uncomplicated CS, with minimal blood loss under spinal anesthesia at 35 weeks' gestation
- **6 hrs after delivery**:
  - Hypotension
  - Tachycardia
  - Febrile
  - Hb: 12

Postpartum Hypotension



Postpartum Hypotension

- Hypotension due to cardiac failure
- **Dagnostic**: postpartum cardiomyopathy
- No signs of IHD (ECG, chest pain,..)
- Treatment:
  - Inotropic support
  - Diuresis
  - ACE inhibitors

Anaphylactic Shock

- 35-yr old primaparous
- No significant medical history
- Delivery suite: epidural analgesia and urinary catheter
- No progress → CS
- Baby delivered: hemodynamic collapse



intubation, fluids, vasopressors

Anaphylactic Shock



Anaphylactic Shock

- Adrenaline boluses
- Steroids
- H1 and H2 blockers
- Adrenaline continuous infusion
- Removal of the urine catheter

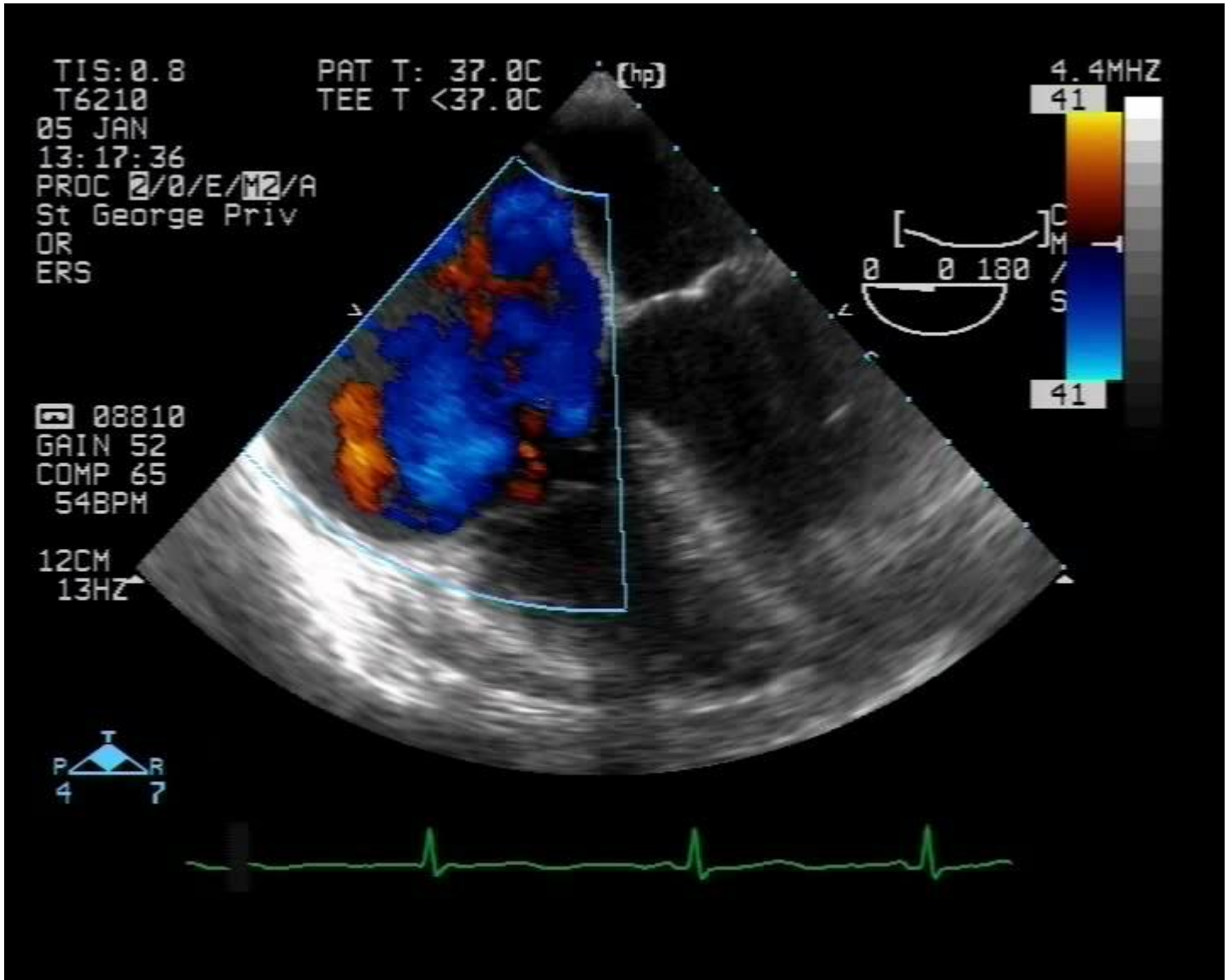
Amniotic Fluid Embolism

- 40-yrs old, gravida 5, para 4
- No remarkable medical history
- Cesarean section at 38 weeks' gestation
- Spinal anesthesia: hemodynamic stability
- After delivery, CARDIAC ARREST
  - Cardiac massage
  - Epinephrine
  - Intubation and ventilation
  - VF: cardioversion X 6

