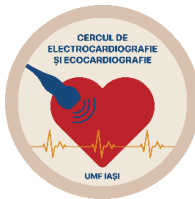




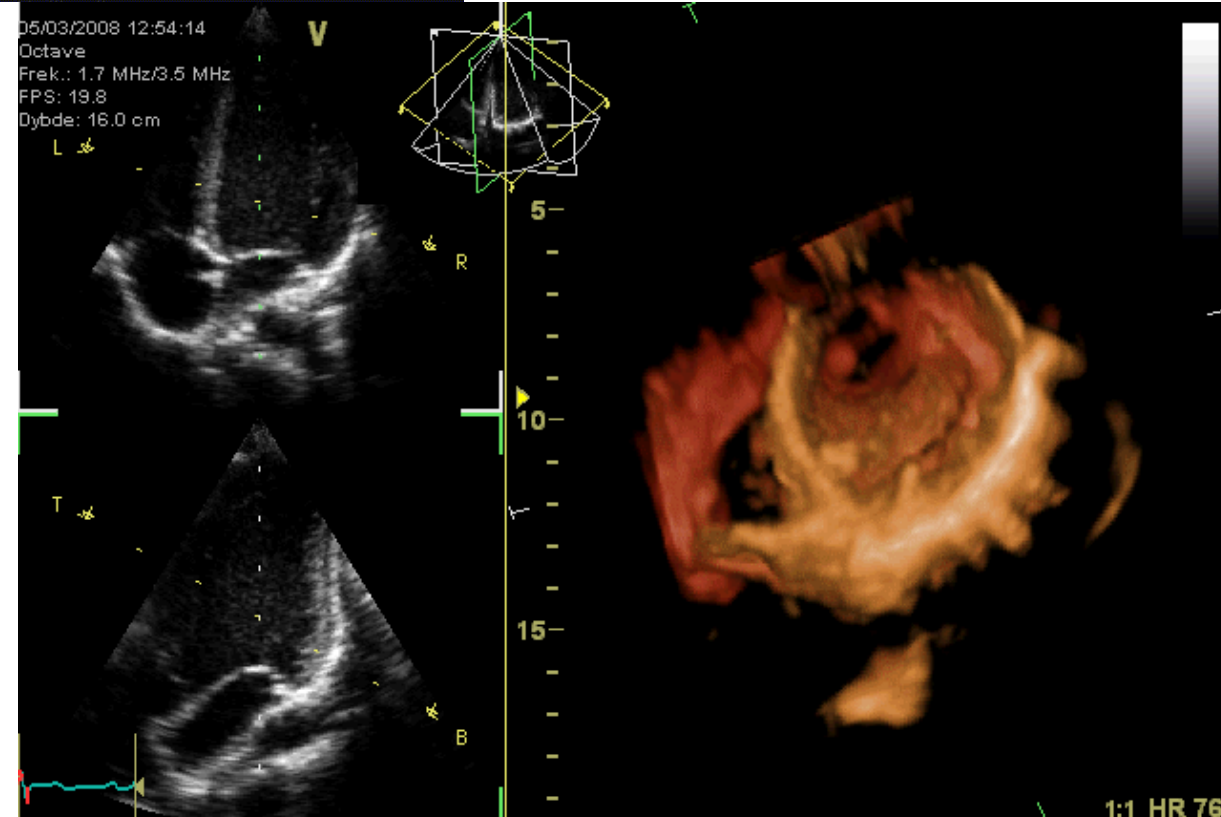
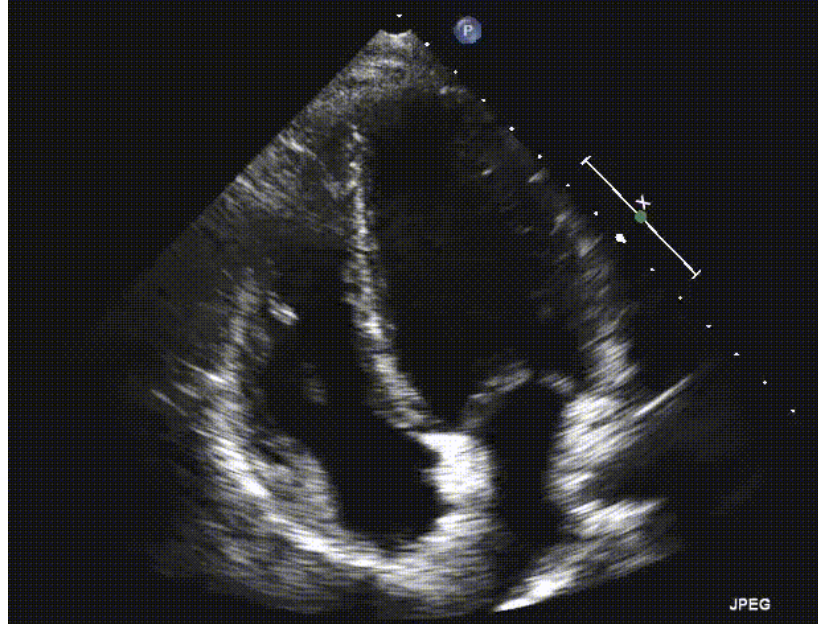
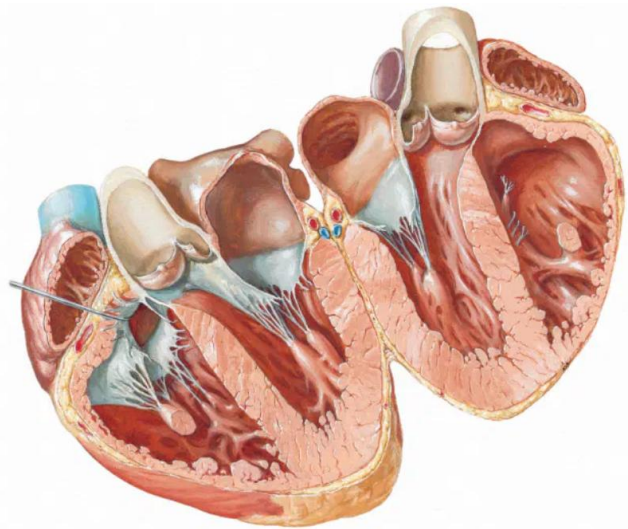
UNIVERSITATEA DE MEDICINĂ ȘI FARMACIE
GRIGORE T. POPA IAȘI



PRINCIPII DE BAZA IN ECOCARDIOGRAFIE. ÎNCIDENTE

***D. MARCU
M. FLORIA***

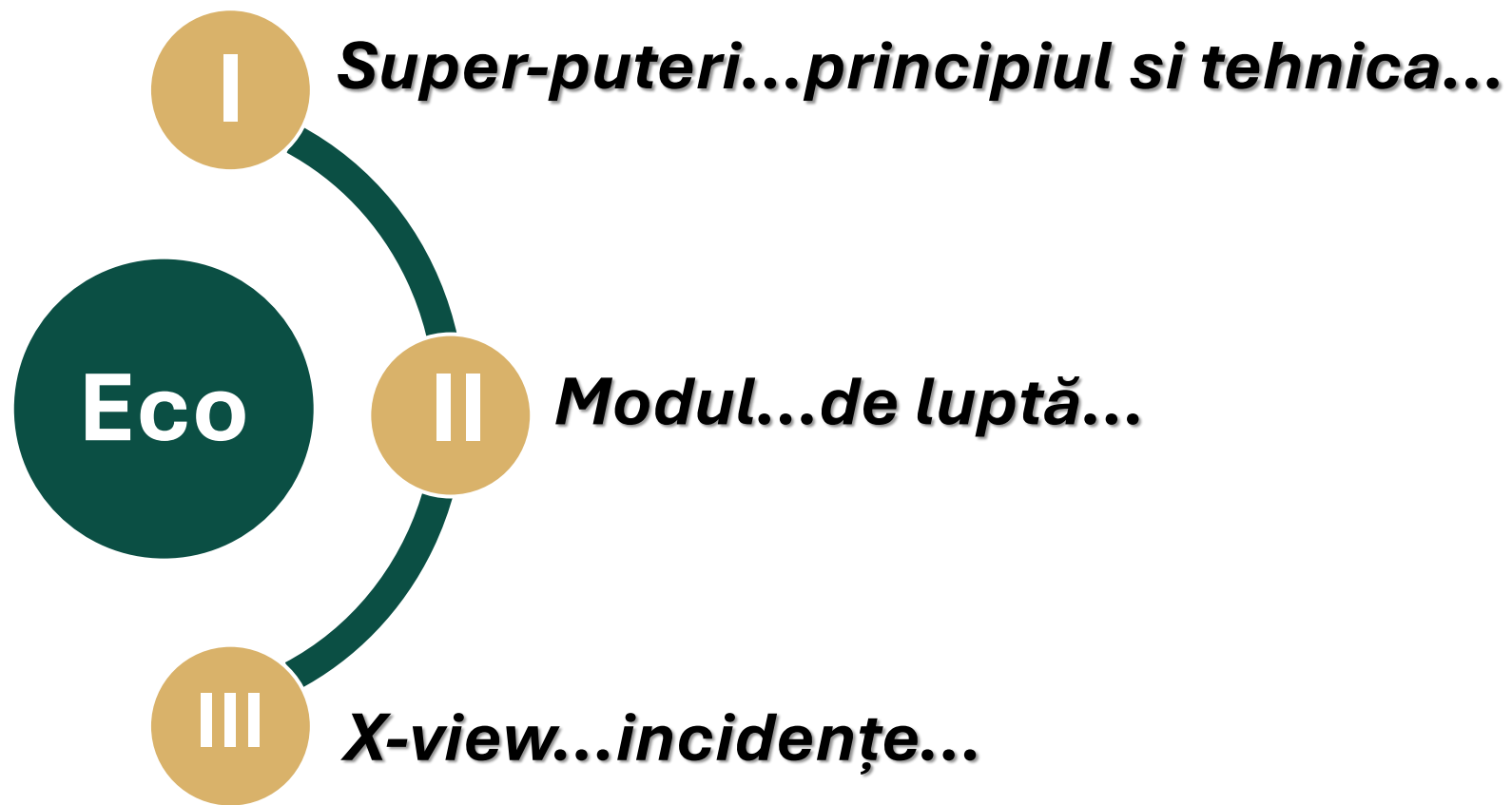






- Identificarea substratului unor *sufluri organice*
- Identificarea *cauzelor de insuficiență cardiacă*
- Identificarea *cauzelor de dispnee*
- Diagnosticul *endocarditei*
- Diagnosticul revărsatelor *pericardice/tamponadei*
- Depistarea surselor cardiace de *embolii și a maselor intracardiace*
- Monitorizarea *leziunilor cardiace cunoscute* și aprecierea evoluției în timp
- Examinarea funcționalității *protezelor valvulare*
- Evaluarea și monitorizarea *bolilor cardiace congenitale*
- Ghidarea unor *manevre invazive*
- Efectuarea *testelor de stres* (dobutamină, efort)

FILMUL SERII...



