

POCUS

Not just a fancy tool

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- No conflicts of interest to disclose

Stethoscope 1816

Medical ultrasound 1940s

Cardiology 1960s

OB 1970s now standard of care

ER 1980s - standard

Critical Care 1990s

Anesthesia, IM 2000s

FM? On the way





Why POCUS: eliminating the gaps

Get report,
Decide, Act

Radiologist
interpretes
selected
images

Technician
acquires
images

See patient,
Ask ? Order

Personal gap

Time gap

Knowledge gap

Care gap

Ask ?
POCUS
Act

Why POCUS: What we learned from the COVID-19 pandemic

- Use of POCUS significantly increased
- 1/2 COVID patient in hospital has cardiac abnormality, 1/3 POCUS lead to change of management
- Decrease personal and equipment exposure, decrease time to correct diagnosis/treatment

Better physician- patient alliance, improve patient understanding of the disease and compliance. Olson et. Al Southern Medical Journal • Volume 111, Number 7, July 2018

Physician's opinion based on survey: use of POCUS **improve patient care, decrease time to correct diagnosis**. Fuchs et, al. PLOS ONE | <https://doi.org/10.1371/journal.pone.0242084> November 20, 2020

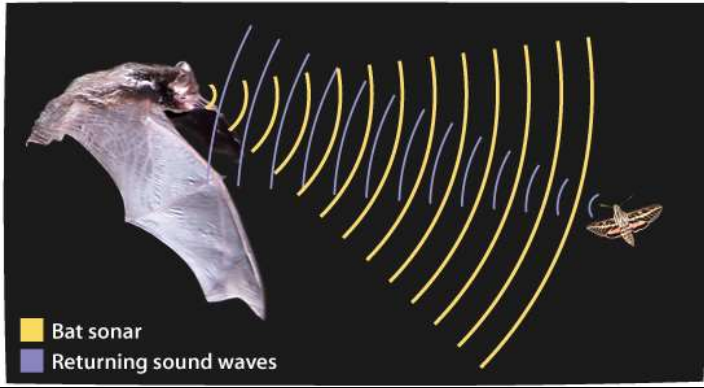
Use of POCUS **altered the diagnosis and clinical decision making in 1/2 of patient** care encounters for primary care physician in a UK study (decreased referral and/or change of treatment plan). Aakjær Andersen C, *et al. BMJ Open* 2020;10:e037664

Systemic review for POCUS in general practice shows that is can be safely used in **wide range of clinical settings to aid diagnosis and improve patient care**. Sorensen and Hunskaar *Ultrasound J* (2019) 11:31

Why POCUS?

AAFP issued new residency curriculum guideline

Half of medical school provide some US training.



- **2.5 MHz:** deep abdomen, OB/Gyn (deep and big)

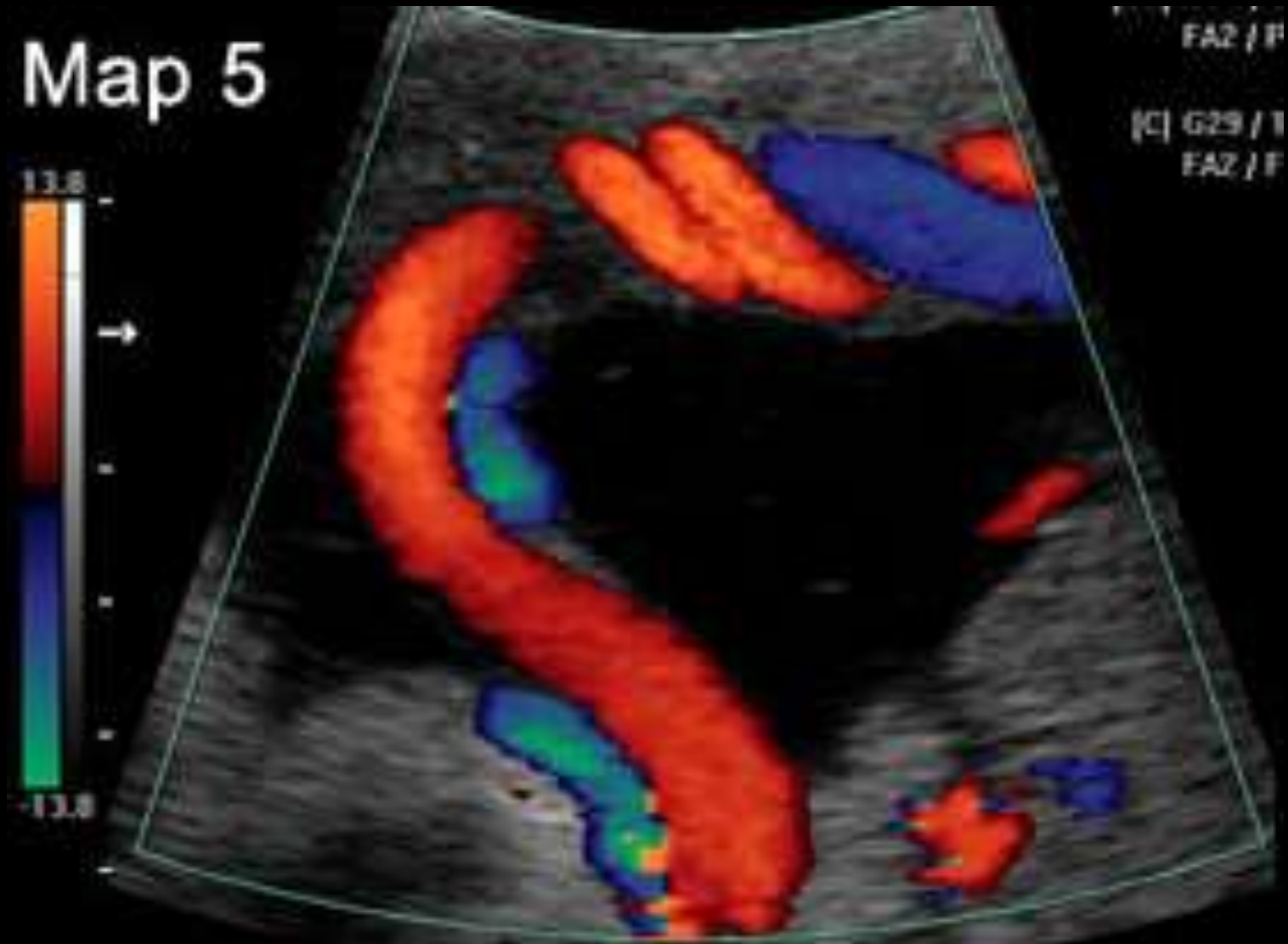


- **15.0 MHz:** superficial structures, musculoskeletal imaging (superficial and small)

B mode : 2 dimensional image



Doppler/Color doppler



Safety

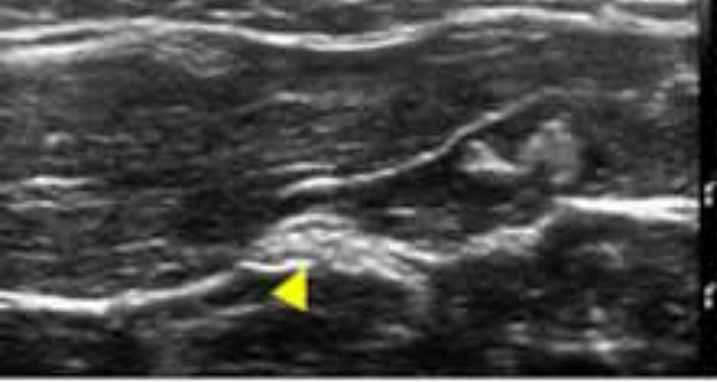
In general, very safe

Potential thermal and non-thermal (cavitation) injuries can occur

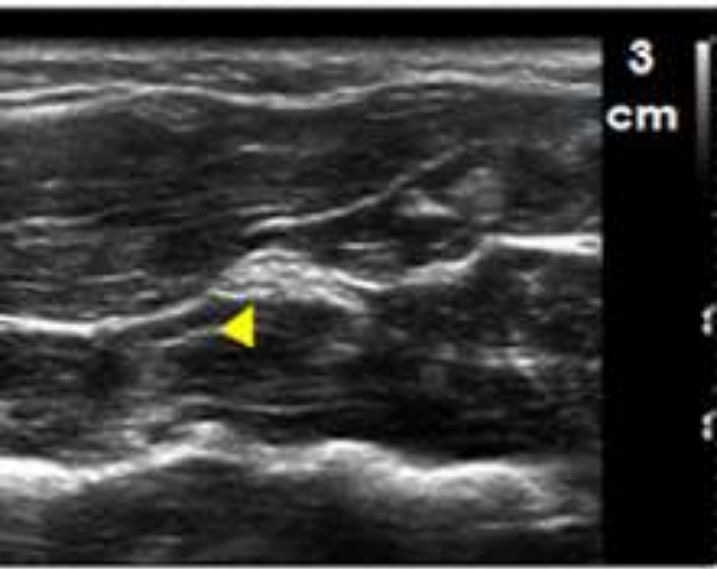
Use the ALARA (As low As Reasonably Achievable) principle