Amniotic Fluid Embolism



Amniotic Fluid Embolism



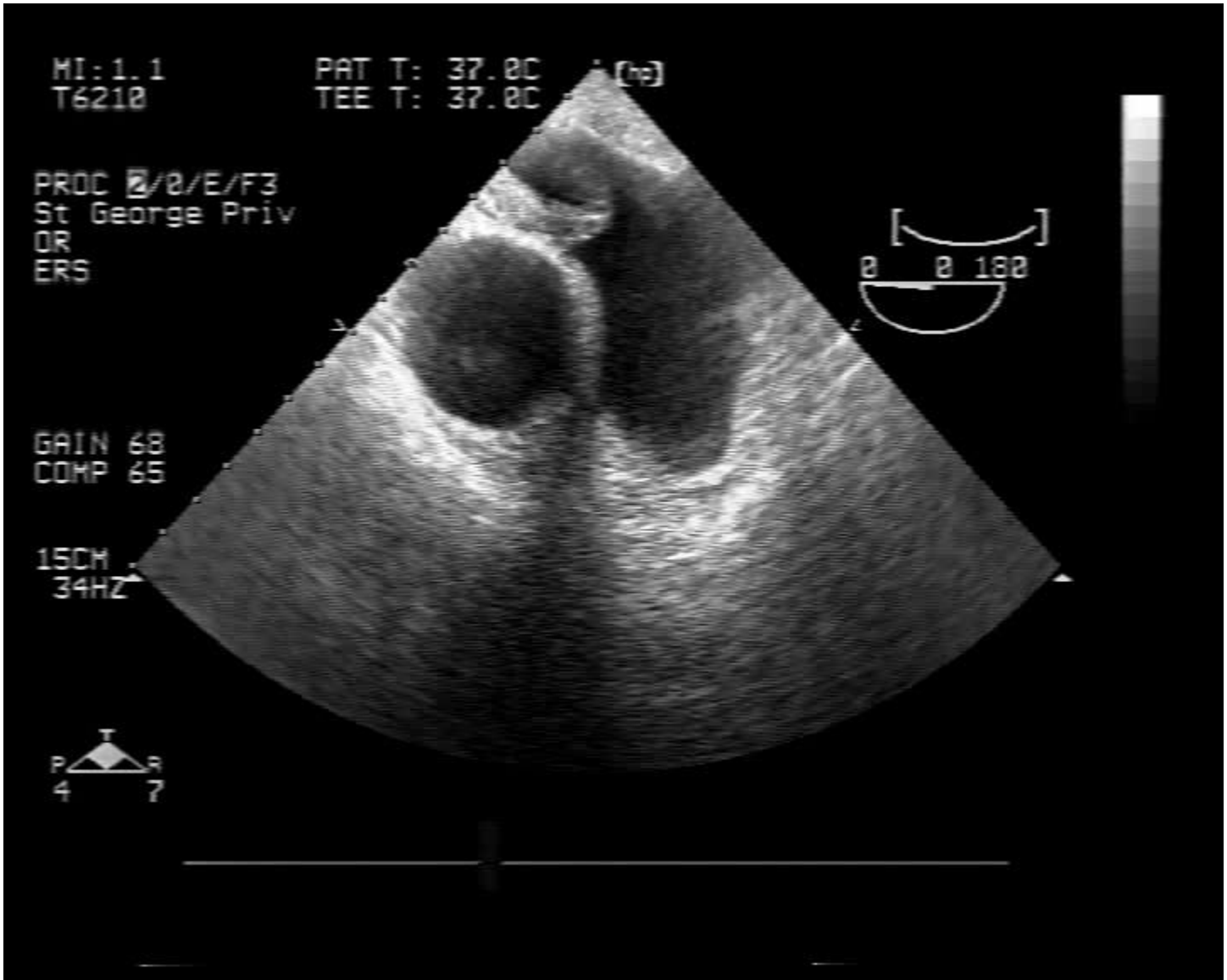
Amniotic Fluid Embolism

- DIC: TEG flat
- Thrombocytopenia
- Supportive treatment

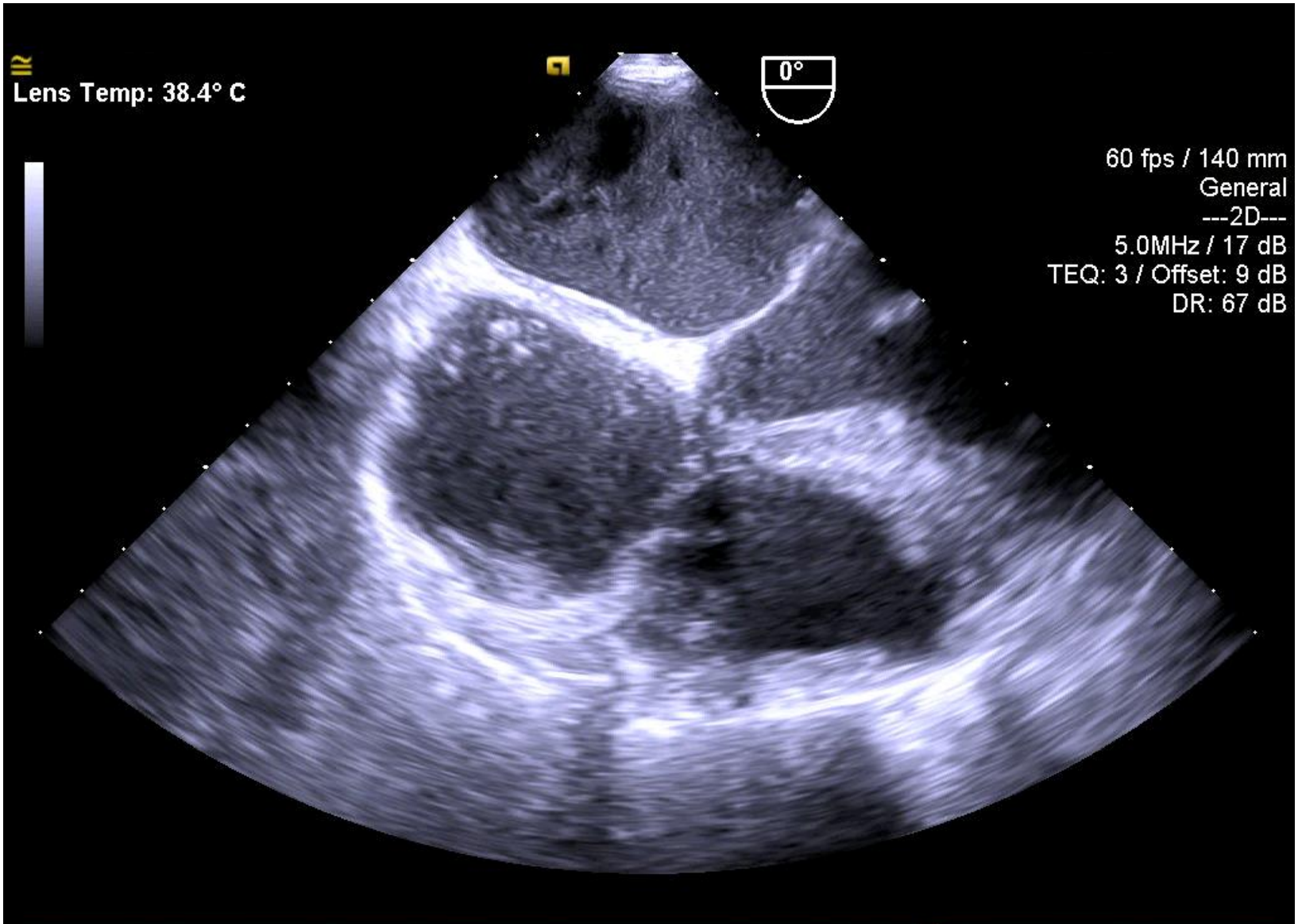
Pulmonary Embolus

- 35-yr old, Gravida 5, Para 3
- Vaginal delivery at 40 weeks'gestation
- Postpartum hemorrhage
- Atonic uterus: pitocin, methergin
- Severe bleeding: 10 units RBC and 10 units FFP
- During surgery, SaO2: 70%
- Hemodynamic instability

