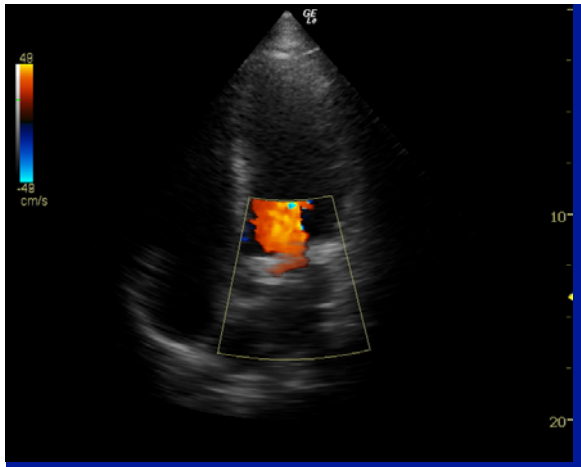


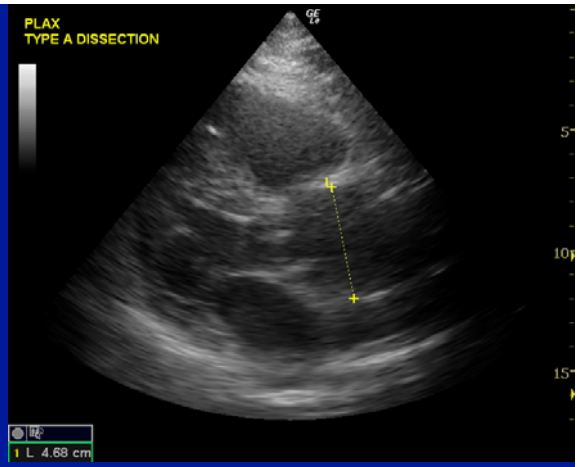


Image optimization for critical care US

Justin Bowra

Critical Care Ultrasound Course

Summary

- Revision: basic image optimization
- B- mode, M-mode, Doppler
- LUNGS
- IVC
- HEART

Revision: basic image optimisation

- Patient position (supine? left lateral?)
- Lighting (dark)
- Plenty of gel
- Probe: curved or sector
- Orientation: abdo versus cardiac
- Preset: abdo or cardiac
- Cheat buttons -
  - Auto –optimize
  - Harmonics

Screening exam: lungs

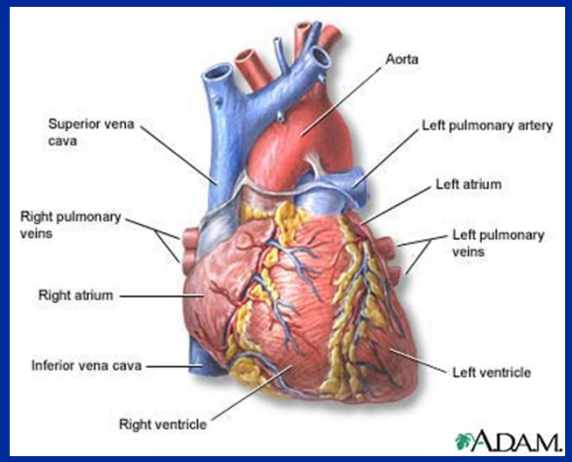
Curved or sector probe
FAST / lung preset
Turn off ‘filters’

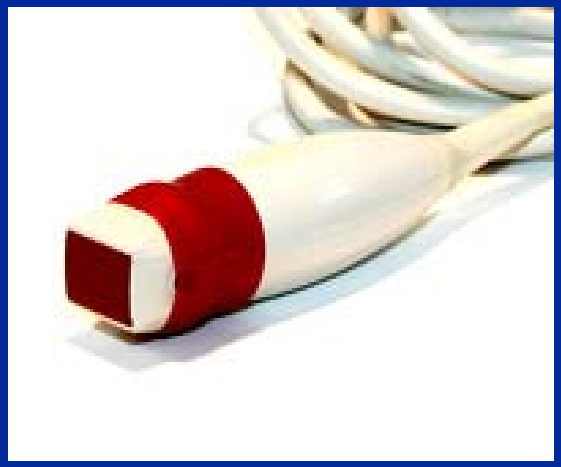
Screening exam: IVC & heart

Curved or sector probe
FAST / cardiac preset
Filters on!