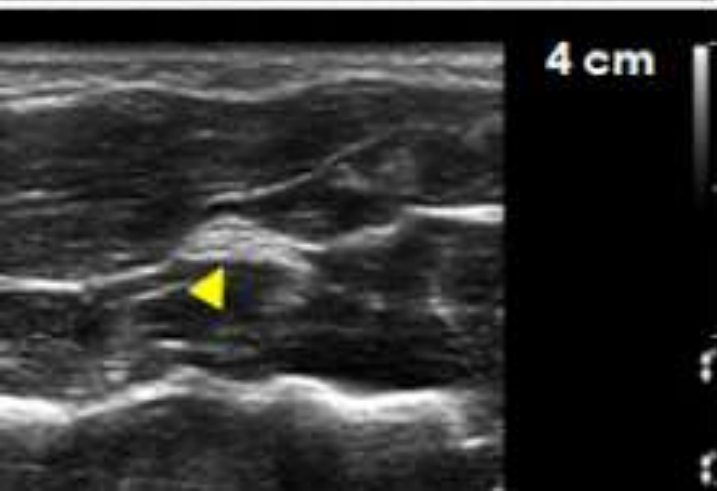
What am I looking at? Orientation



3
cm



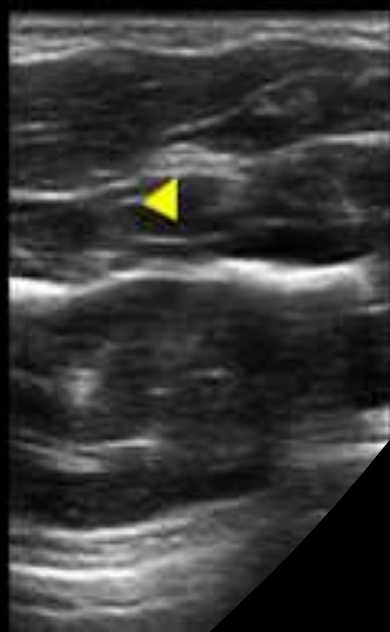
4
cm



5
cm



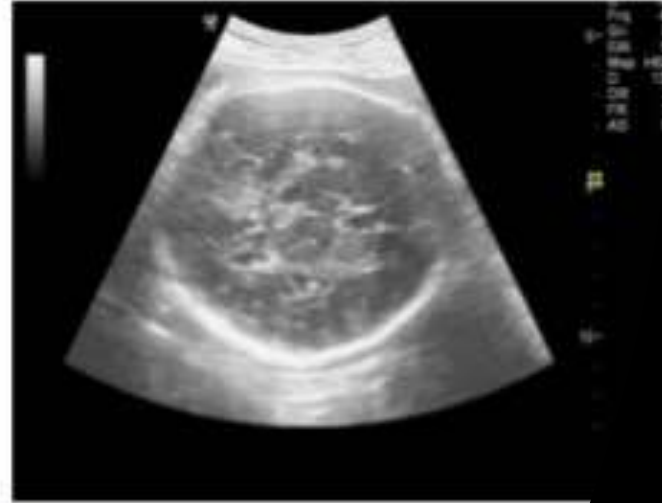
6
cm



What am I
looking at?
Adjusting
depth

Gain
Low

High



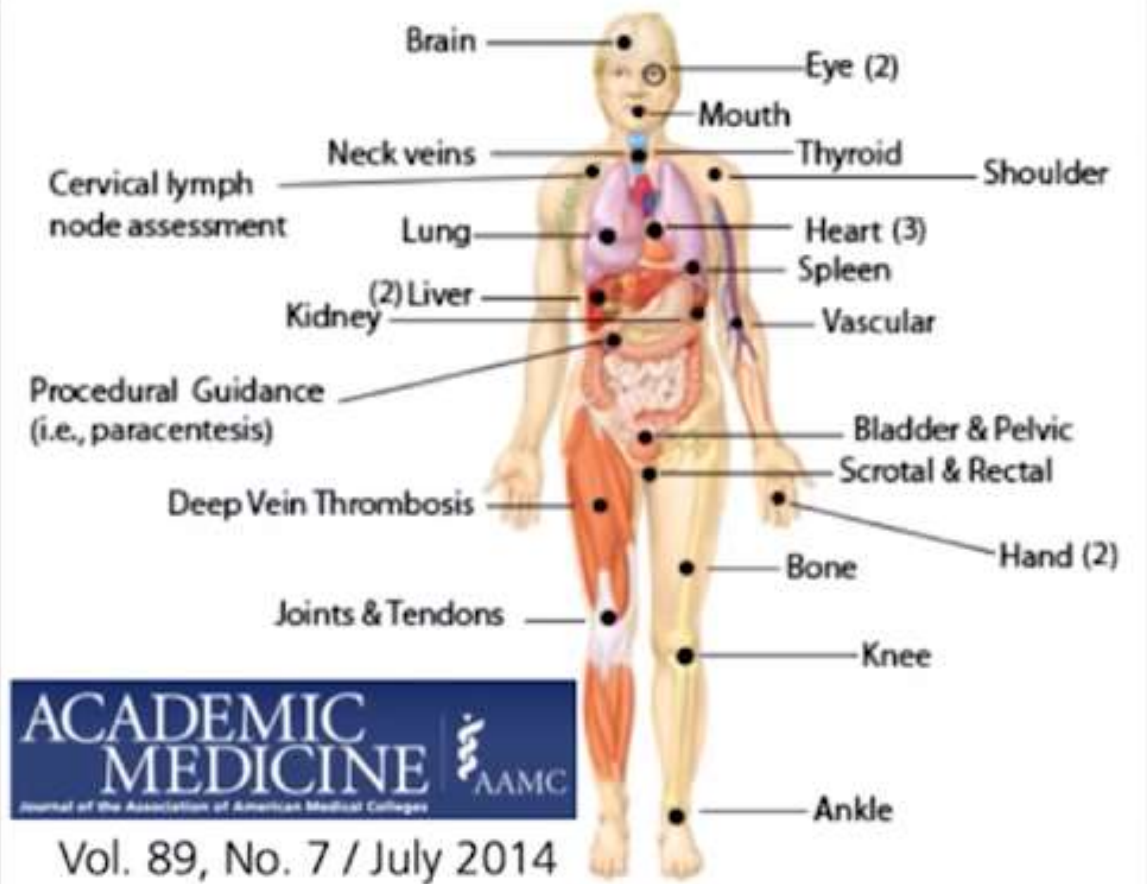
Optimal



What am I
looking at?
Adjusting gain

**Proactive Medicine: The “UCI 30,” an
Ultrasound-Based Clinical Initiative From the
University of California, Irvine**

J. Christian Fox, MD, Joelle R. Schlang, Graciela Maldonado, Shahram Lotfipour, MD, MPH,
and Ralph V. Clayman, MD



When to use it?

To get a good answer,
ask a good question.

What Can I use it for? Soft tissue



Cystic vs solid mass

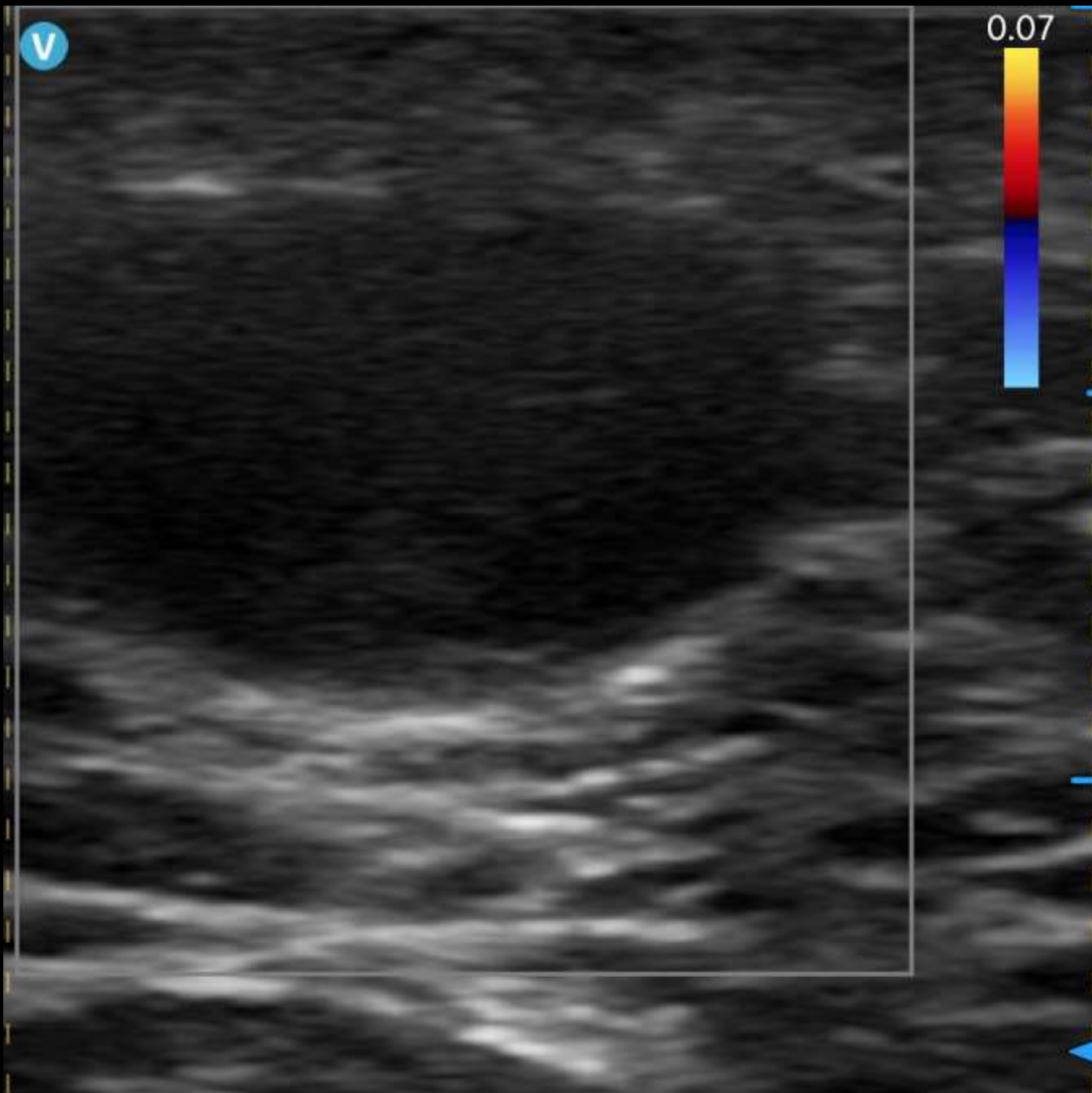
US guided
aspiration/biopsy

64 yo male with 2 artificial valves, Afib on coumadin
here for arm pain after some yard work