- Ultrasunetele sunt unde sonore cu o frecvență mai mare decât cea audibilă. Gama de frecvențe audibile este cuprinsă între 20 Hz și 20 kHz.
- Aplicațiile de imagistică cardiacă utilizează o gamă de frecvențe cu ultrasunete de 1-45 MHz.

Currently used frequency range for cardiac imaging applications (including paediatric)

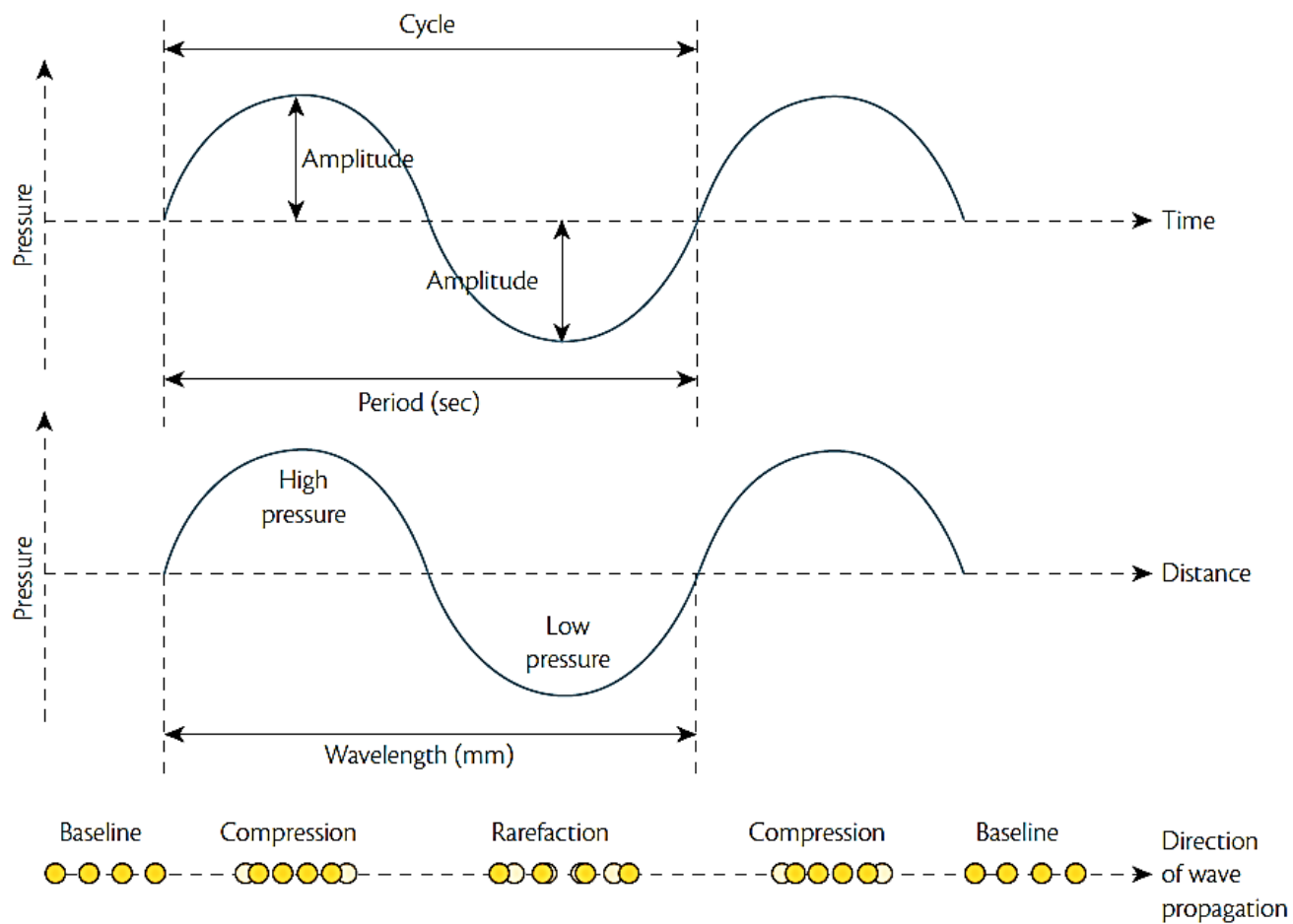
Transthoracic	1–8 MHz
Transoesophageal	3–10 MHz
Intracardiac	3–10 MHz
Epicardial	4–12 MHz
Intracoronary	10–20 MHz

Cu cât **frecvența** este mai mare, cu atât **rezoluția** este mai mare, dar **penetranta** este mai mică.

Cu cât **frecvența** este mai mică, cu atât **rezoluția** este mai mică, dar **penetranta** este mai mare.

Characteristic of an ultrasound wave

Number of cycles per second = frequency

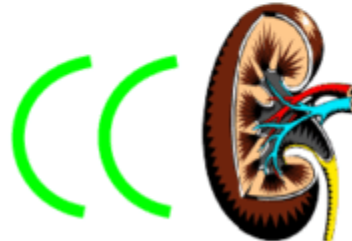


Piezoelectric Effect on Ultrasound

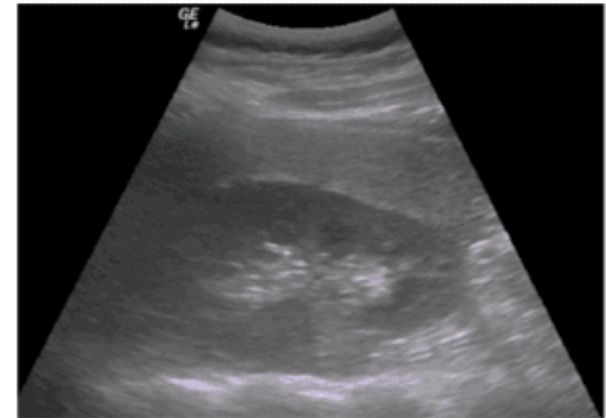
1 Piezoelectric Crystal
Emits Ultrasound Waves



2 Ultrasound Wave
Returns from Organ



3 Creation of Ultrasound
Image on Screen





Sondele sunt *atât generatoare, cât și receptoare* de ultrasunete utilizate pentru a crea imagini ecocardiografice, pe baza *efectului piezoelectric* (conversia electricității în ultrasunete și invers, conversia ultrasunetelor în electricitate).

- Pentru **adulți** se recomandă utilizarea sondelor cu frecvențe de minim **2-2,5 MHz** iar la copii și persoane slabe între 3 și 5 MHz.
- În ETT, transductorii cu **frecvență mai mare** pot fi utilizați pentru imagini ale structurilor superficiale (aproprate de peretele toracic).
- Pentru imaginile transtoracice 2D, în majoritatea cazurilor, este necesar un număr de cadre („frame rate,„) ridicat (**≥ 25 cadre/secundă; 40 ms/cadru**).

Bidimensional

Gain

M-mode

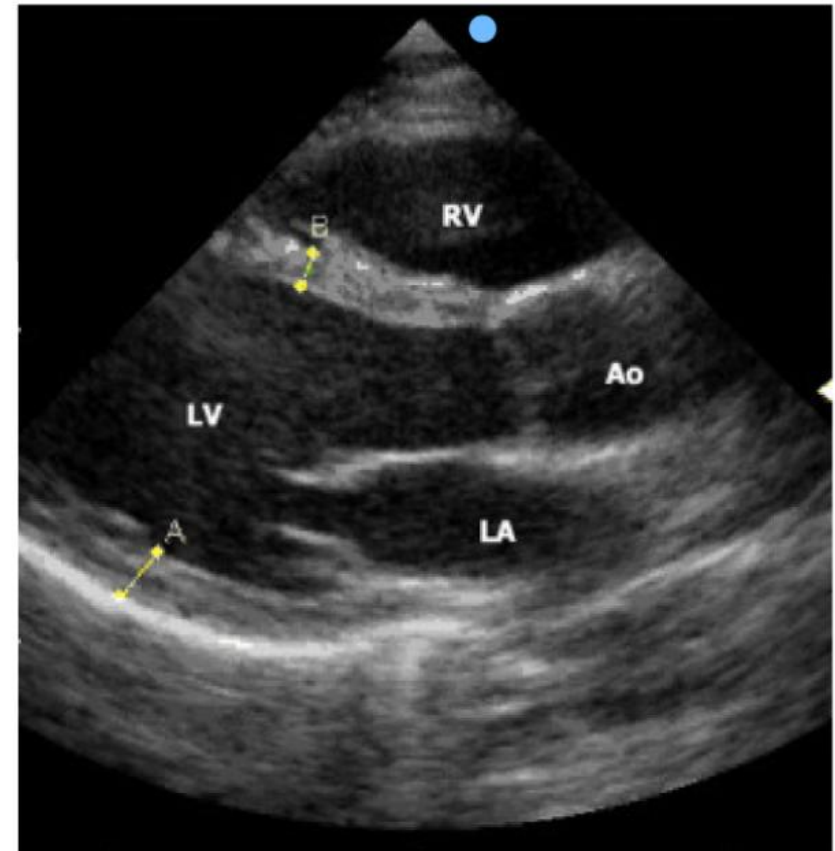
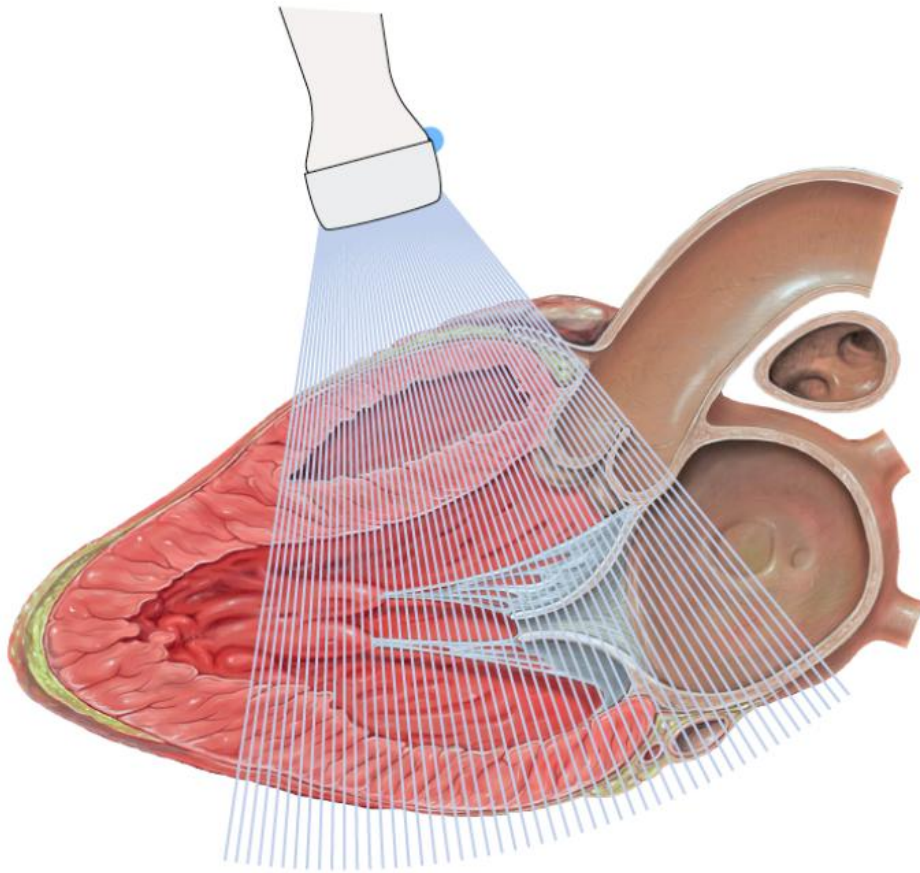
Time gain
compensation