A quick note on the cardiac preset

We’re not in Kansas any more

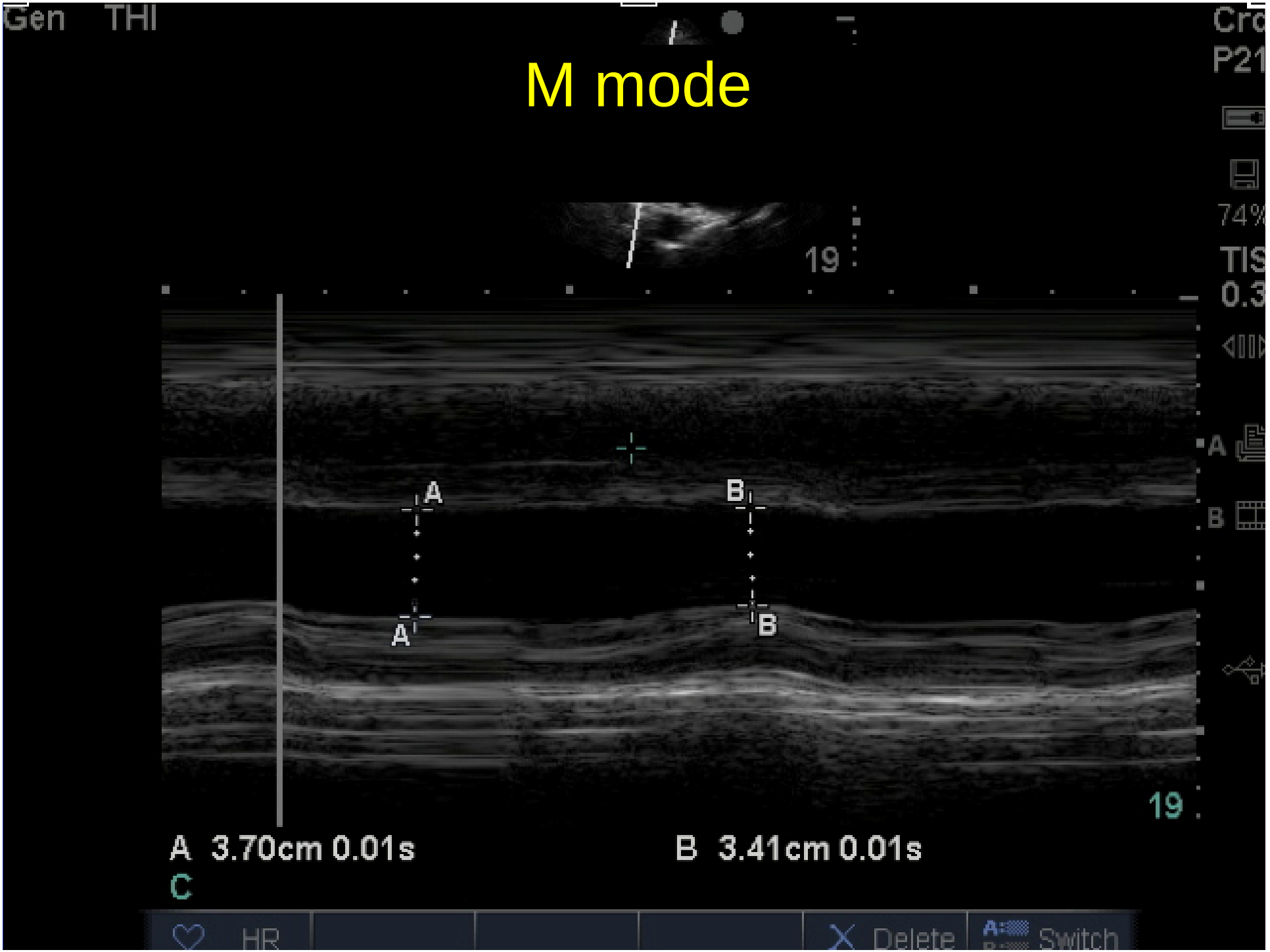




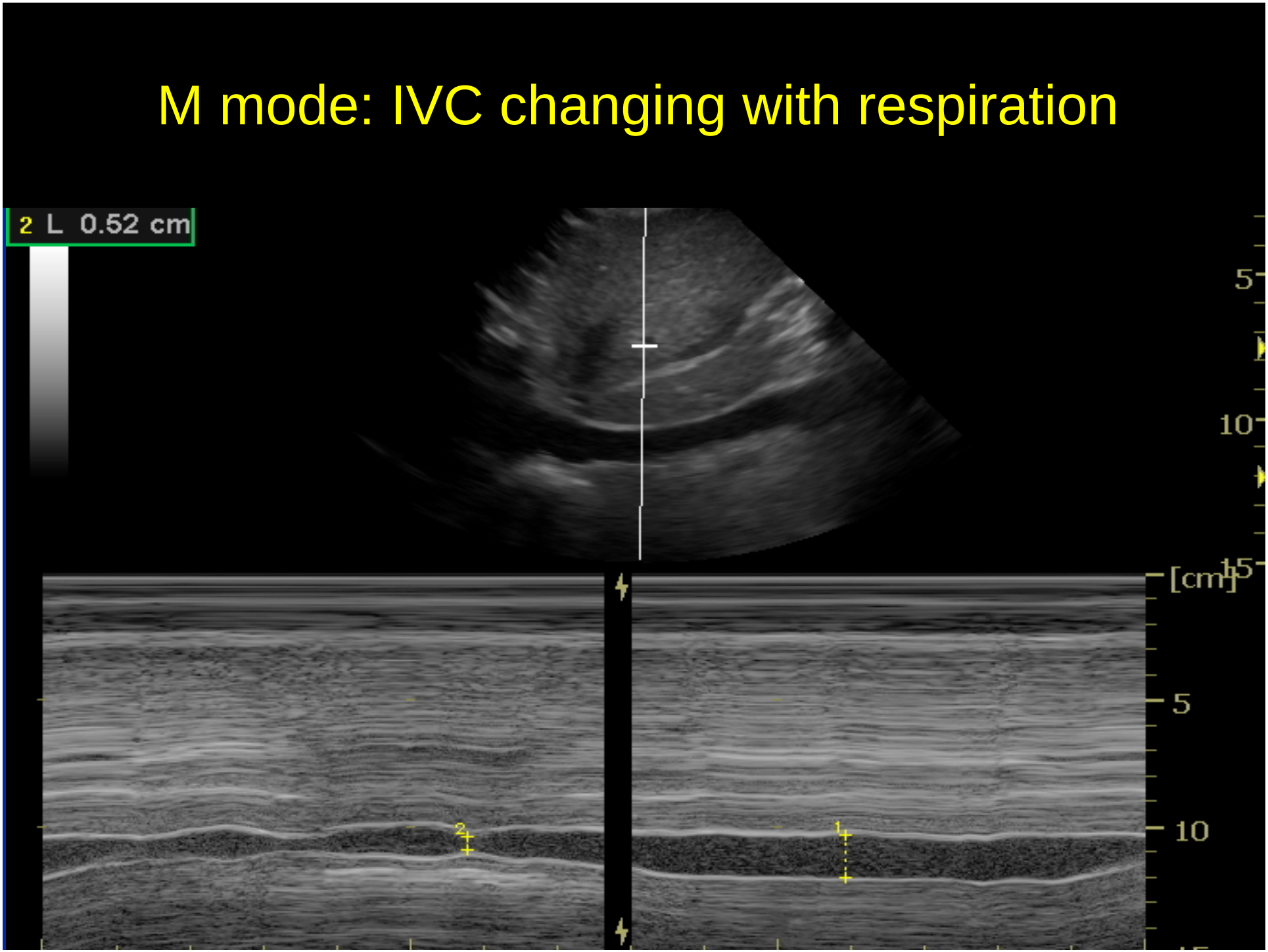
‘Proper’ cardiac scan is different!

- Sector probe
- Cardiac preset (image ‘round the wrong way’)
- ‘Jerky’ image (less averaging)
- Dynamic range decreased (more contrast)
- Less spatial resolution
- Better temporal resolution


MI 0.5
TIS 0.0
P
R
4.0


Gen THI
M mode
19
A
A
B
B
19
A 3.70cm 0.01s
B 3.41cm 0.01s
C
HR
Delete
Switch

M mode: IVC changing with respiration



M mode = motion mode

- Press ‘M’ button once & a line appears
- Use touch pad / track ball to move the line to area of interest
- Press ‘M’ again to plot a graph of what that line sees versus time
- Stationary stuff = straight line
- Moving things = curved/ dots

M-mode: what's the point?

