

Putting it together in the resus room

CARDIAC ARREST

Justin Bowra

Critical Care Ultrasound Course

The story so far

Quick look at...

Lungs

IVC

Heart

So what?

The arrested patient

Adapted from Lichtenstein's SESAME
protocol
(with permission)

CPR is in progress

Pulseless

Not in VF / VT

What's the clinical question?

Formulate a question

Formulate the question

a. Is there a reversible cause?

b. Where's the ETT?

Is there a reversible cause?

Tension PTX

Tamponade

Toxins

Thrombosis (MI)

Thromboembolism (PE)

Hypovolaemia

Hypothermia

Hypoglycaemia

Hyperkalaemia

Hydrogen (acidosis)

Is there a reversible cause?

Tension PTX

Tamponade

Toxins

Thrombosis (MI)

Thromboembolism (PE)

Hypovolaemia

Hypothermia

Hypoglycaemia

Hyperkalaemia

Hydrogen (acidosis)

Where's the ETT?

Bilateral pleural sliding = both lungs ventilated

Where's the ETT?

Bilateral pleural sliding = both lungs ventilated

Unilateral sliding = 1 lung ventilation / PTX

Where's the ETT?

Bilateral pleural sliding = both lungs ventilated

Unilateral sliding = 1 lung ventilation / PTX

No sliding = maybe the ETT is in the oesophagus /
NB bilateral PTX?

The arrest screen

Curved or sector probe

Abdo or cardiac preset

Whatever you're using is fine

Lungs

IVC

Heart

Other?

RUSH

SESAME

FATE

FEEL

JB's version

A 3-step scan

1. Single view heart
2. Anterior lung fields (1 point each side)
3. At your discretion:
 - IVC (hypovolaemia)
 - Abdo (eg AAA / free fluid in trauma)
 - **Or finish scanning**

Don't get in the way of CPR

You need to scan during the rhythm check

You have ten seconds!

CPR

Scan/save heart image

CPR & discuss images

Scan/ save lung images

CPR & discuss images



Step 1

Single view of heart

What am I looking for?

Is there a heartbeat?

Pericardial effusion?

$RV > LV$?