Depth

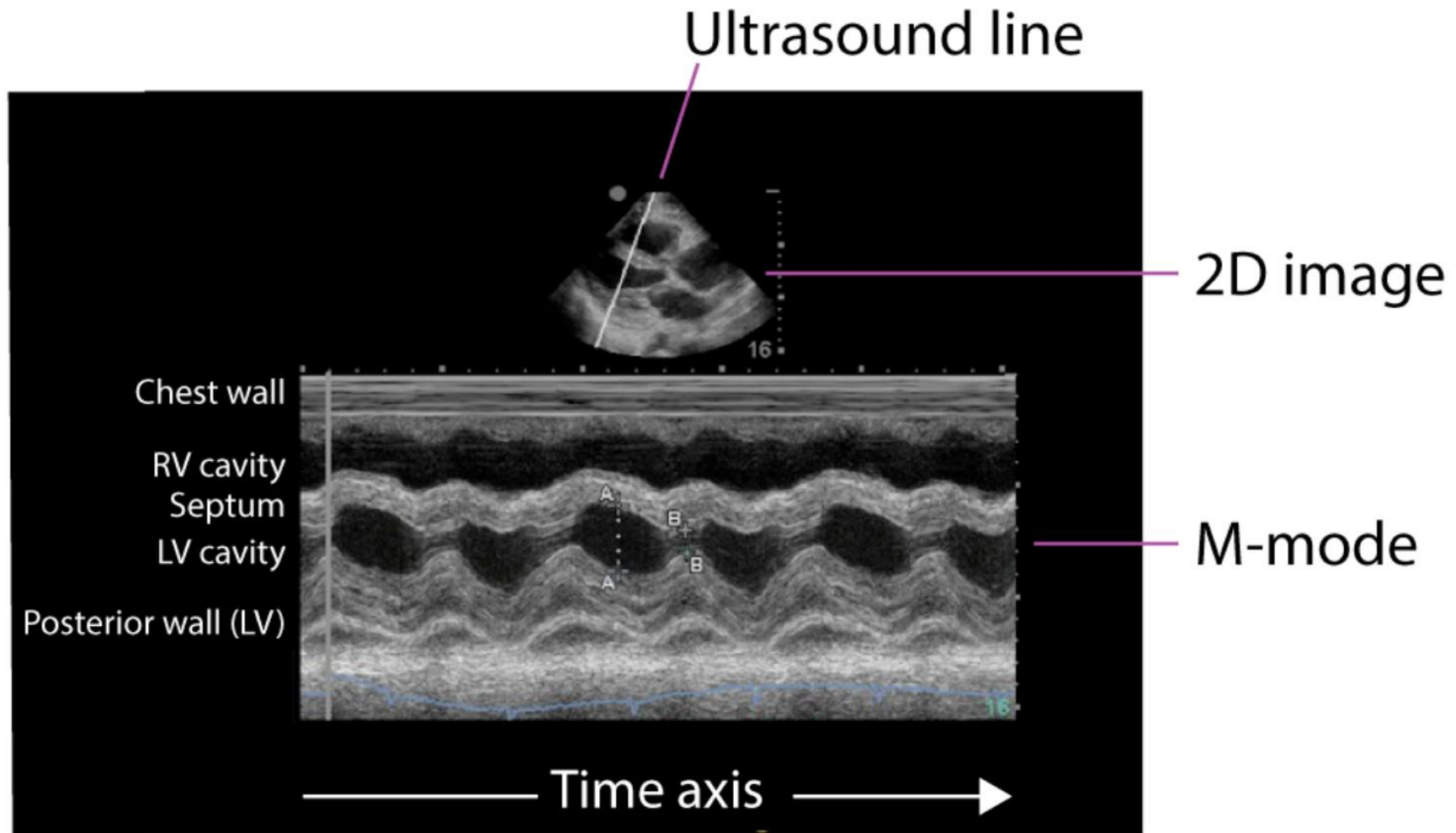
Doppler



2D (two-dimensional) ultrasound



M-mode (Motion mode)





$$\Delta f = (2 * f * v * \cos(\theta)) / c$$

$$\Delta f = (2 * f * v * \cos(\theta)) / c$$

Where:

- Δf is the change in frequency (Doppler shift).
- f is the transmitted or operating frequency.
- v is the velocity of the moving target or blood flow.
- θ is the angle between the ultrasound beam and the direction of blood flow.
- c is the speed of the wave in the medium (e.g., speed of sound in soft tissue).