PROS

- M-mode (motion mode) = movement along a single line of info against time
- Single line therefore much better sensitivity & resolution
- More accurate dimensions

CONS

- If angles wrong, measurements wrong!
- Easier to stuff up than B-mode
- IF IN DOUBT, USE B MODE

Doppler

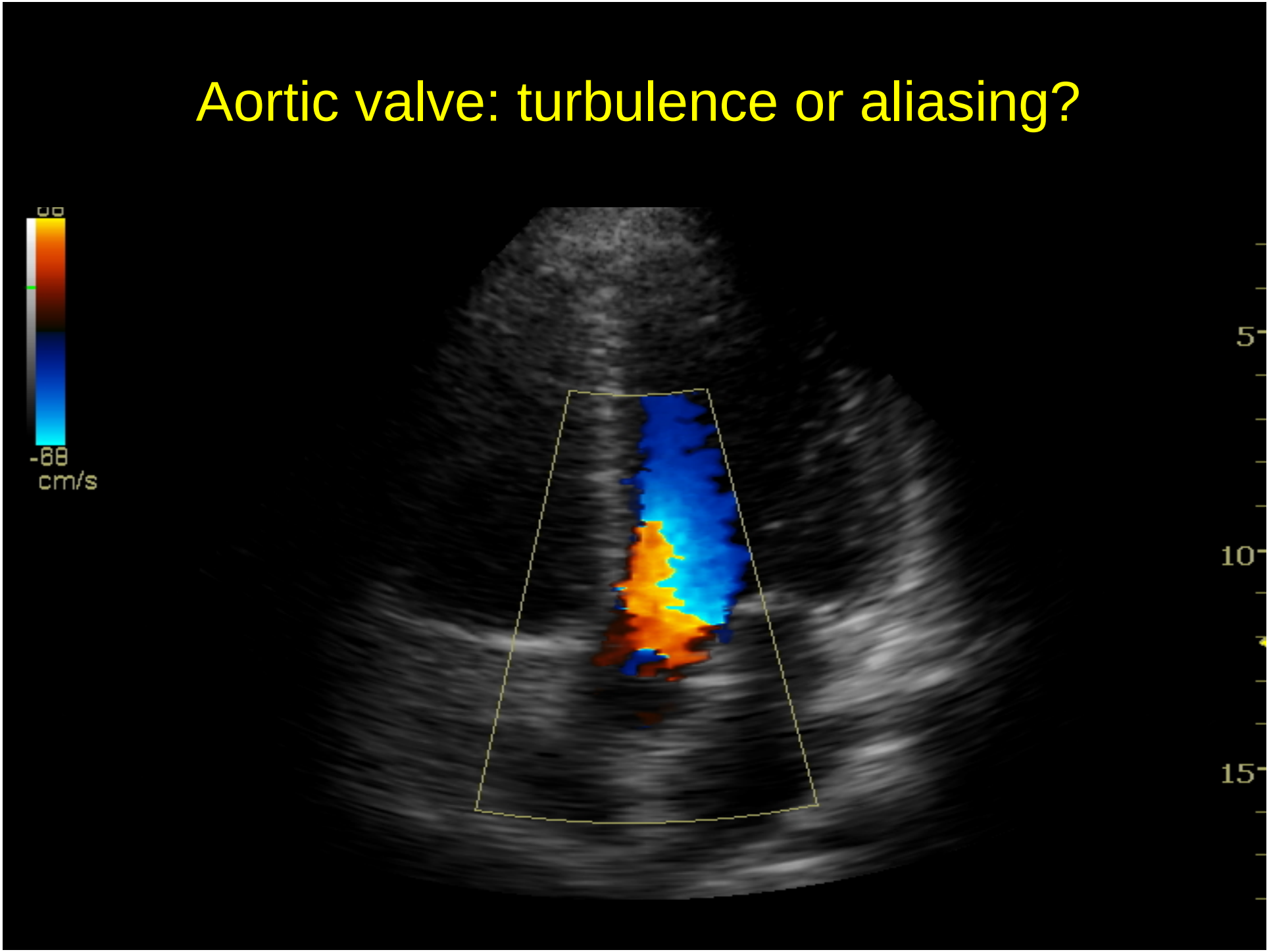
Doppler effect

- Probe sends a sound wave of known frequency
- If it hits object moving towards probe, the returning sound wave is higher frequency
- If object moving away, the returning wave is lower frequency