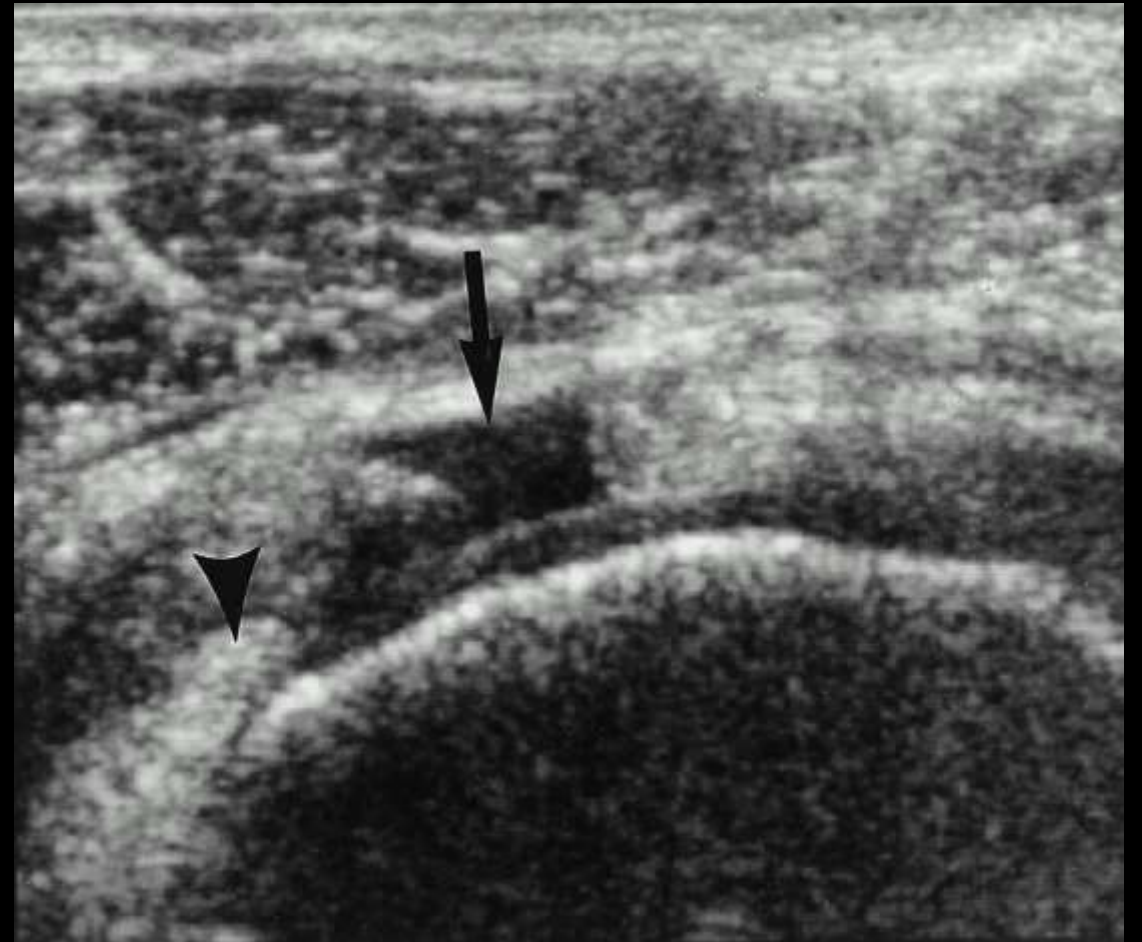
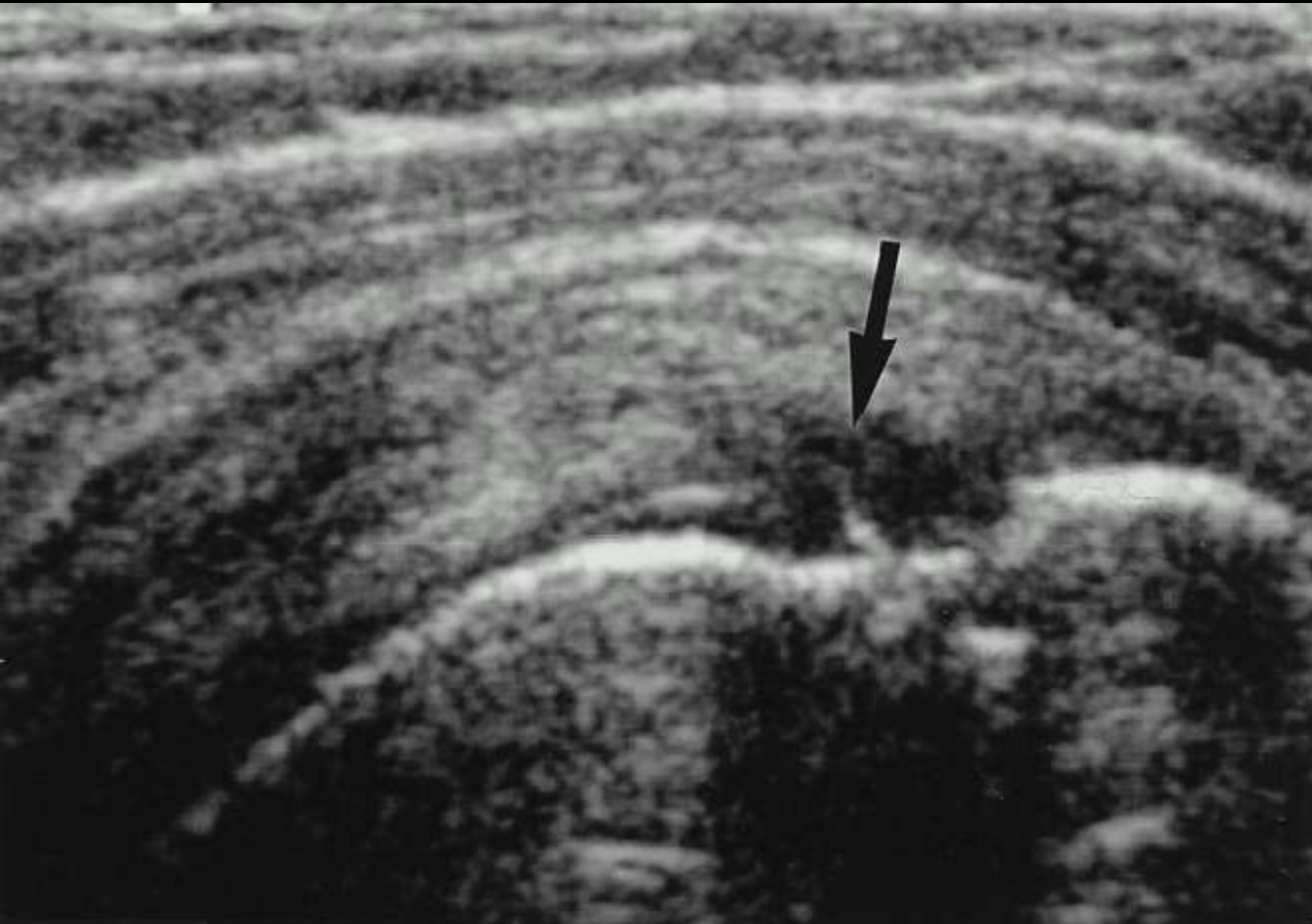


38 yo female here
for fatigue, right
side of her neck is
always more
prominent than
the left.