Doppler effect



Stationary sound source



Moving towards the observer



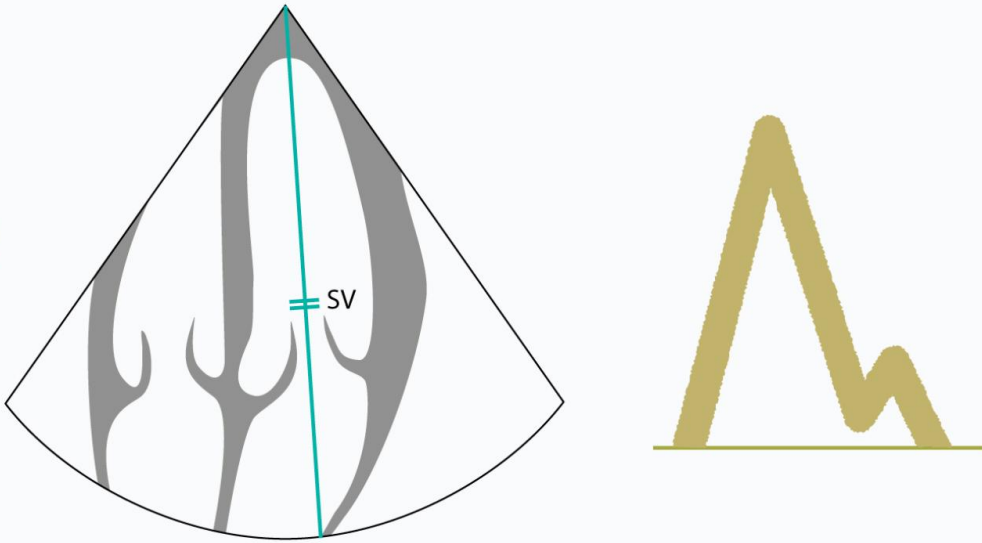
Moving away from the observer



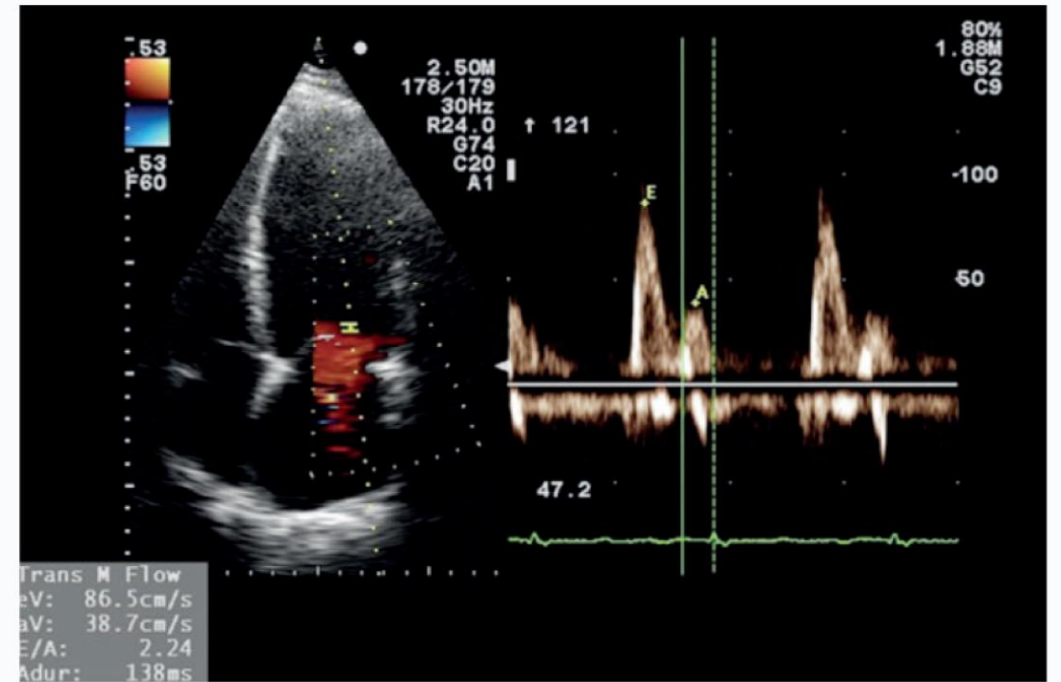
MODURI DE EXAMINARE

Pulsed wave Doppler

A

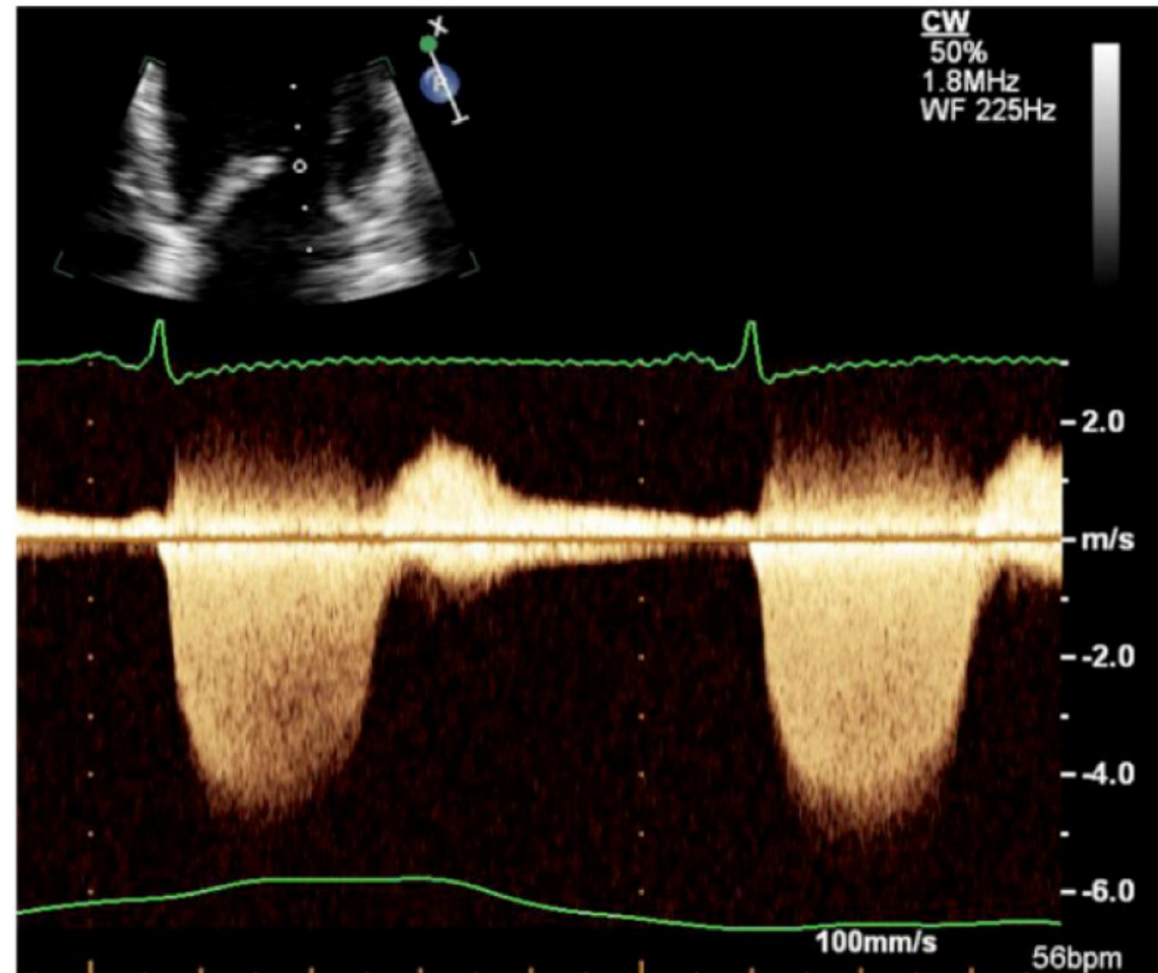


B

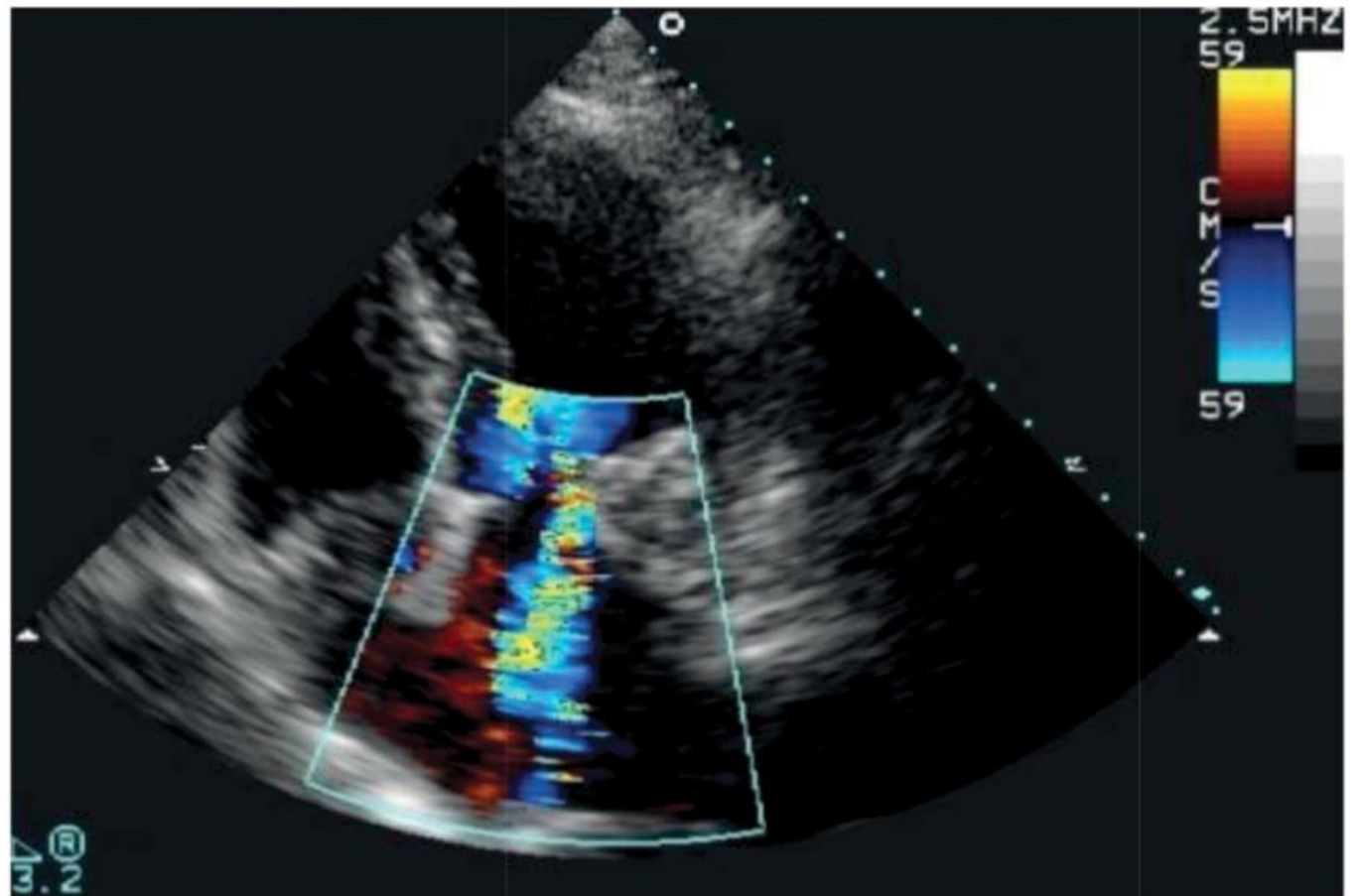
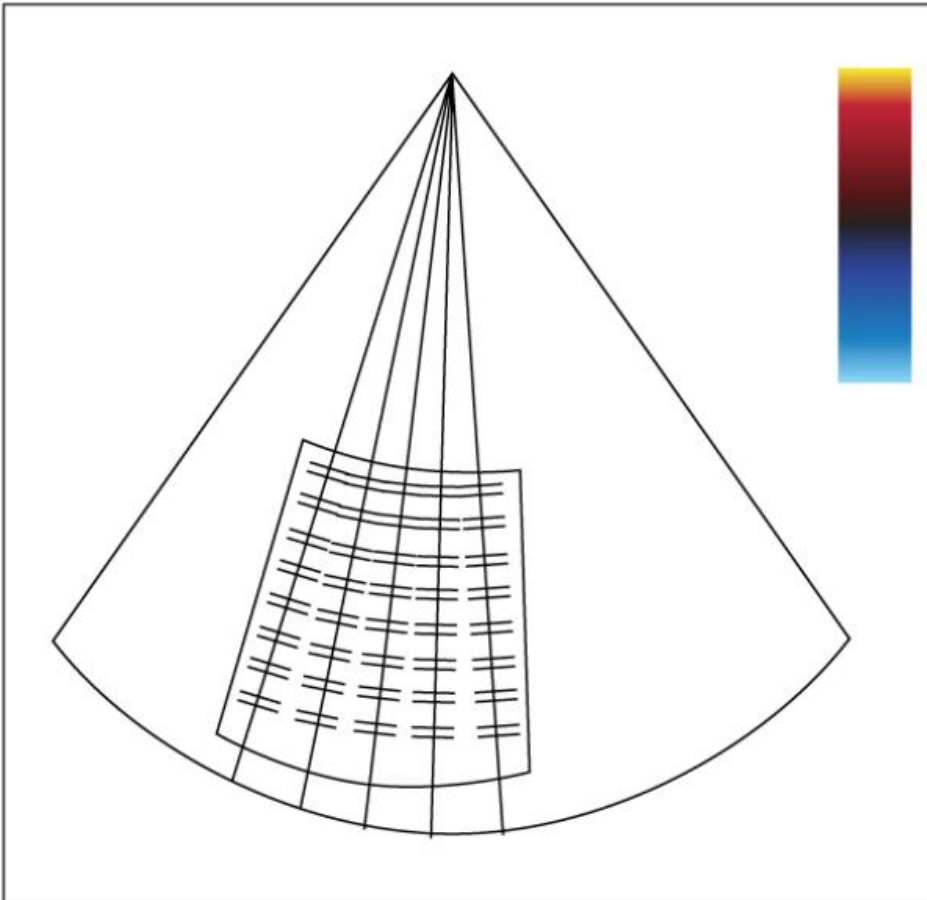