Step 1: single view heart

Subcostal window is easiest

But any window will do

Possible outcomes





Big RV

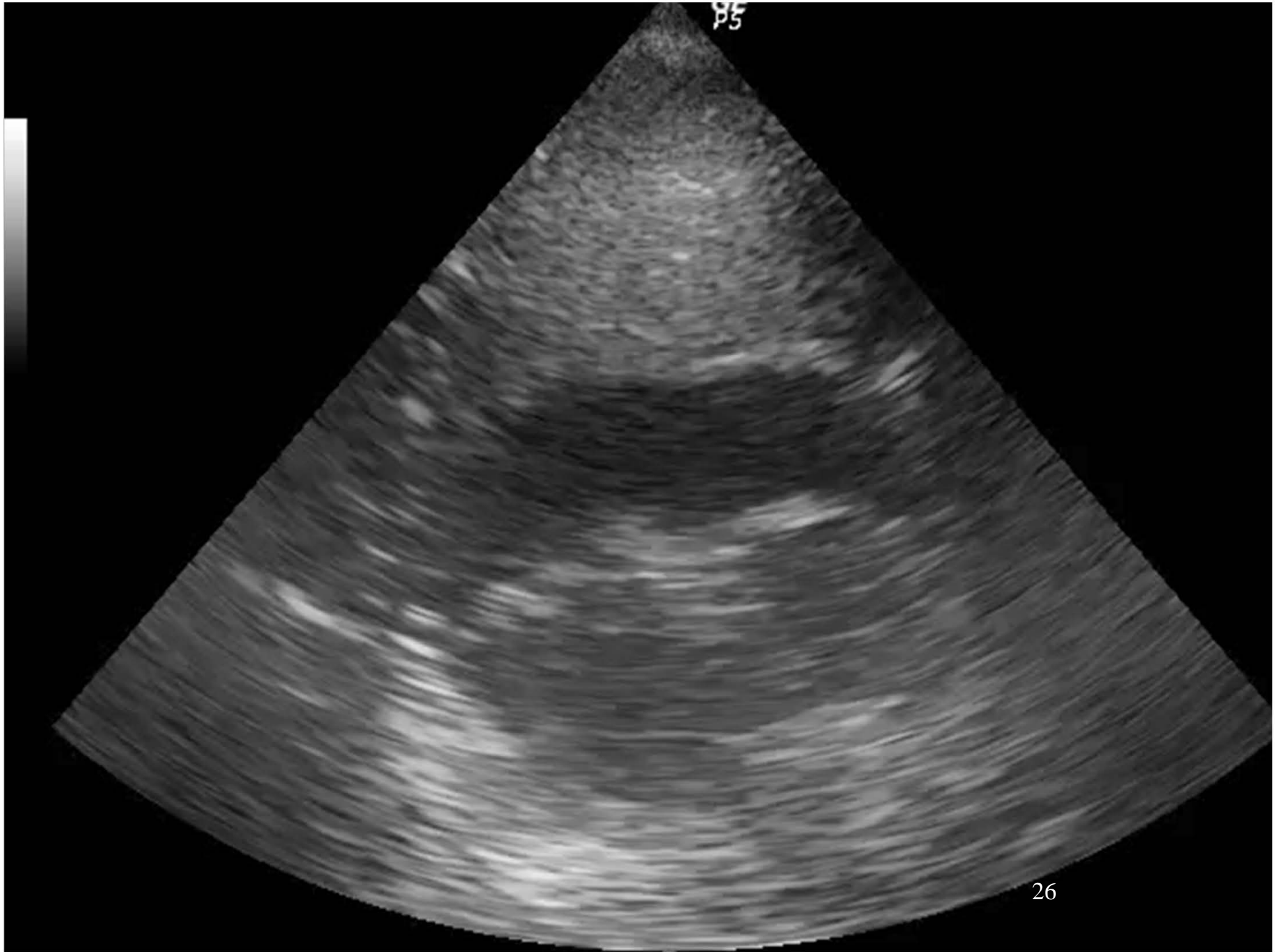
squashing LV

It's a PE

Caveats:

- Is it chronic? Thickened RV wall
 - Is it dilated? Intra arrest

Action: consider thrombolysis
If in doubt, consider 3-point DVT scan



Pericardial fluid

It's a tamponade

Caveat: it might be an incidental finding

What if you're wrong?

What have you got to lose?