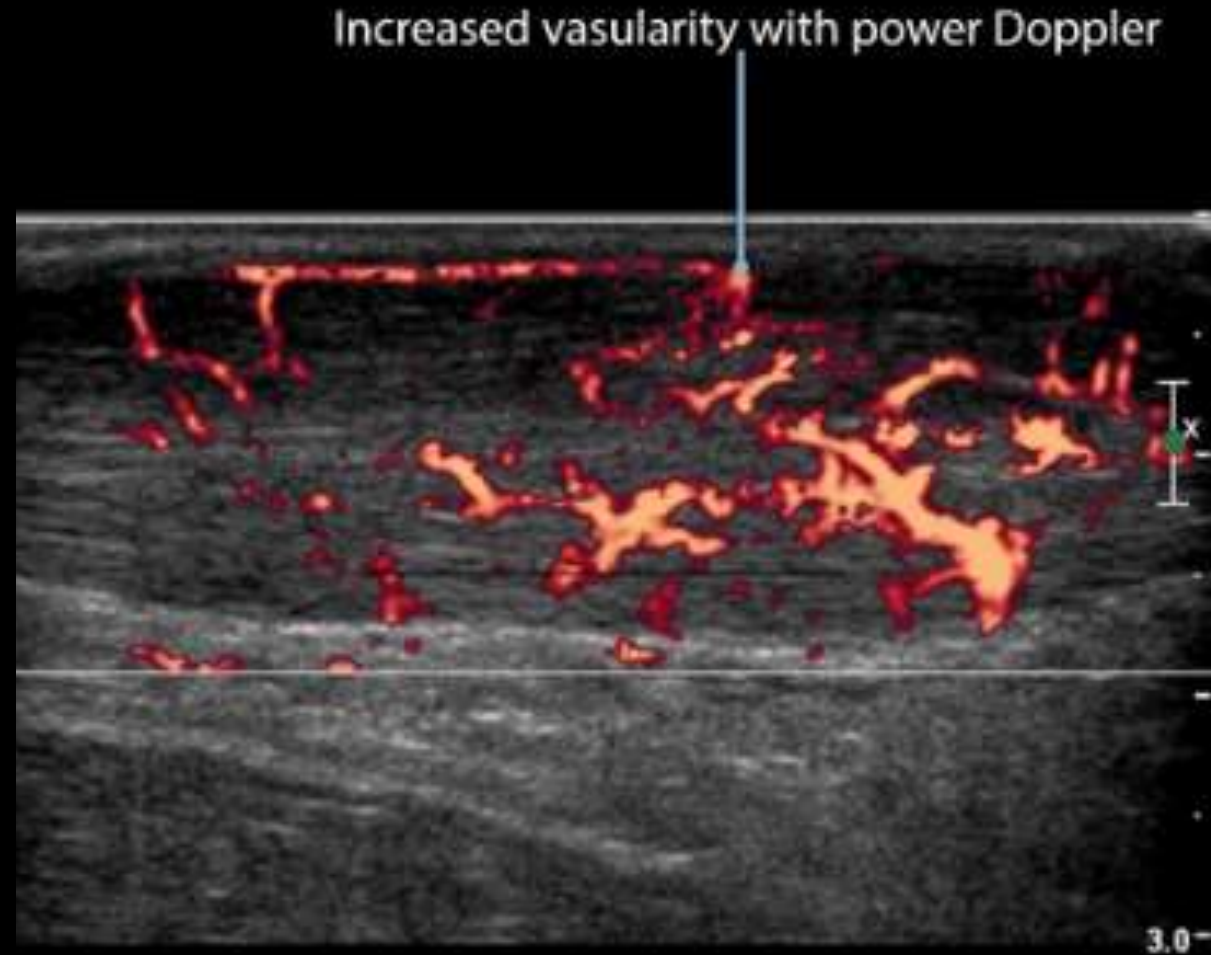


36 yo male with
a lump on back
bothering him
for years

What Can I use it for? MSK the rotator cuff



What Can I use it for? MSK

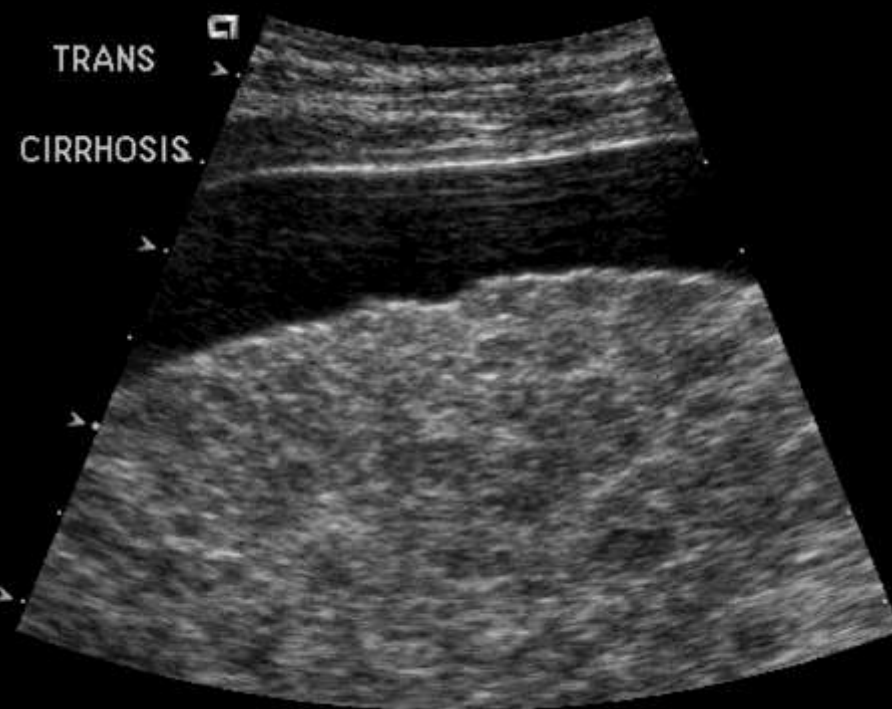


Abdominal Pain in the office

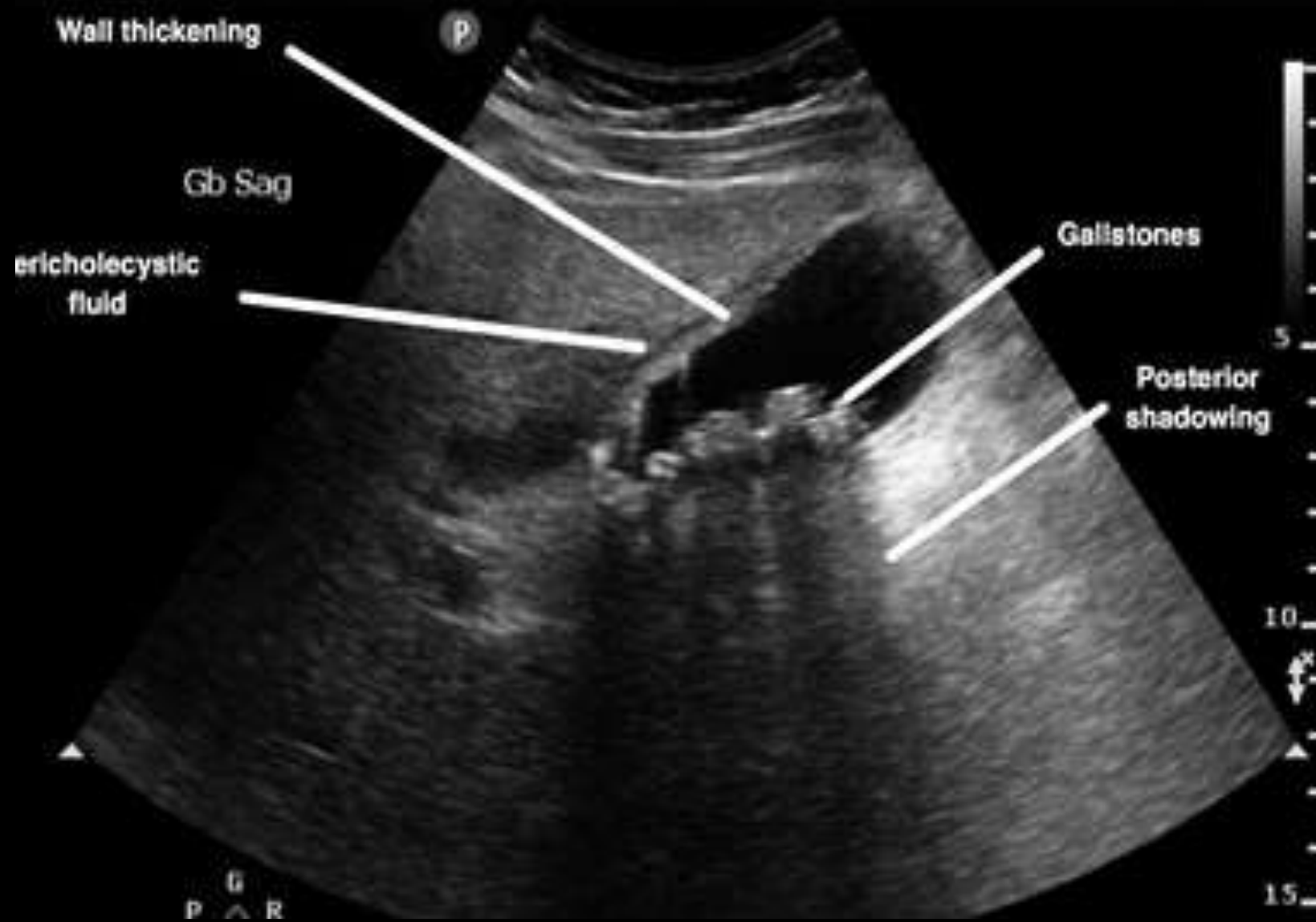
Is POCUS helpful?

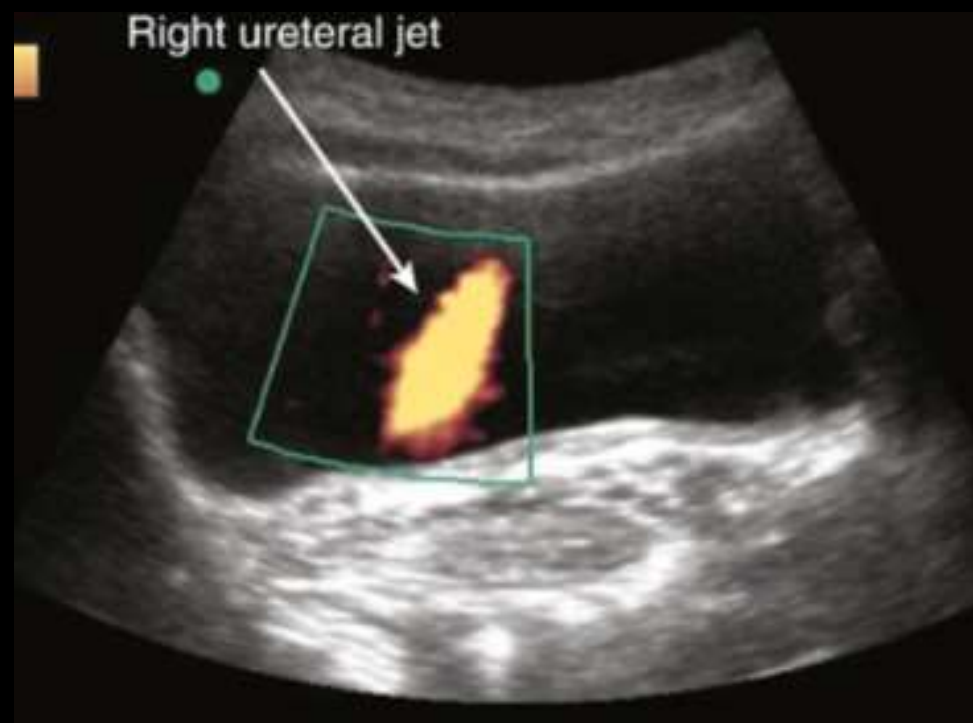
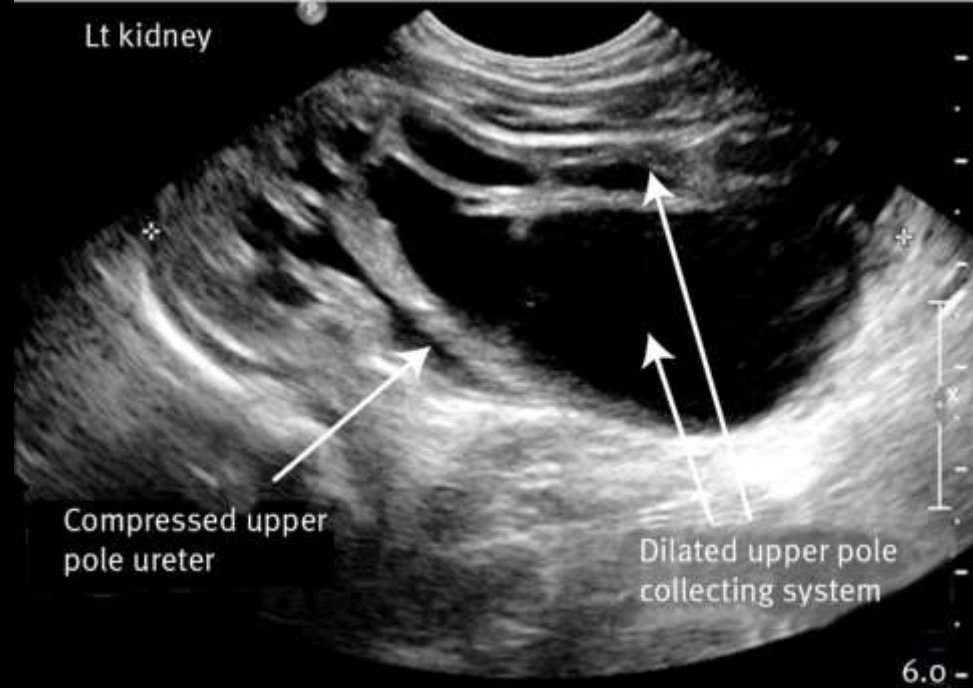
What am I looking for?

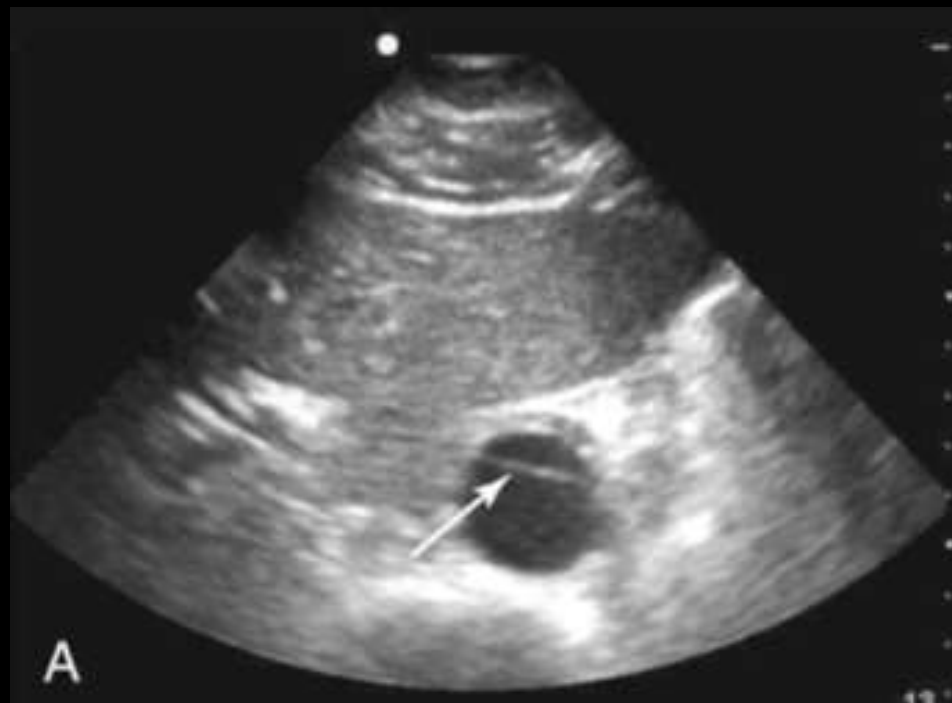
History and physical is the key.