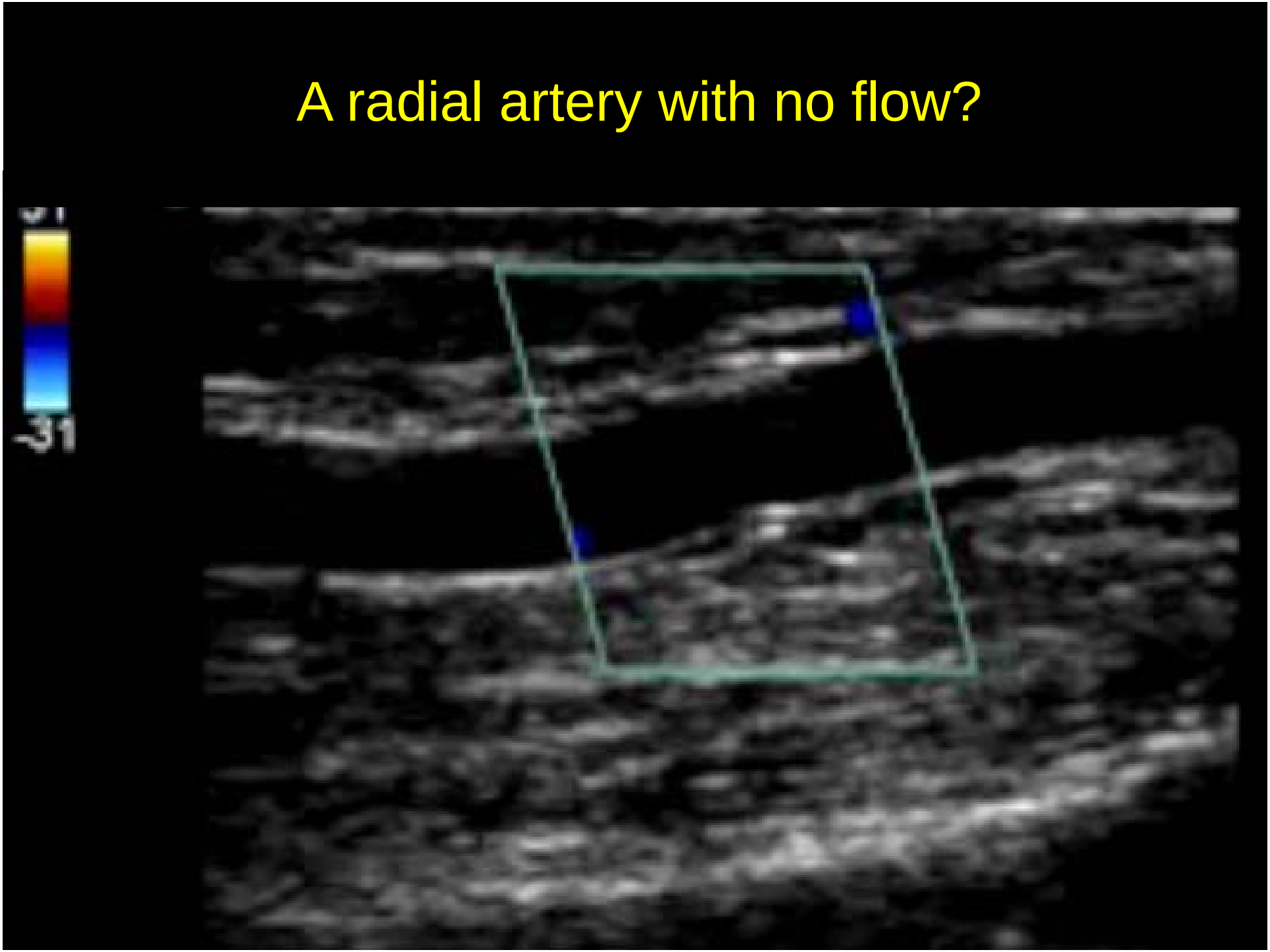
Why is Doppler dangerous?

- Wrong PRF / scale = will miss flow / get the direction wrong
- Wrong angle = will miss flow
- Wrong gain = will miss flow

Aortic valve: turbulence or aliasing?



A radial artery with no flow?



Today: we leave Doppler alone

Master the basics first

Know your limitations

Summary

- TTE is tricky!
- But screening exam is simple

References

Roger Gent: Applied Physics & Technology of Diagnostic Ultrasound

1997

Sam Kaddoura: Echo Made Easy

Cindy Lucas, senior sonographer Liverpool Hospital