Action: pericardiocentesis /

ED thoracotomy /

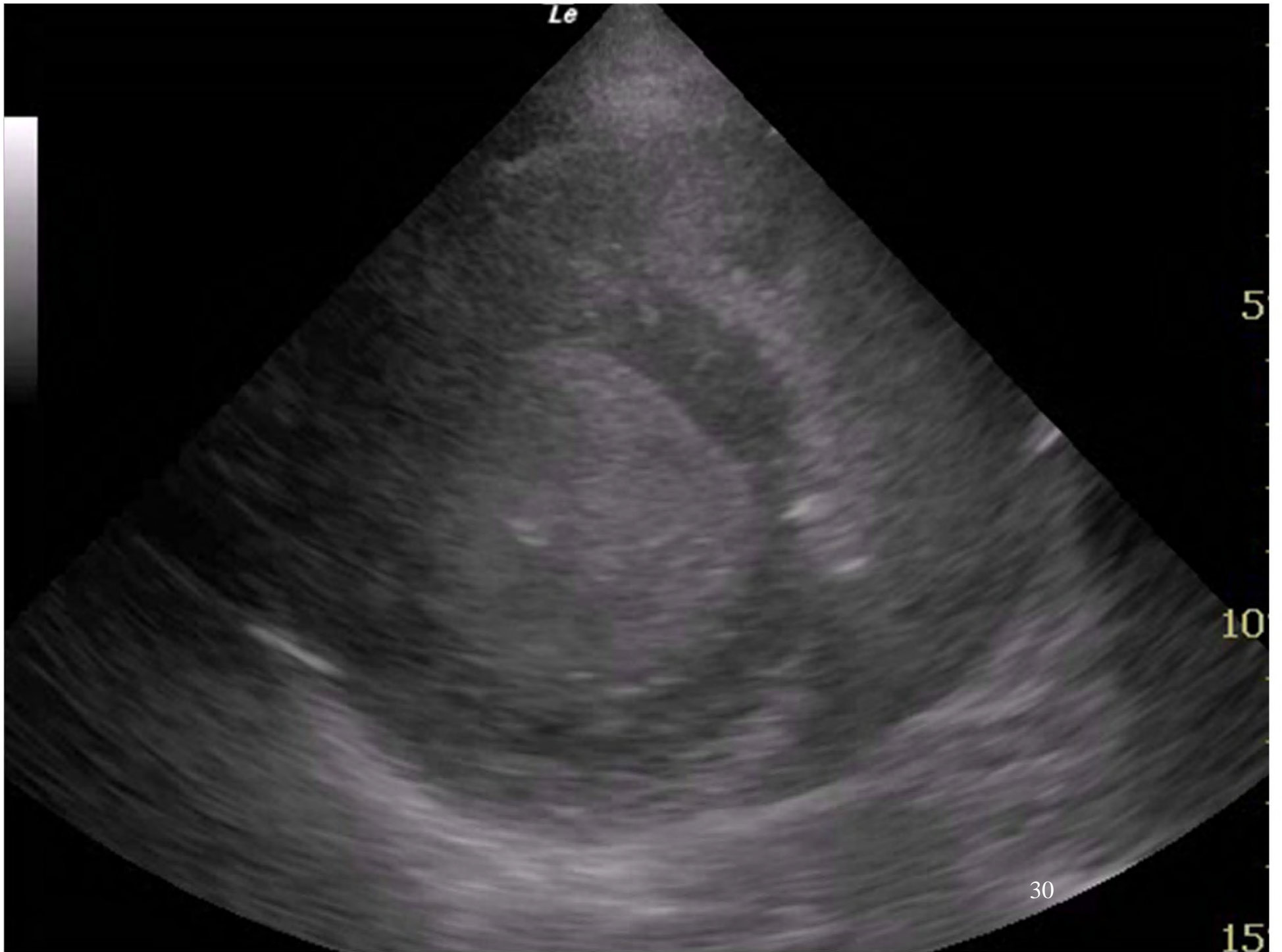
NB OT?



Active heart, small LV = PEA

Hypovolaemia?

Action: replace volume
Continue CPR
Find & treat cause



Cardiac standstill

Exclude other reversible causes (Hs, Ts)

Action: cease CPR

Inadequate view

Options:

Try another window

Try cardiac probe

Try step 2

Get help

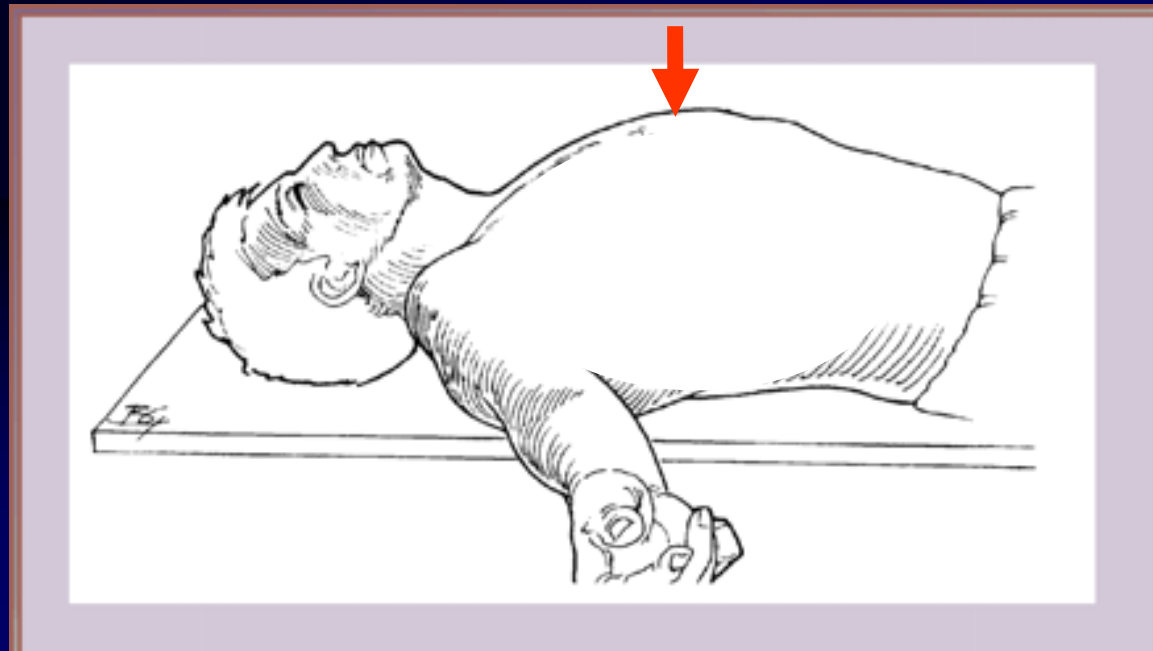
Step 2

Anterior chest

NB not always necessary

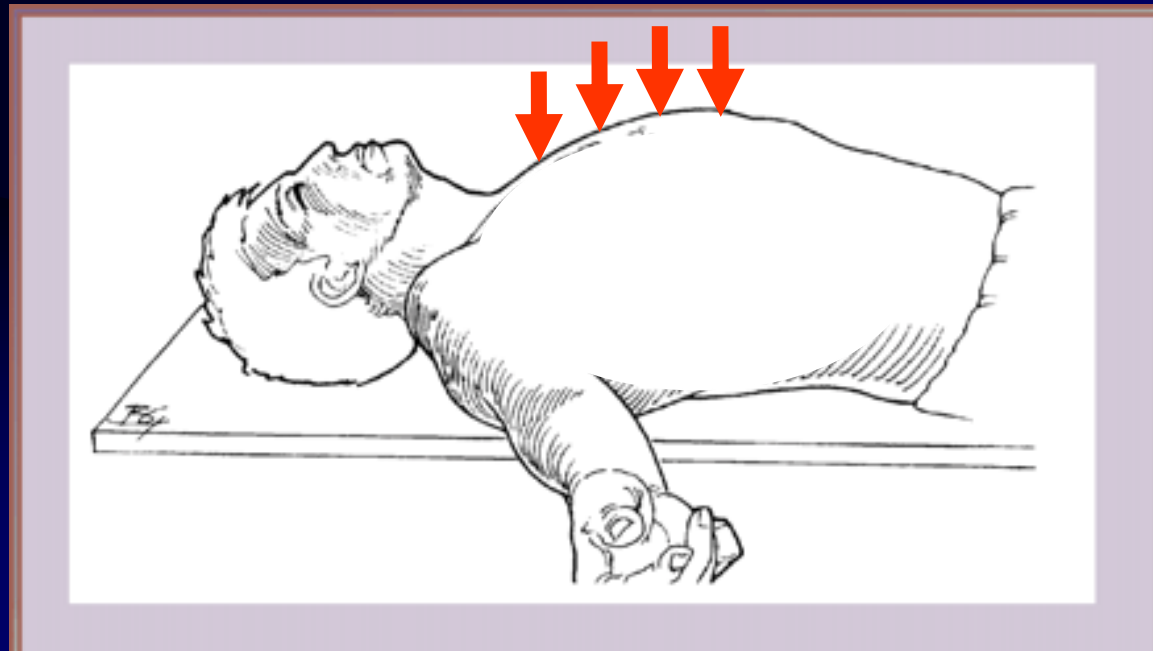
Step 2: anterior chest

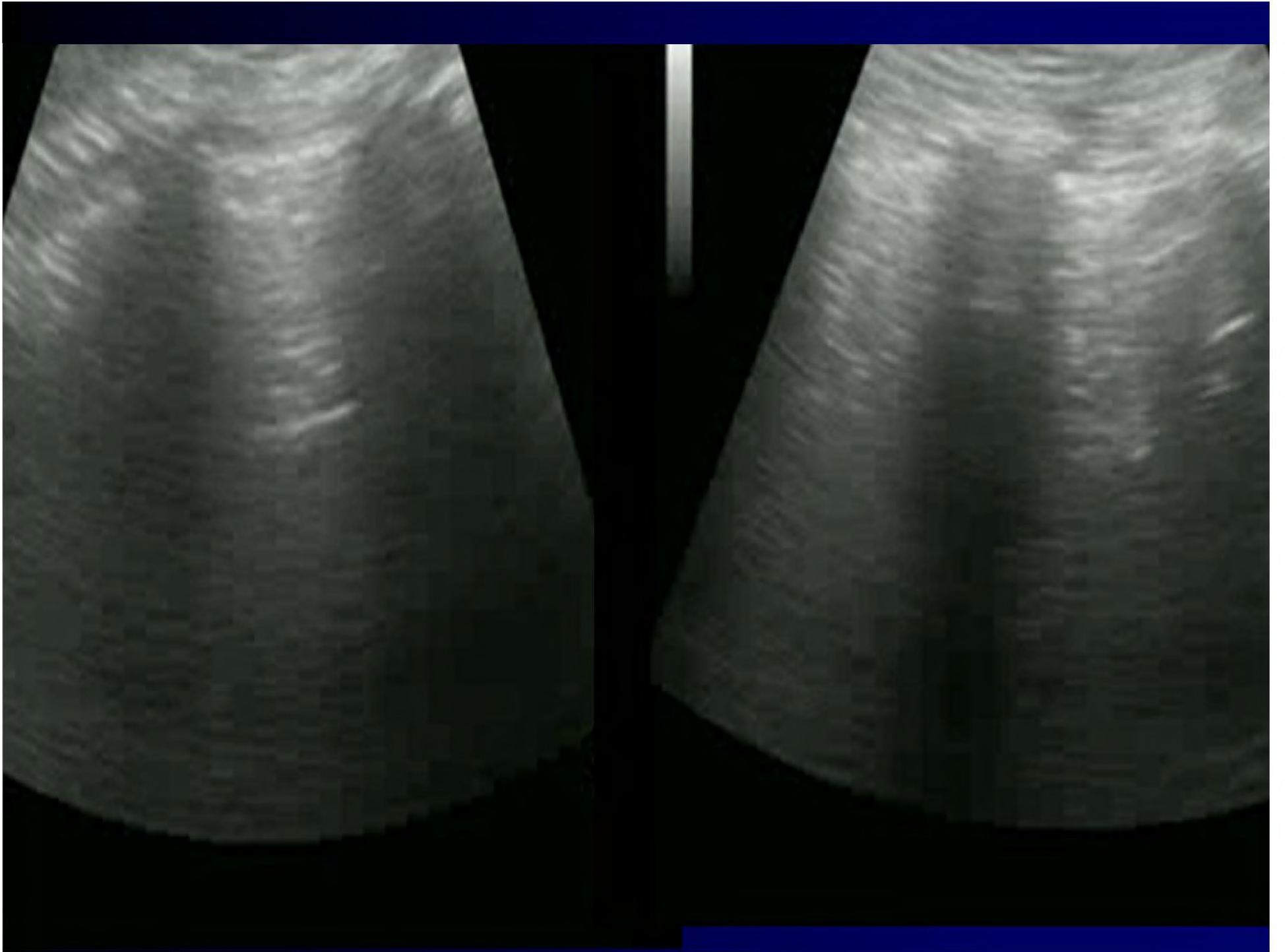
- Probe sagittal, 5cm depth
- Just 1 spot on each side
- Ideally the most elevated portion of chest



TOP TIP: you don't need to be exact

- If tension PTX, it will fill the hemithorax
- You'll see it anywhere on the anterior chest





Step 2 findings

Neither lung is
sliding?

One lung is not
sliding?

Both lungs sliding

Step 2 findings

Neither lung is
sliding?



Not ventilating!
(NB bilateral PTX?)

One lung is not
sliding?



PTX or
1 lung ventilation

Both lungs
ventilating



No PTX
Lungs are ventilating

Step 2 findings

Neither lung is sliding?



Not ventilating!



Check the airway

One lung is not sliding?



PTX or
1 lung ventilation



Check the ETT
Drain PTX?

Both lungs sliding



No PTX
ETT in trachea



Go to step 3

Step 3

Hypovolaemia

What's the cause?

At your discretion:

- Review clinical picture
- Scan the IVC (confirm hypovolaemia)
- Scan the abdomen (eg AAA / free fluid in trauma)

Recap: the arrest screen

A 3-step scan

1. Single view heart
2. Anterior lung fields
3. At your discretion:
 - IVC (hypovolaemia)
 - Abdo (eg AAA / free fluid in trauma)
 - **Or finish scanning**

Thanks to

Daniel Lichtenstein

James Dent

Kari Small

Yogi Tikare