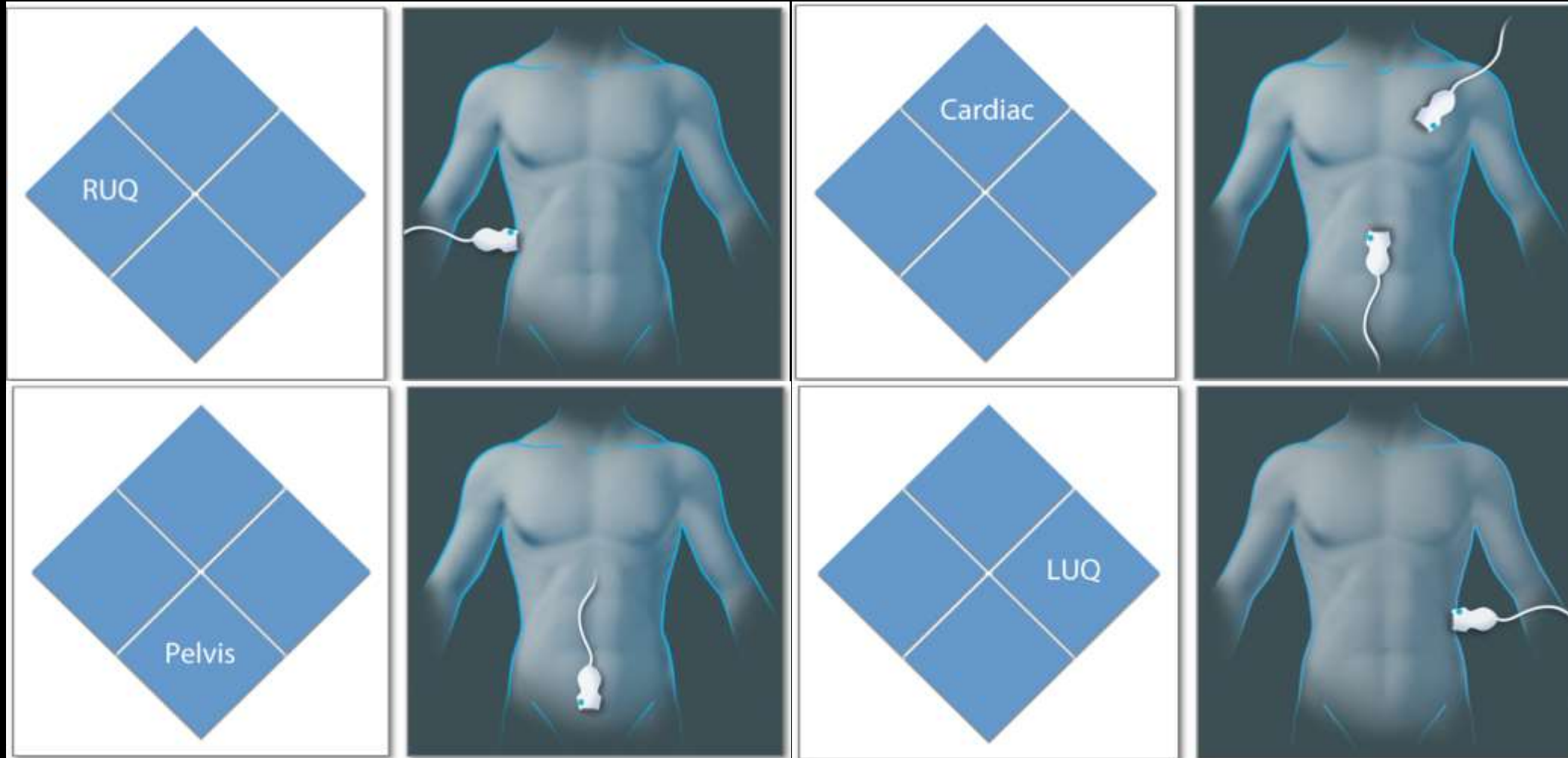
MI 0.5
TIS 0.1







FAST Scan (Focused assessment with sonography in trauma)