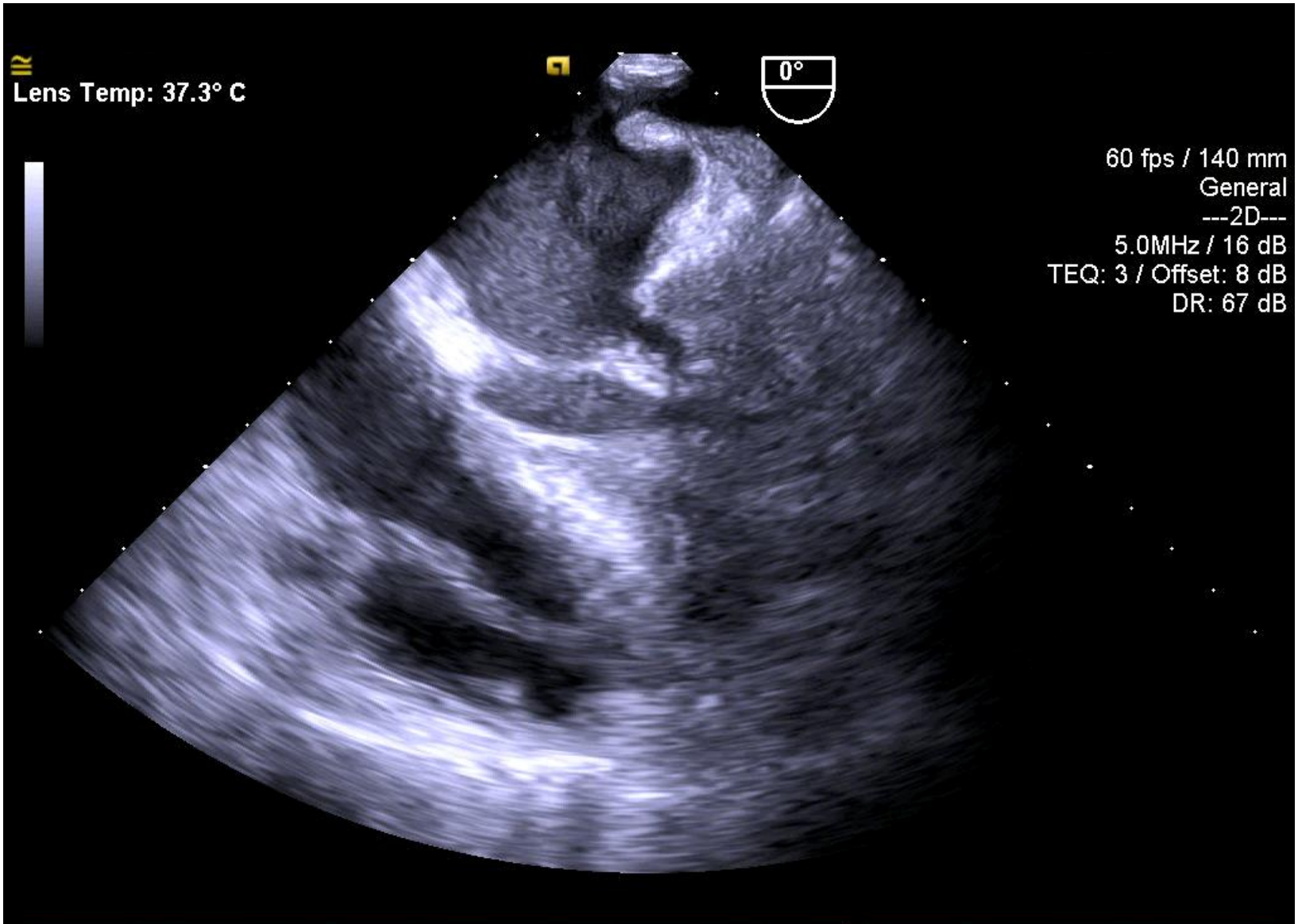
Pulmonary Embolus



Pulmonary Embolus



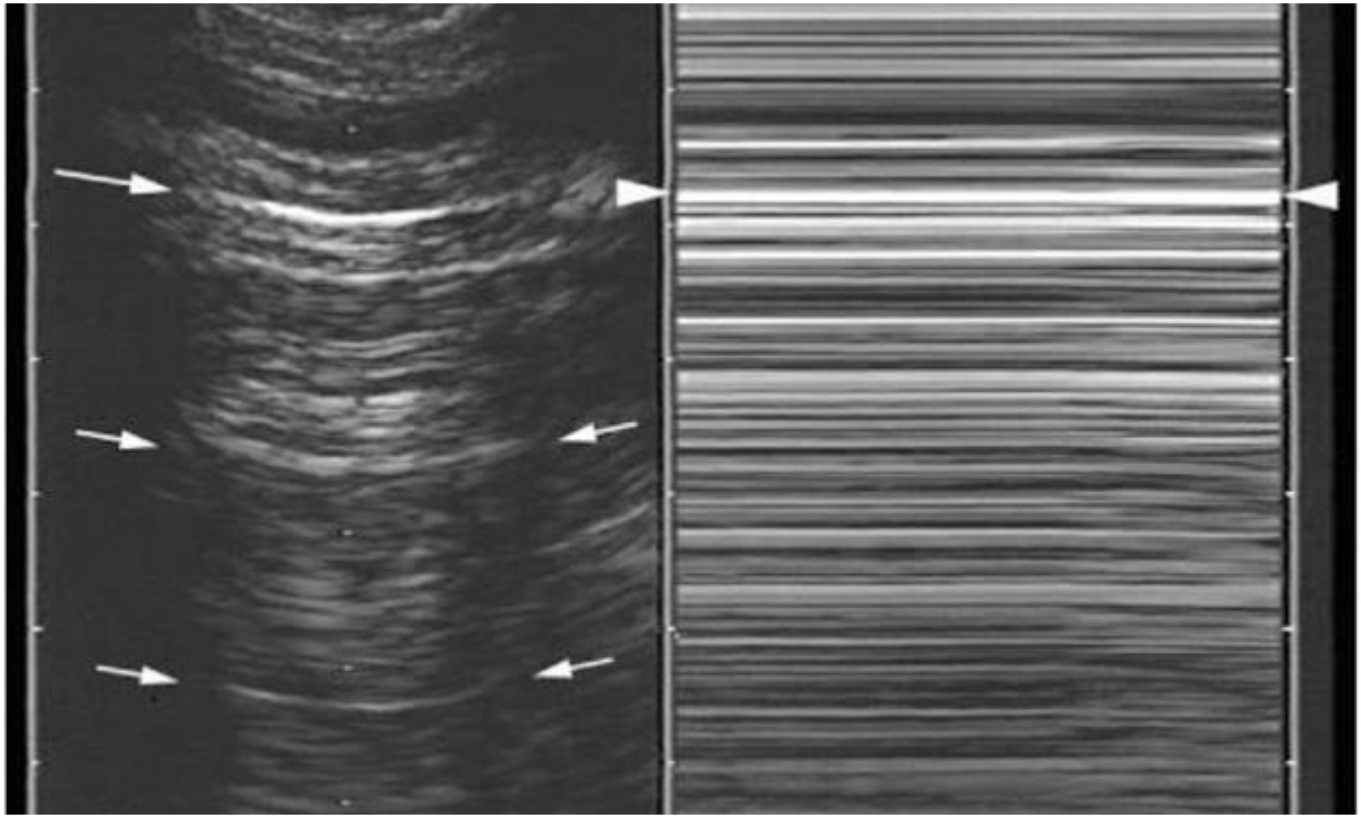
Pulmonary Embolus



LUNG ULTRASOUND
Pneumothorax



LUNG ULTRASOUND
Pneumothorax



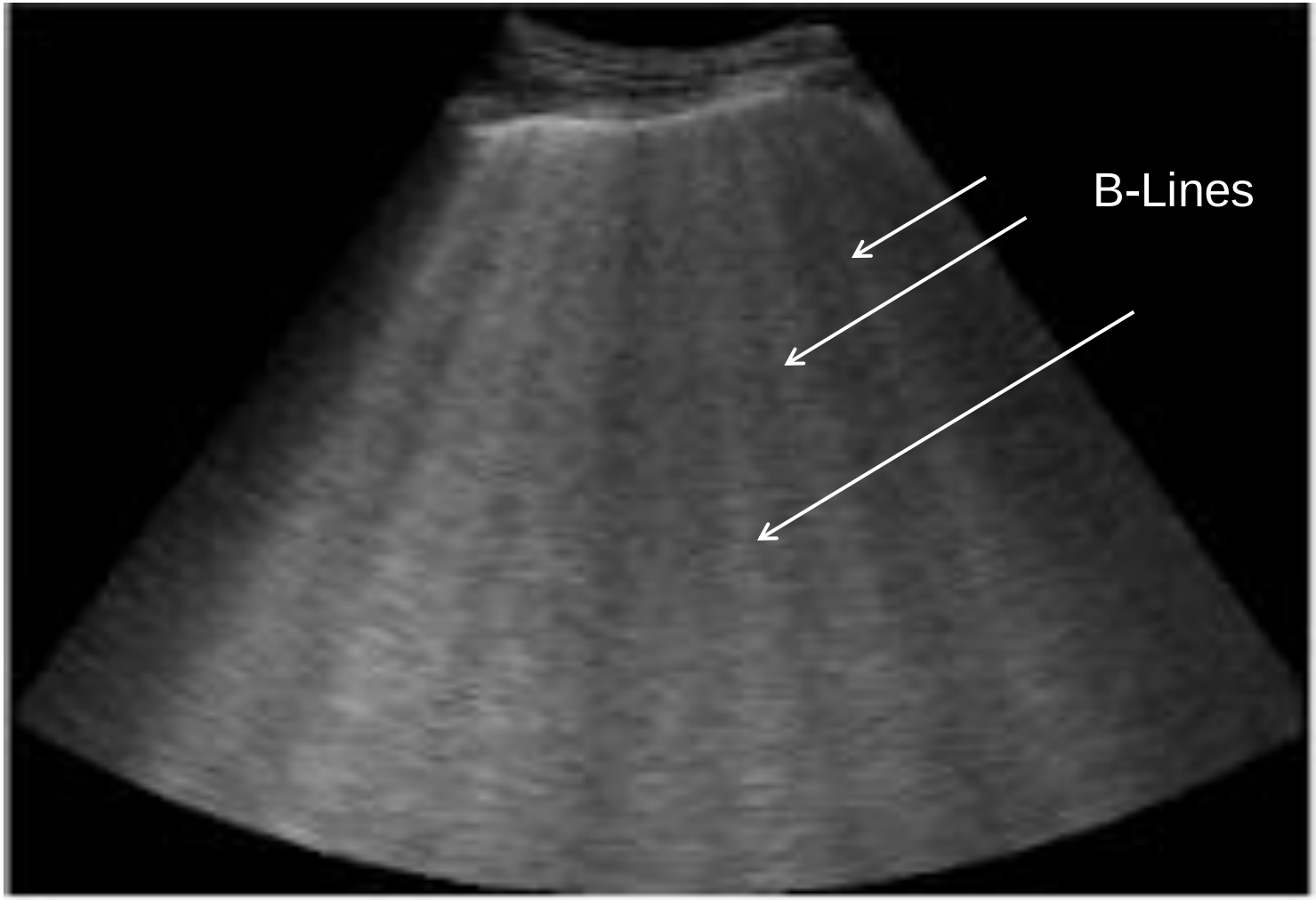
LUNG ULTRASOUND
Acute Dyspnea

- 40-yrs old, gravida 3, para 2
- Acute respiratory distress at 31 weeks' gestation
- Medical background: *asthma, morbid obesity and diabetes*
- Examination:
  - Tachypneic
  - SaO2: 85% (RA)
  - Bilateral wheezing
  - Lower limb edema

LUNG ULTRASOUND
Acute Dyspnea



LUNG ULTRASOUND
Acute Dyspnea



TTE
Acute Dyspnea



LUNG ULTRASOUND
Acute Dyspnea

- **Diagnosis**: acute pulmonary edema rather than exacerbation of asthma
- Management: diuretics and oxygen therapy



Rapid Improvement

CONCLUSIONS

- Ultrasound: unique tool
- Diagnostic and monitoring capabilities

Ultrasound

=

3rd eye of the anesthesiologist