MODURI DE EXAMINARE

Continuous wave Doppler



Color Doppler



INCIDENTE





Parasternal
stâng



Apical



Subcostal



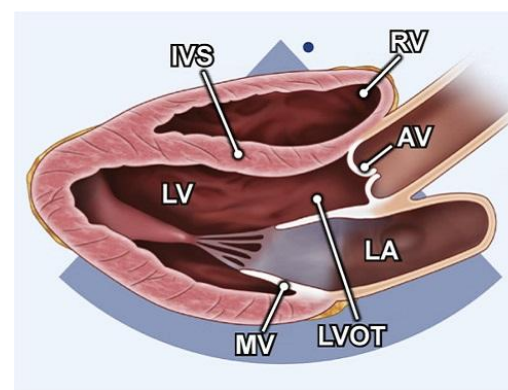
Suprasternal



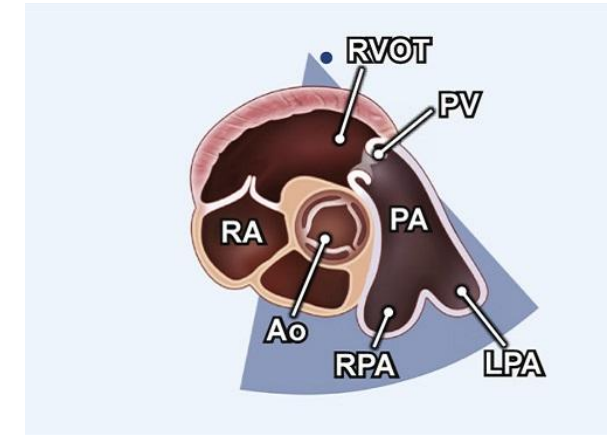
Parasternal
drept



FEREASTRA PARASTERNAL STANG



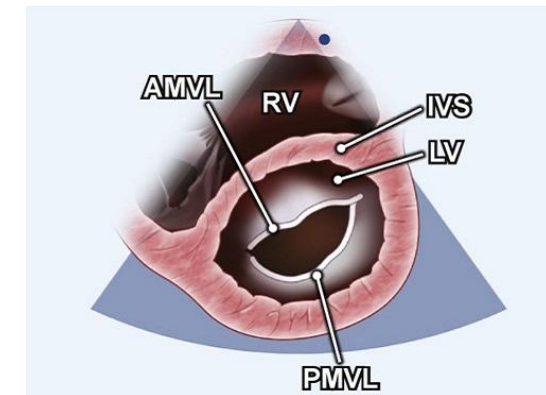
Parasternal ax
lung



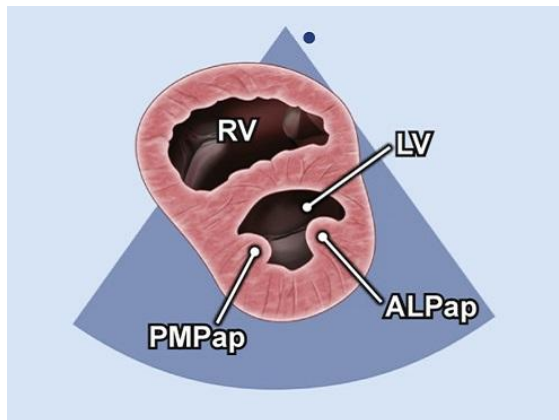
Parasternal ax
scurt la nivelul
marilor vase



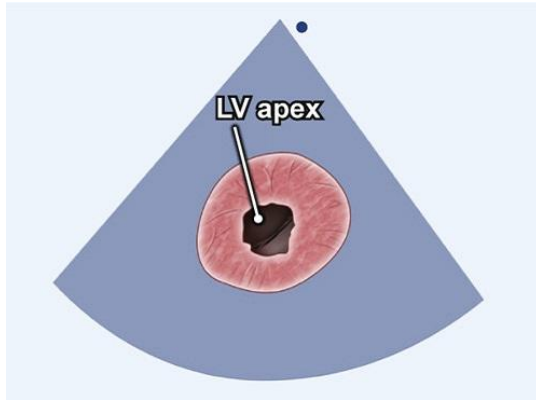
Parasternal ax
scurt la nivelul
valvei mitrale



Parasternal ax
scurt la nivelul
mușchilor papilari



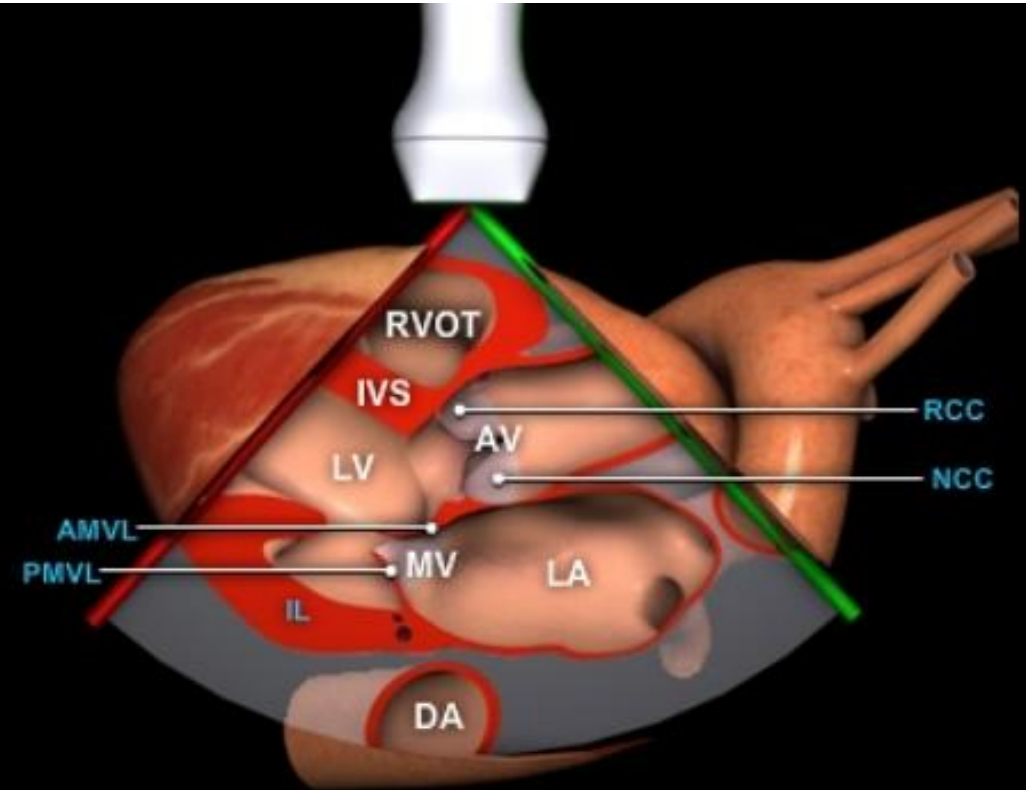
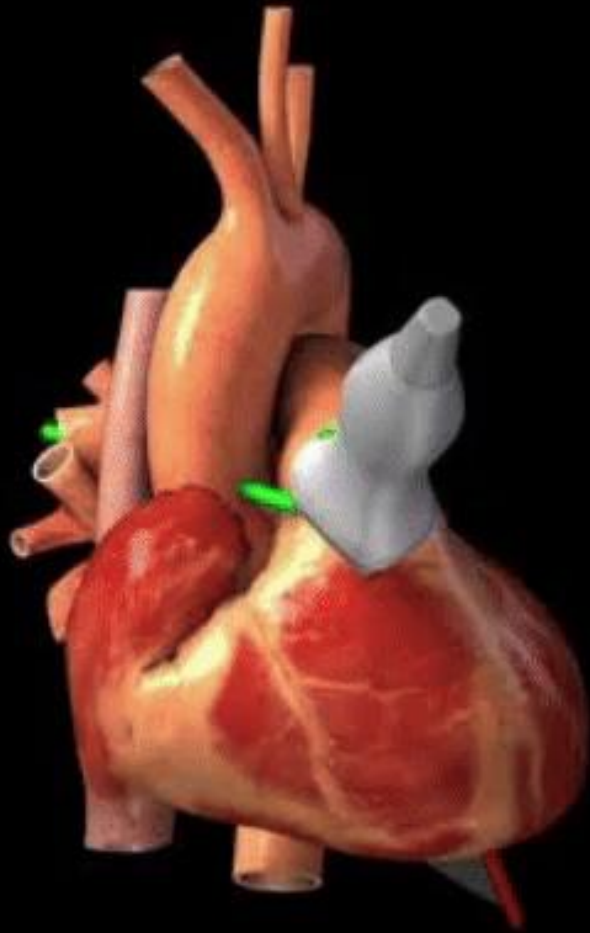
Parasternal ax
scurt la nivelul
apexului