OB/Gyn



What Can I use it for? Pulmonary

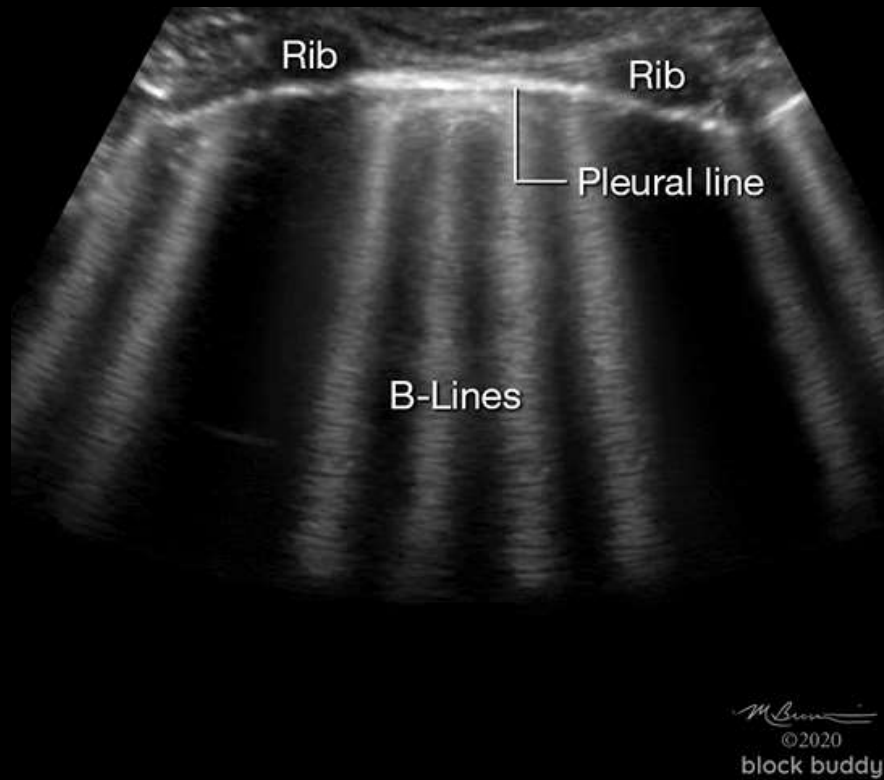
Pulmonary edema

Pleural effusion

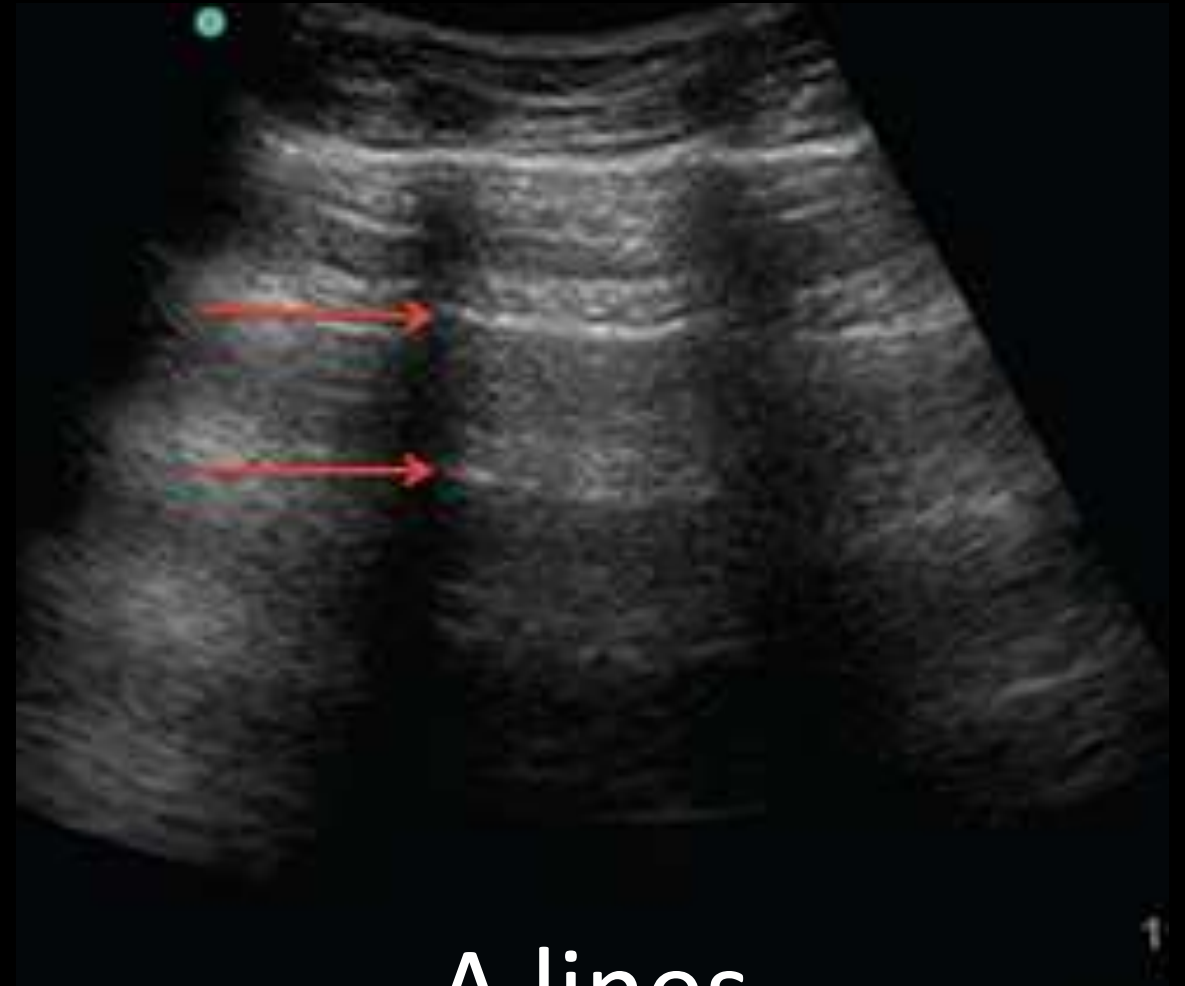
Pneumothorax

Lung consolidation

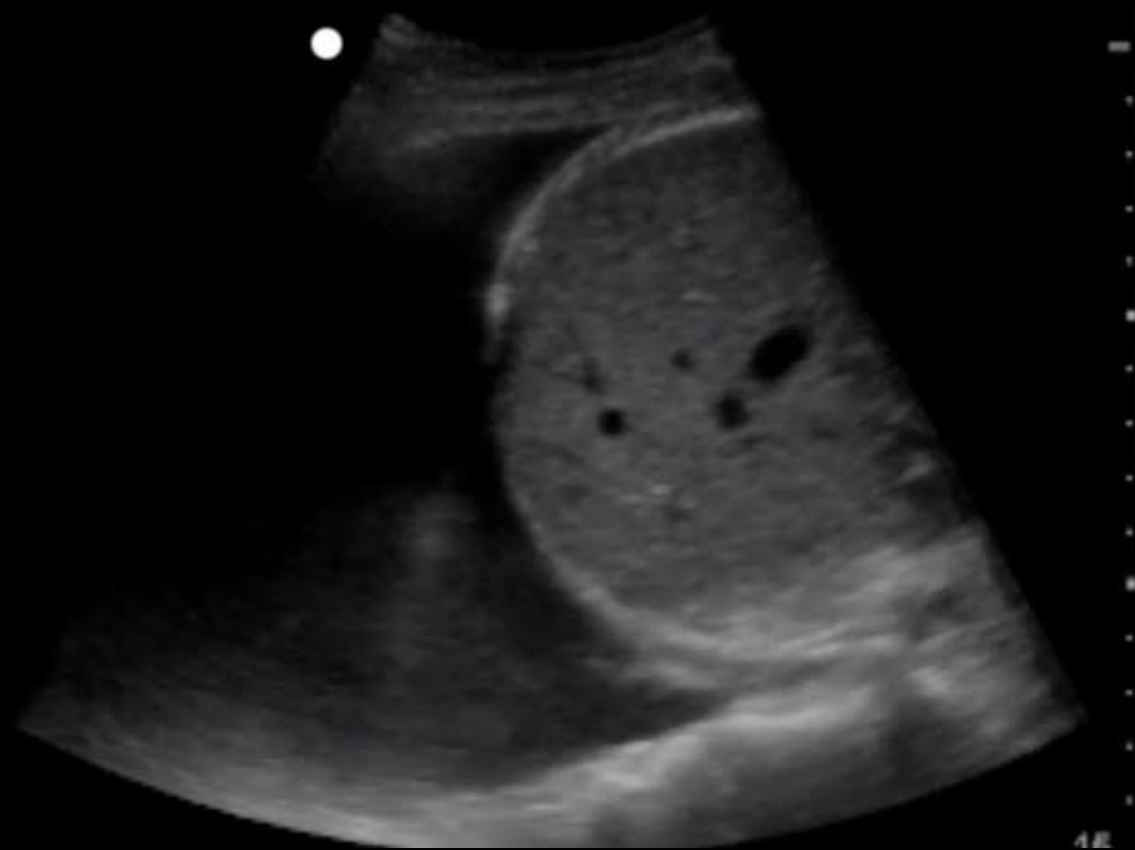
Lung and pleura



B lines



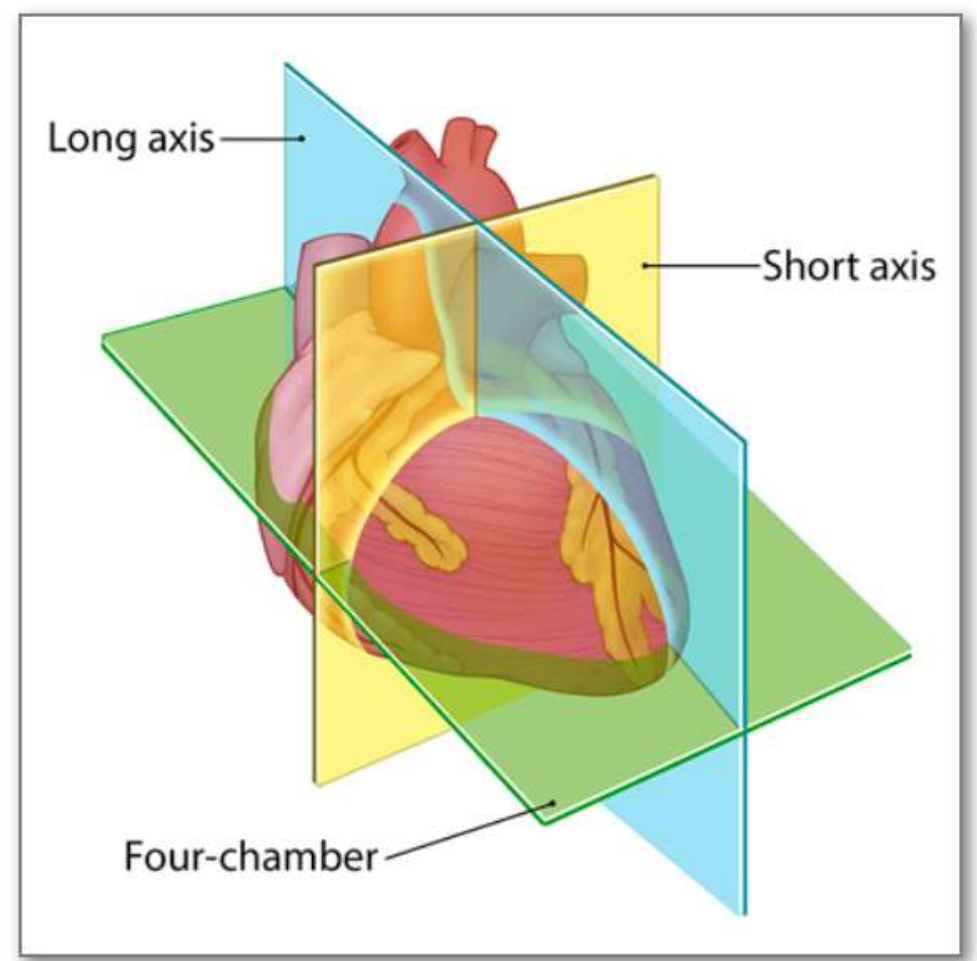
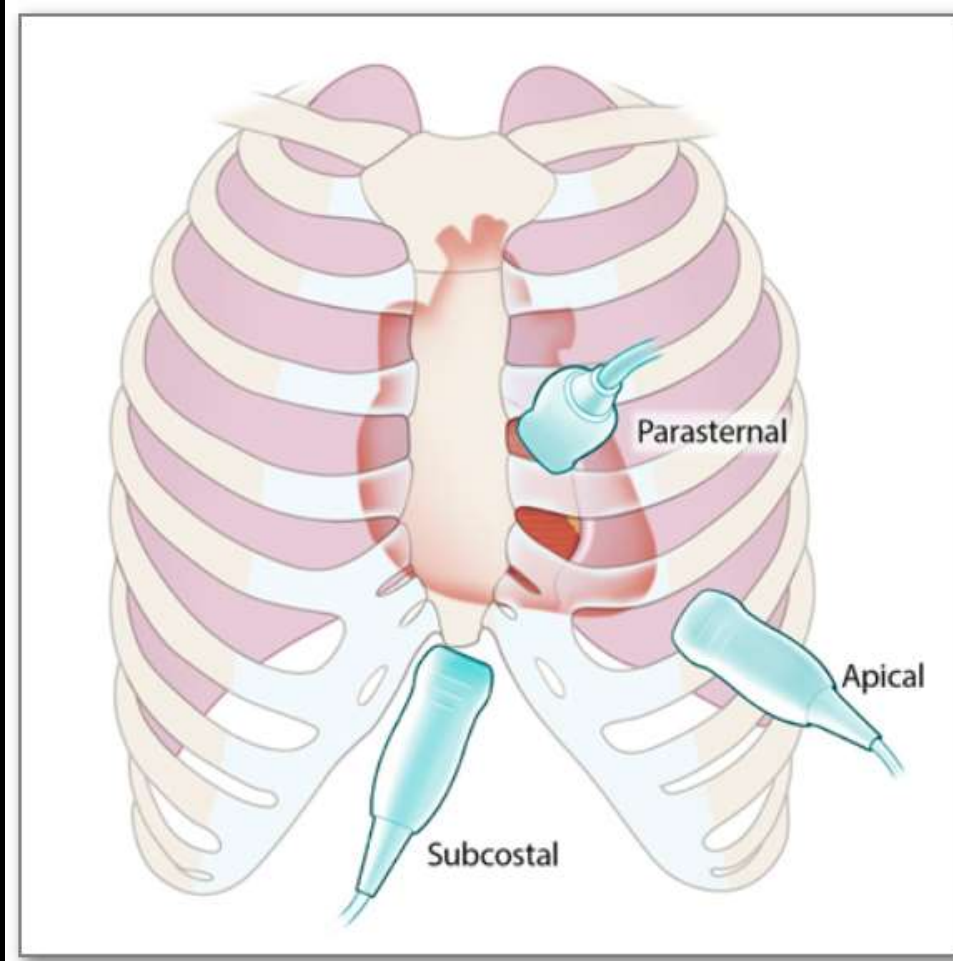
A lines



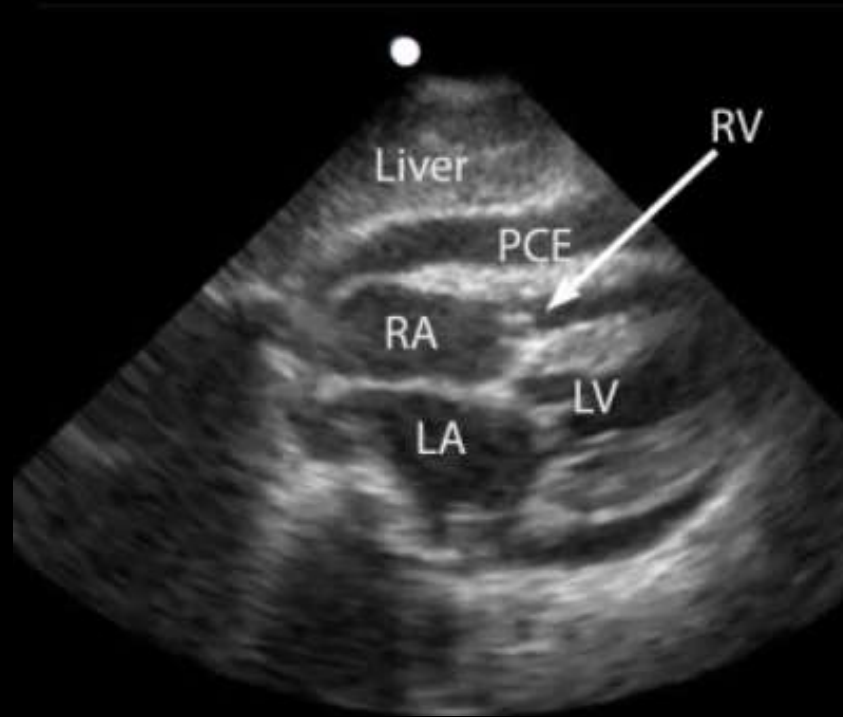
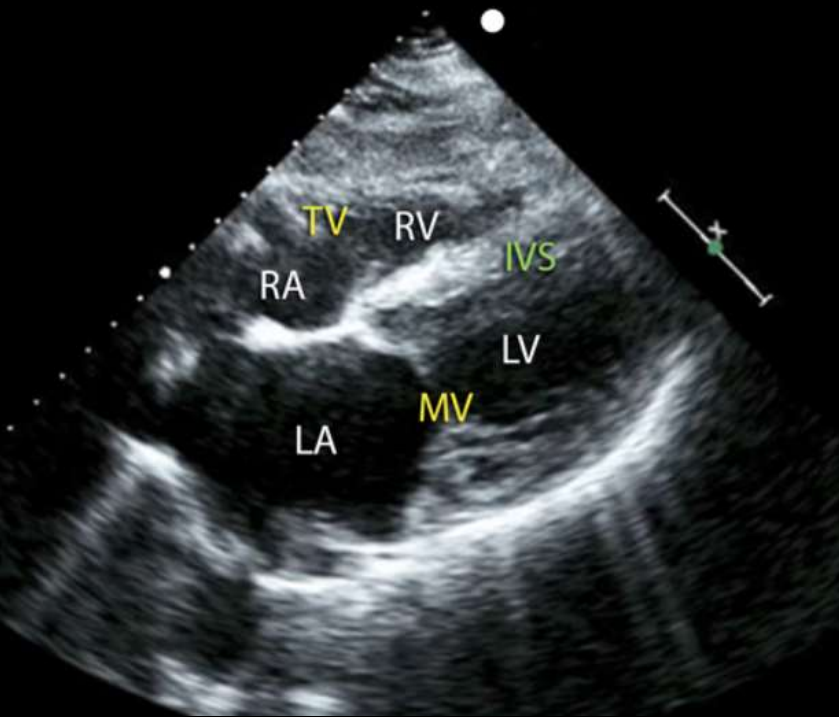
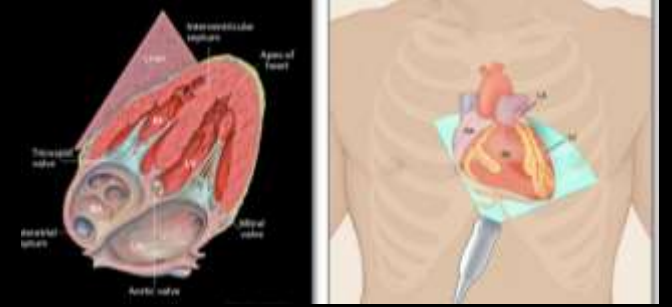
Cardiac