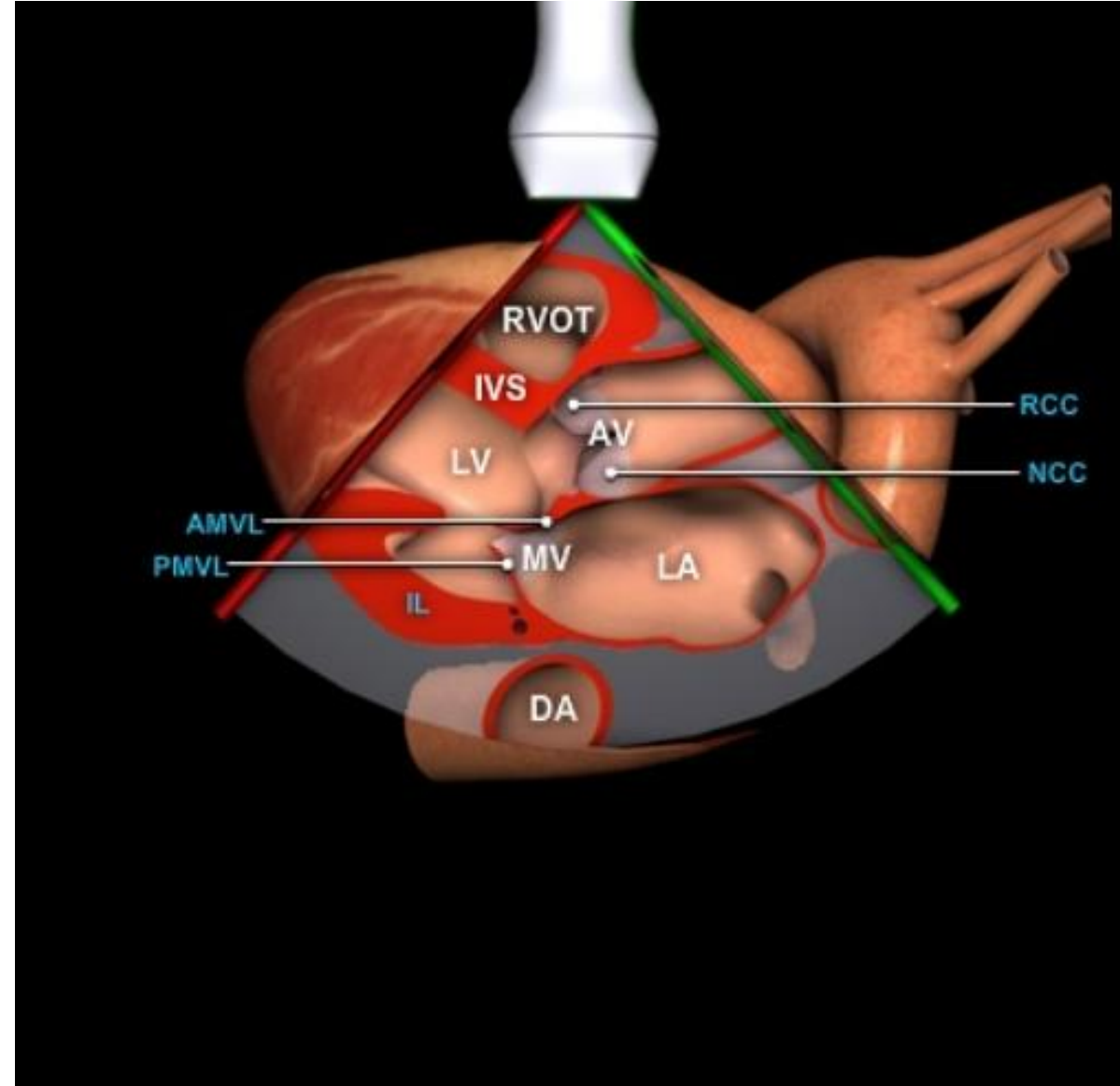
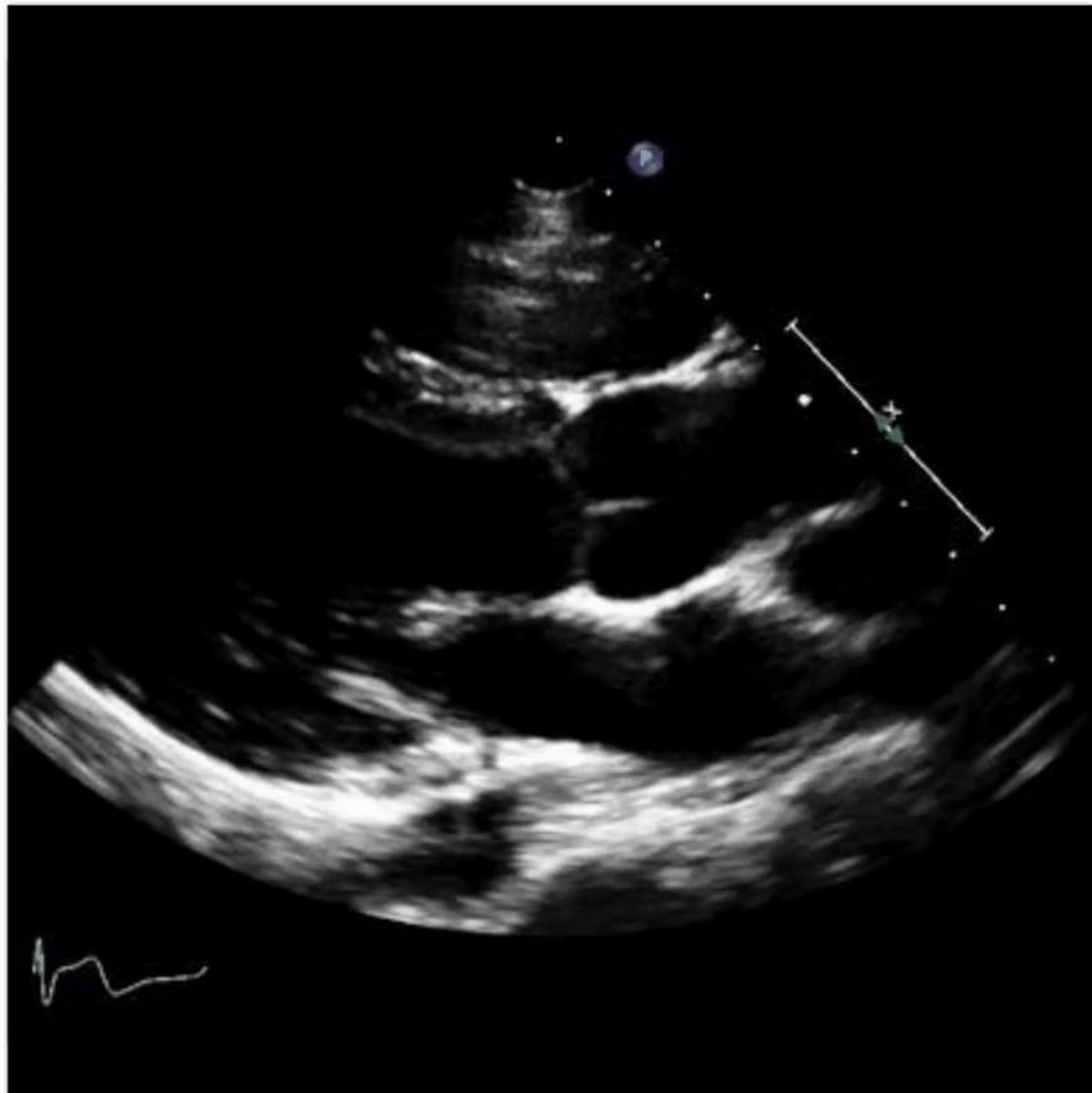
PARASTERNAL AX LUNG



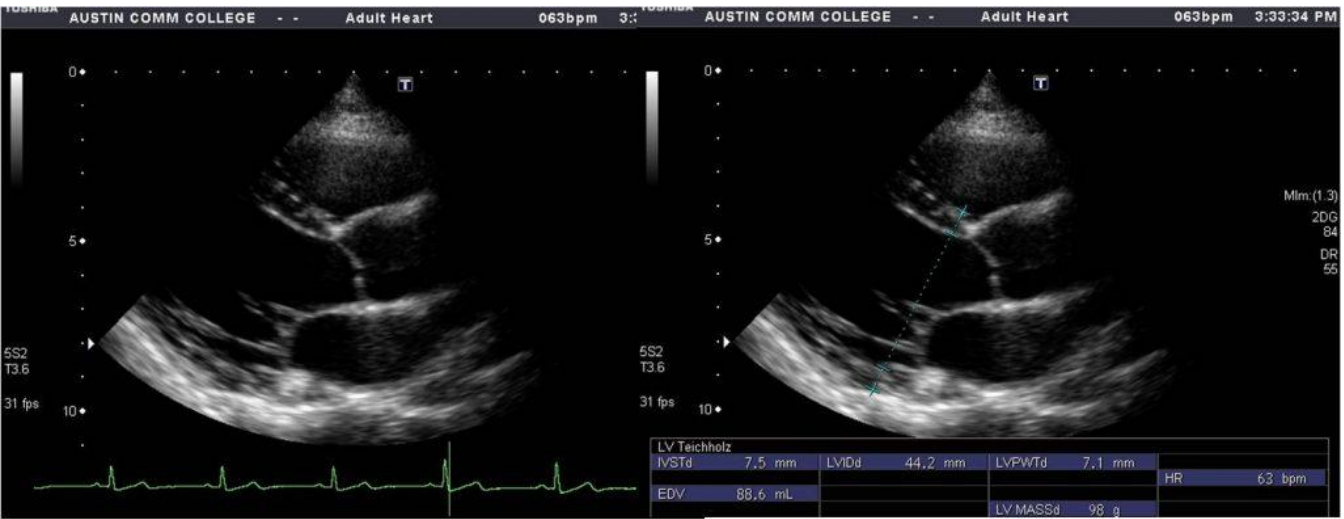
PARASTERNAL AX LUNG



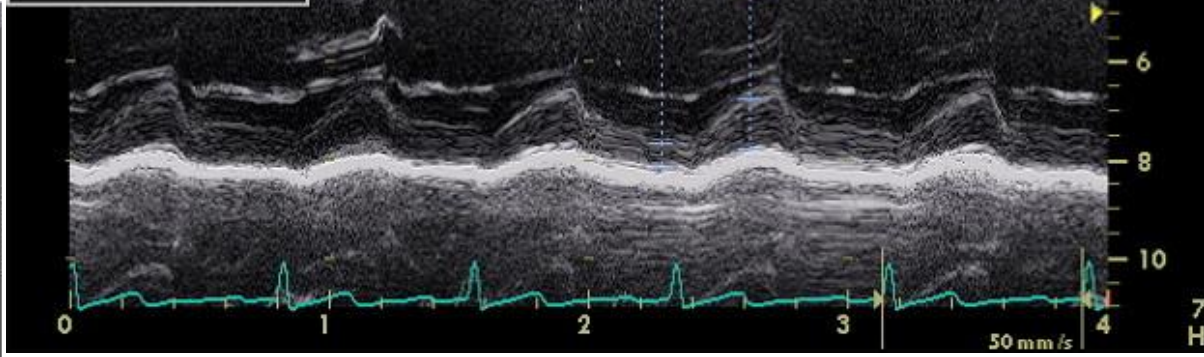
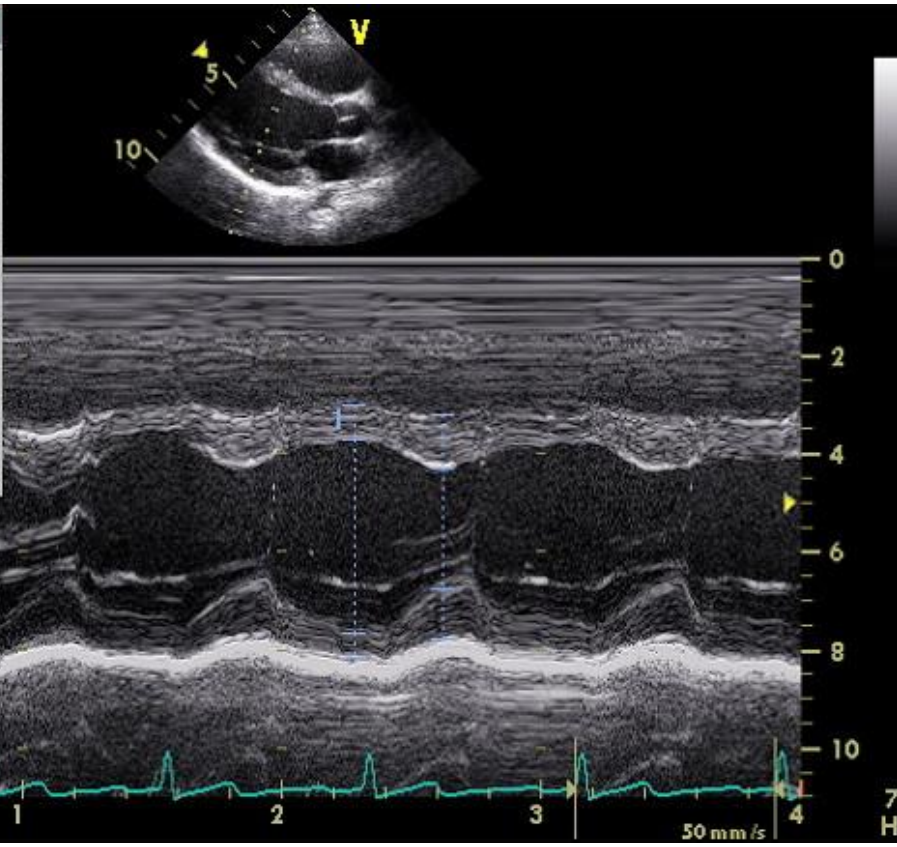
PARASTERNAL AX LUNG



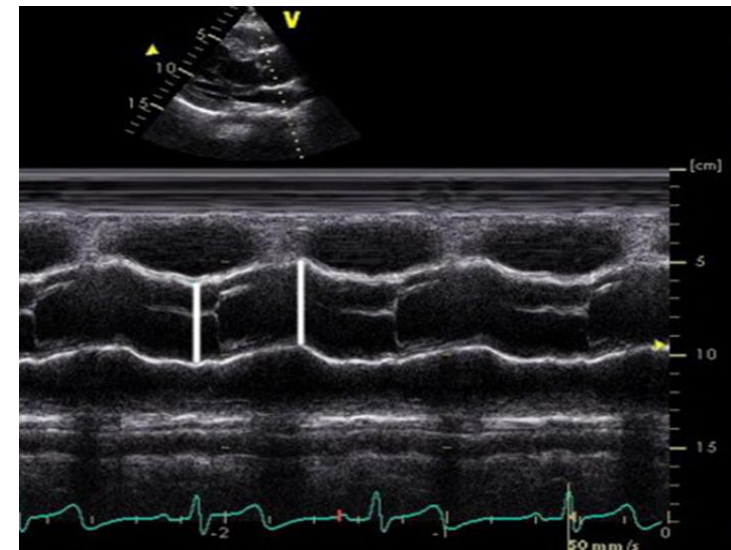
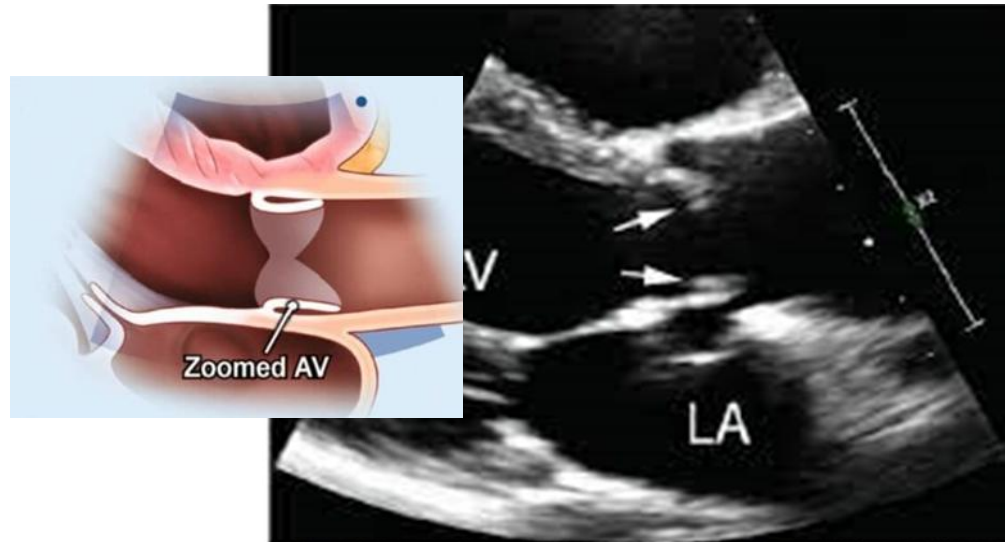
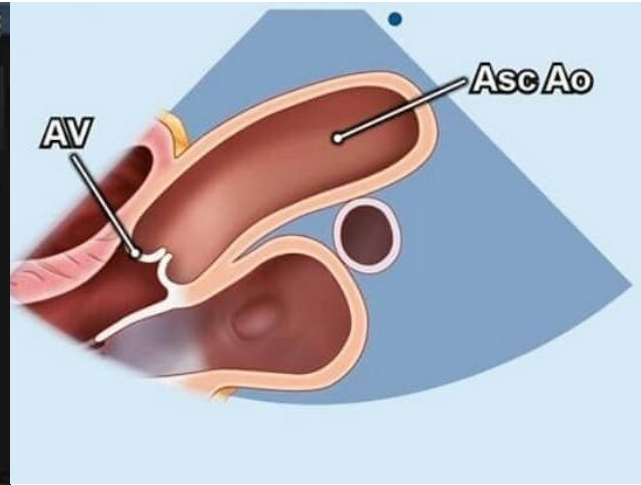
PARASTERNAL AX LUNG



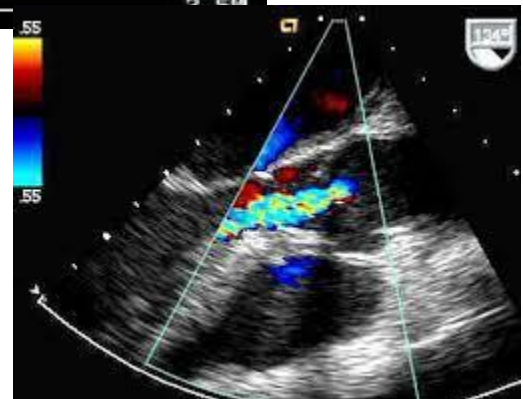
1	IVSd	0.70 cm
	IVSs	1.09 cm
	LVIDd	3.94 cm
	LVIDs	2.46 cm
	LVPWd	0.51 cm
	LVPWs	1.01 cm
	EDV(Teich)	67.5 ml
	ESV(Teich)	21.4 ml
	EF(Teich)	68.3 %
	SV(Teich)	46.1 ml
	%FS	37.6 %