Several high yield view to answer the most common questions:

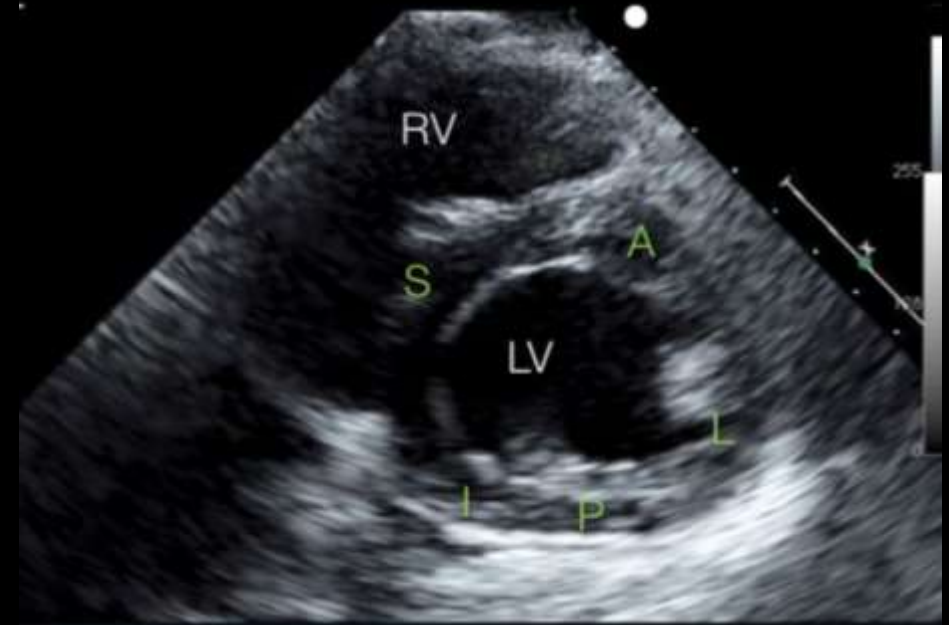
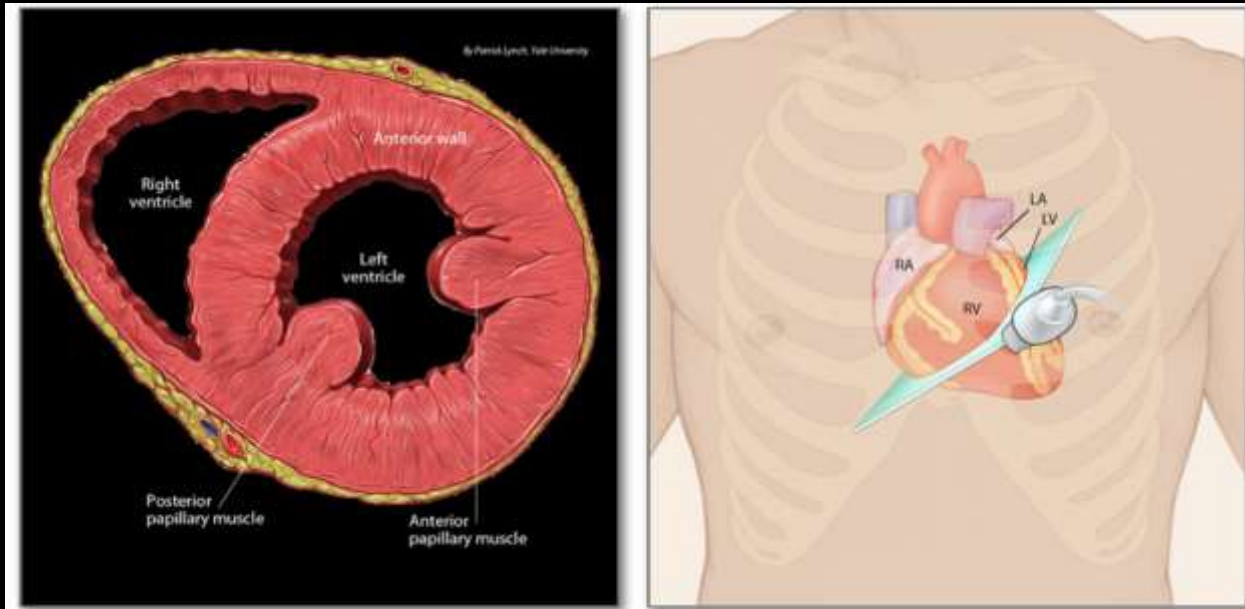
- LV enlargement
- LV systolic dysfunction
- LV hypertrophy
- LA enlargement
- pericardial effusion
- RA pressure elevation



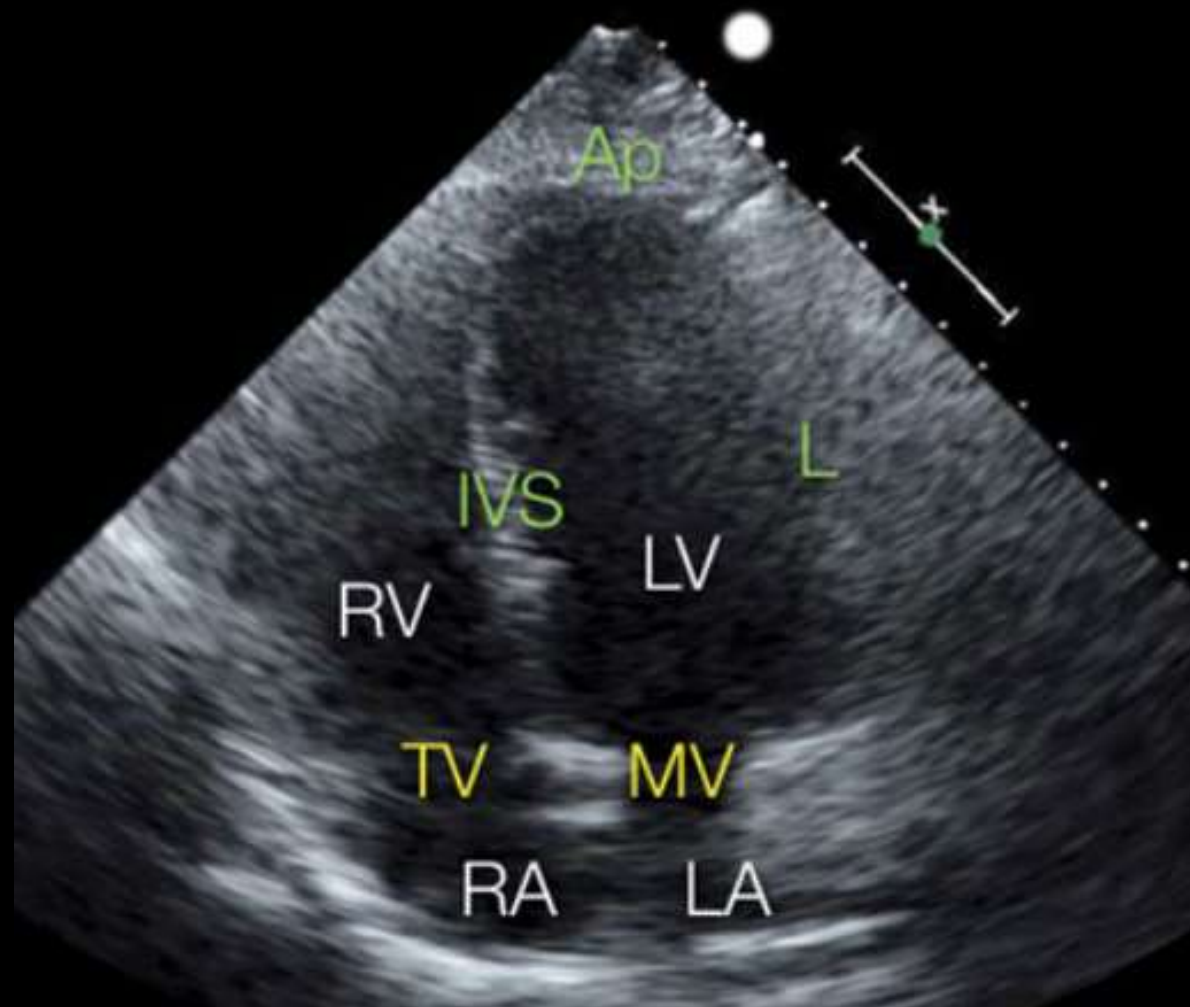
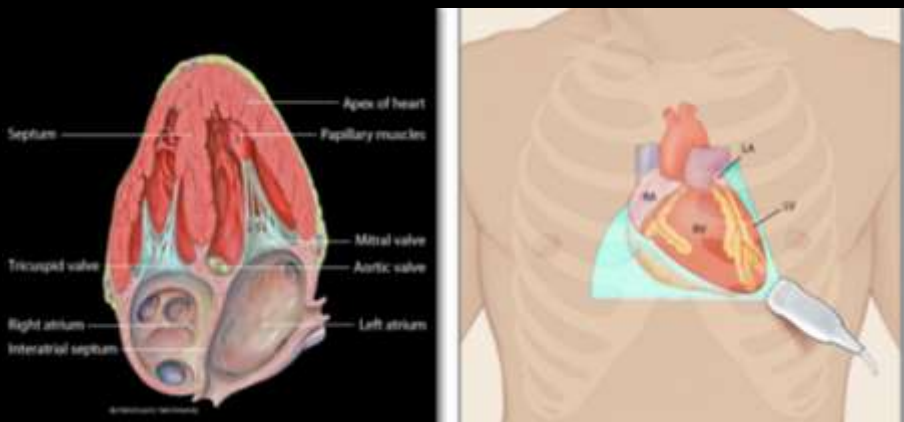
Subcostal 4 chamber and IVC view



Parasternal mid-ventricular short axis view

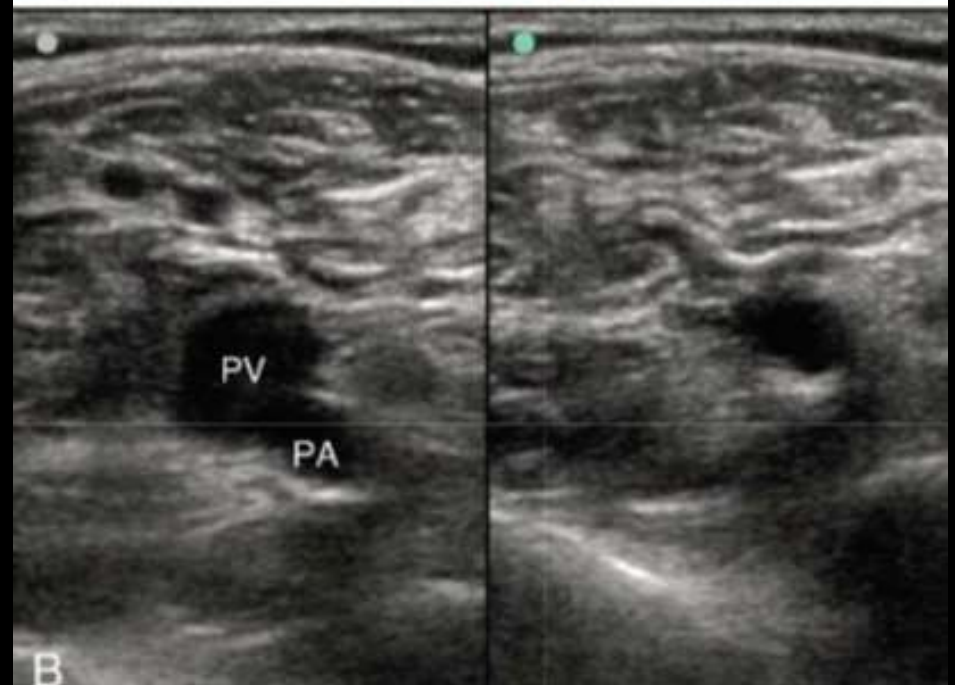


Apical 4 chamber view

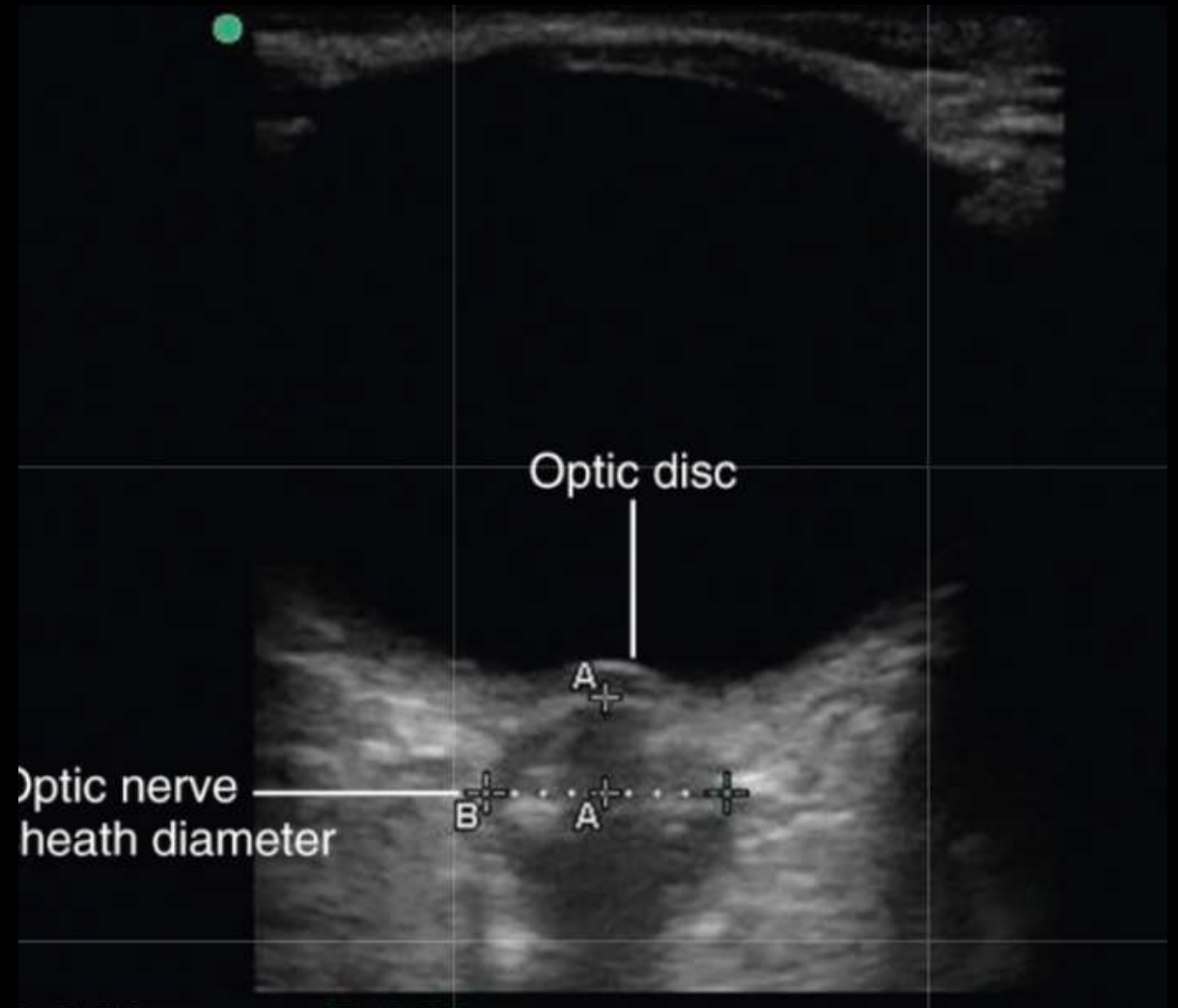
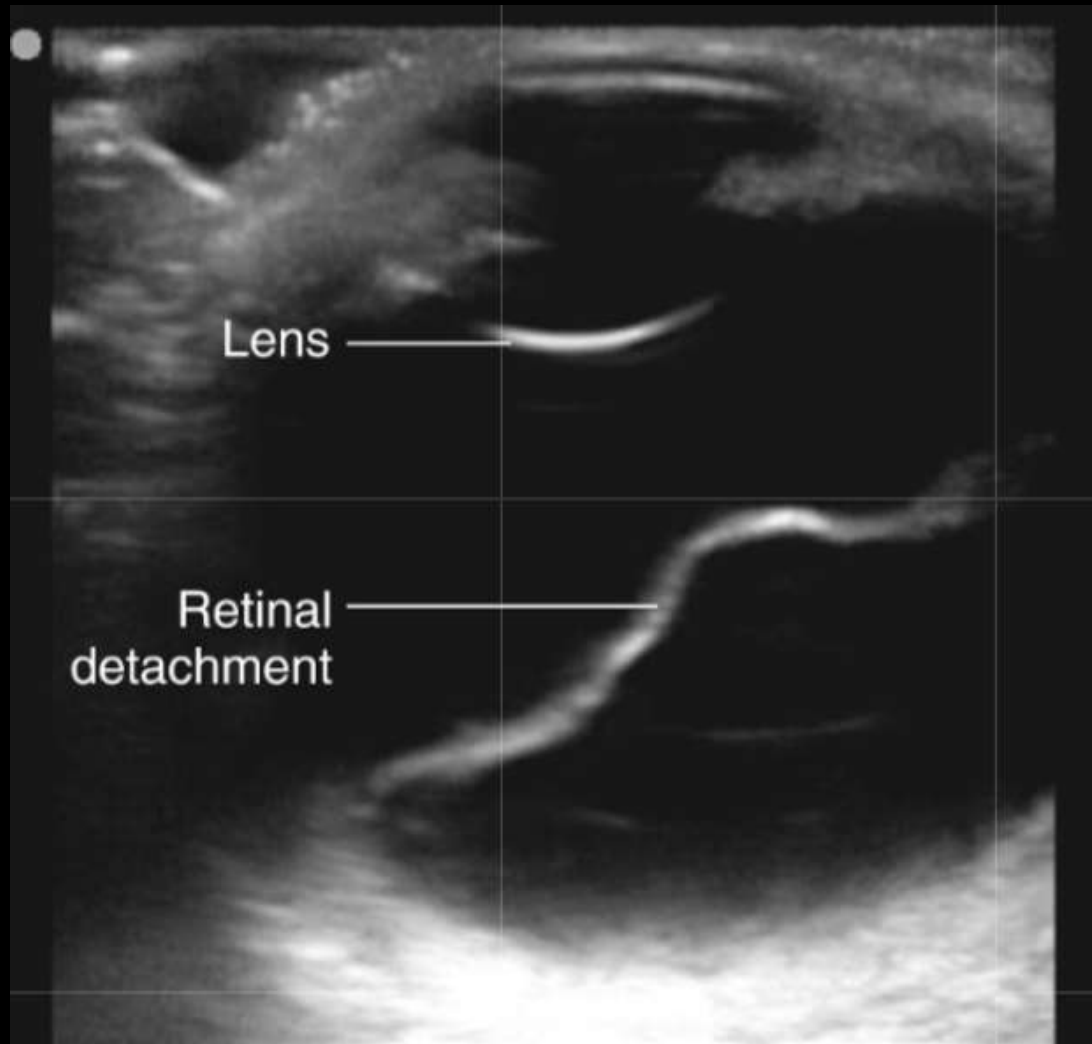


Vascular

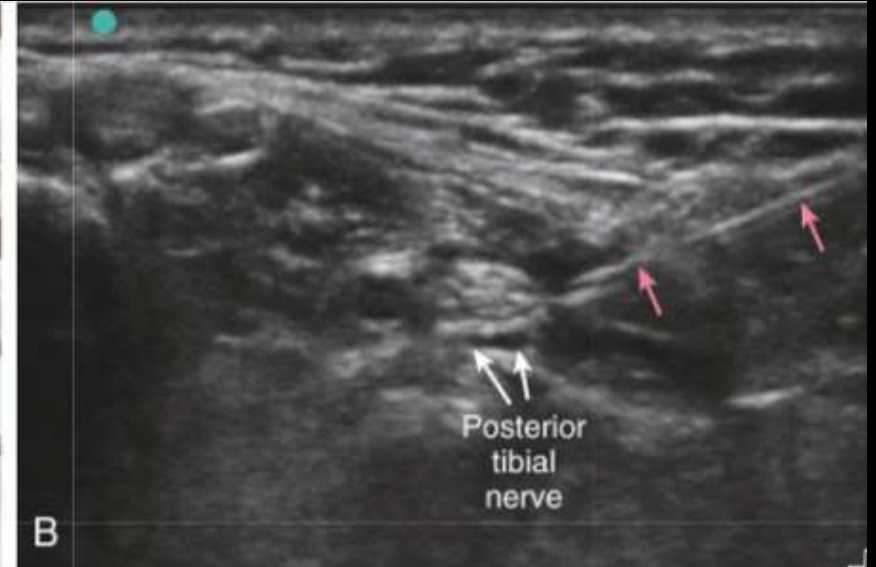
DVT ?



Head and Neck



US guided procedure/injections



Foreign body removal

Posterior tibial nerve block

US guided procedure/injections



How much does it cost?

- Monthly payment rent to own: several hundred \$
- Handhold: starting 2500\$ - 40K
- What kind of study are you doing?
- What kind of probe do you need?