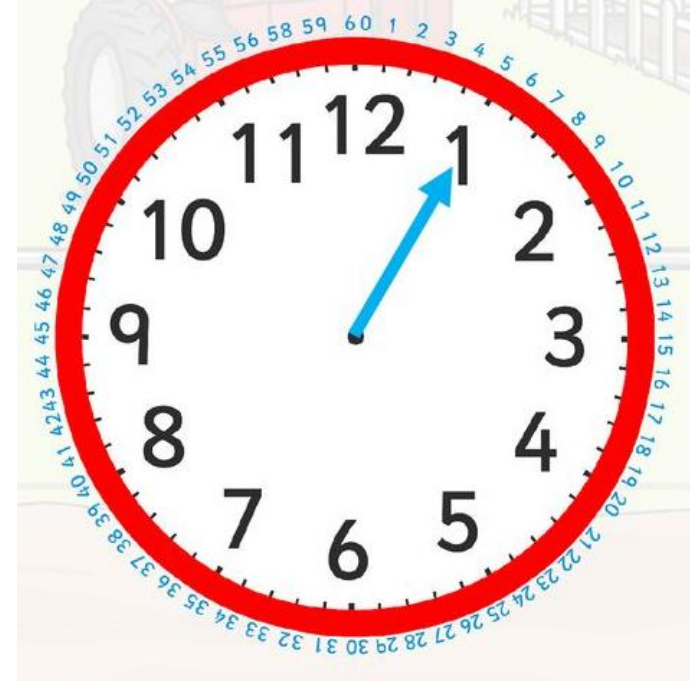
PARASTERNAL AX LUNG



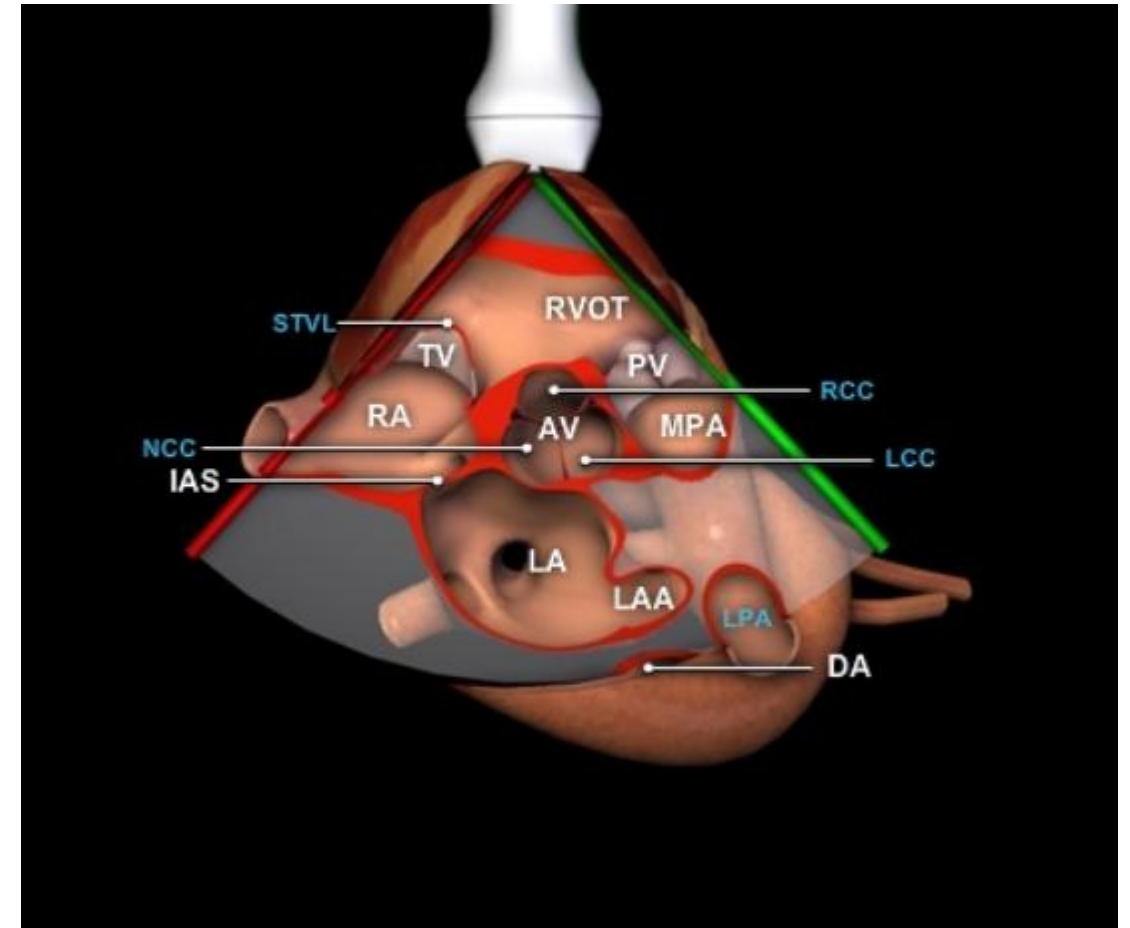
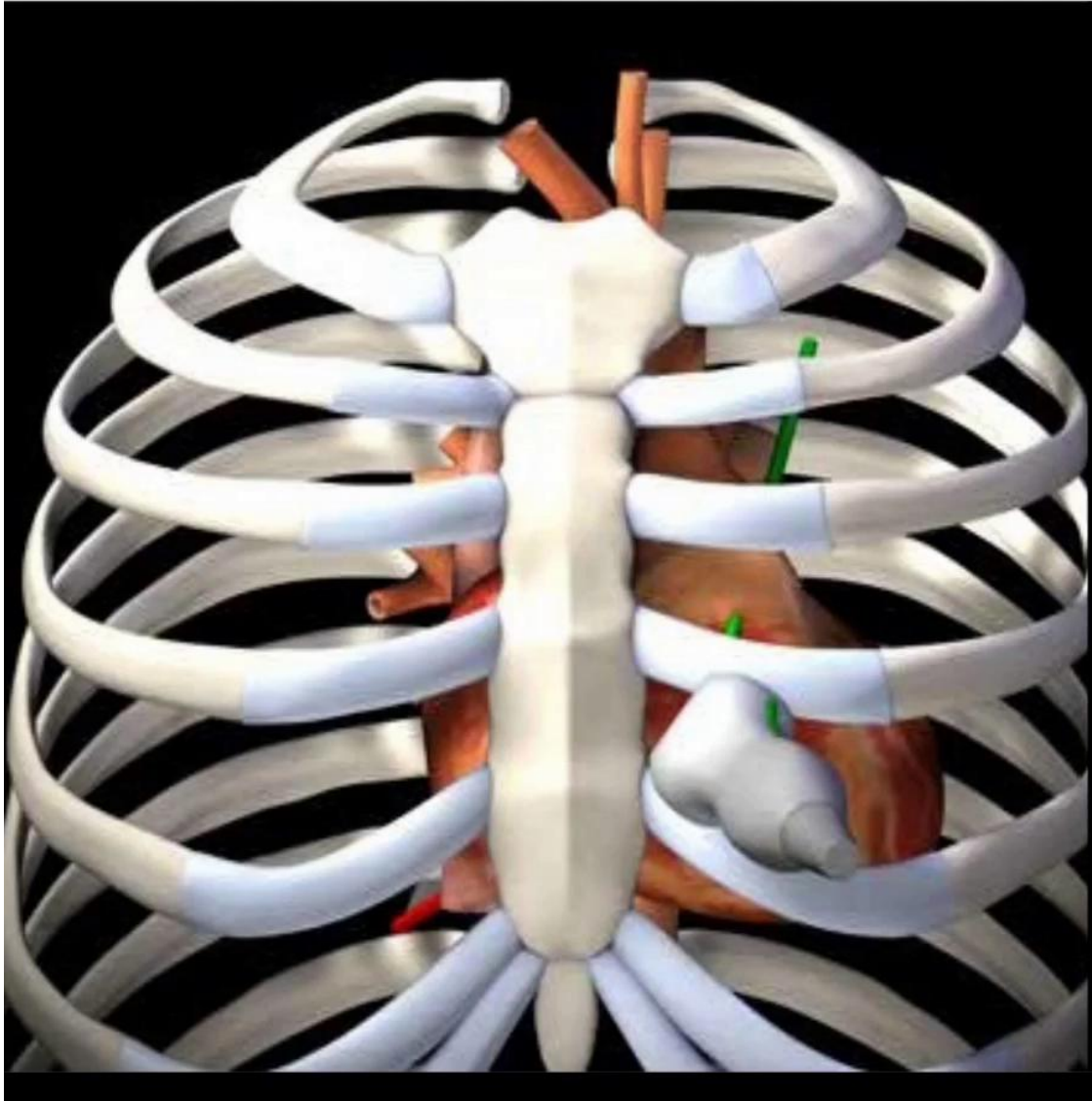
PARASTERNAL AX LUNG



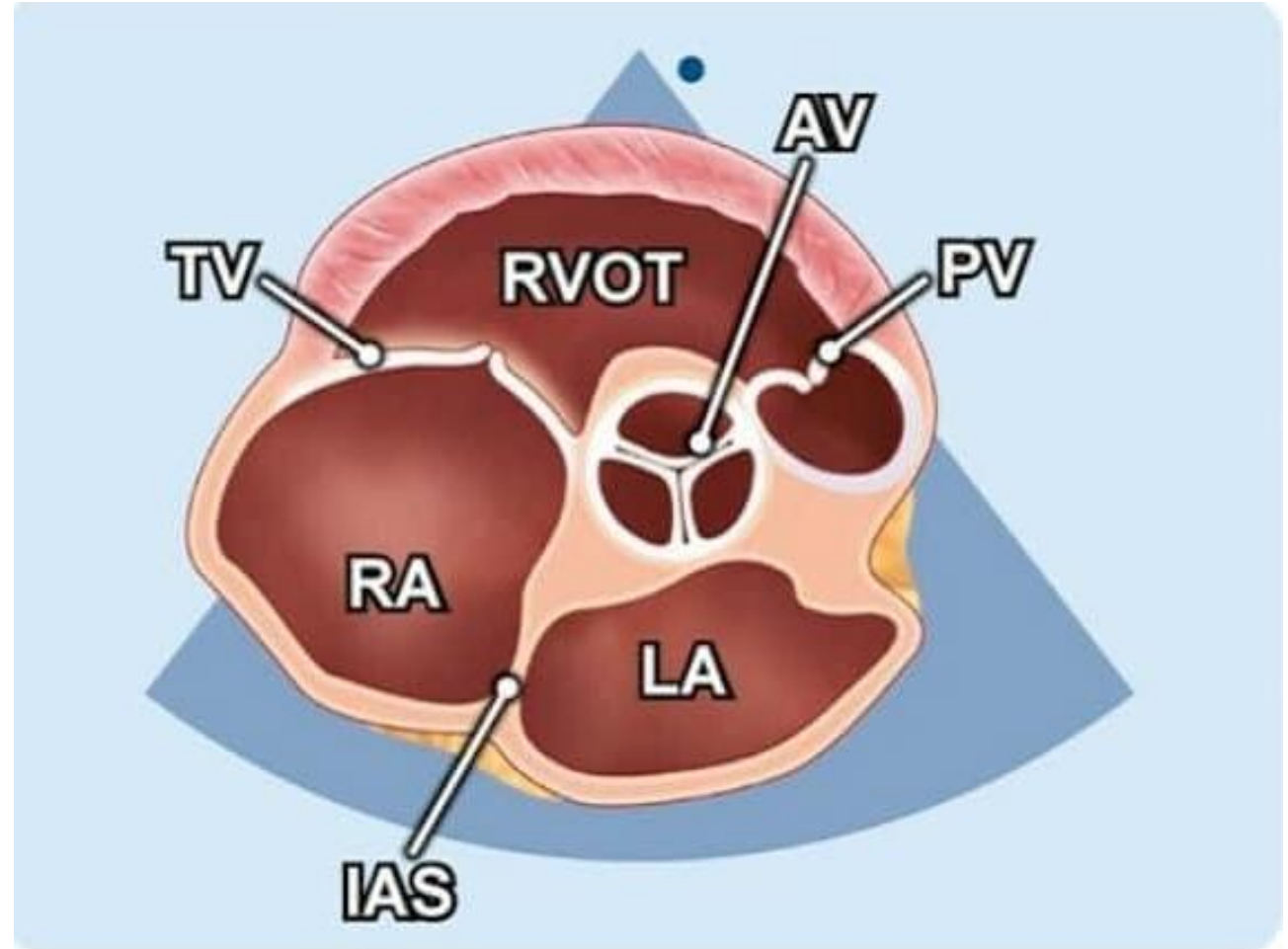
PARASTERNAL AX SCURT



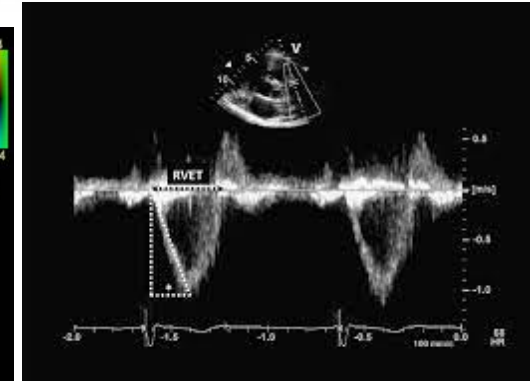
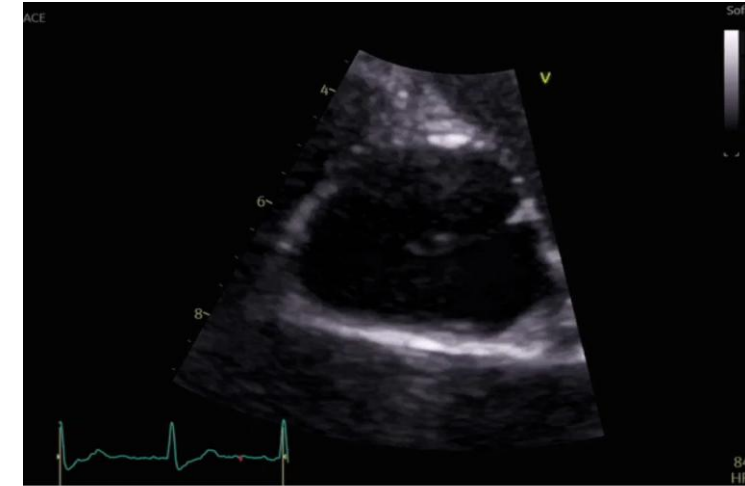
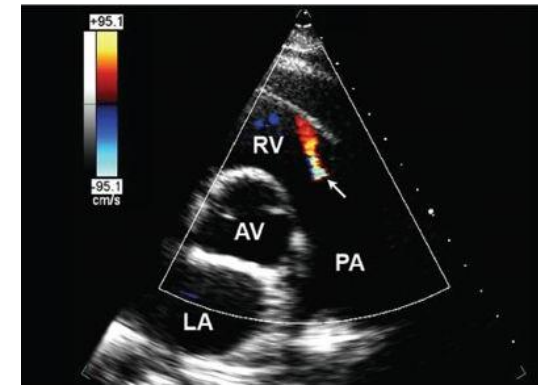
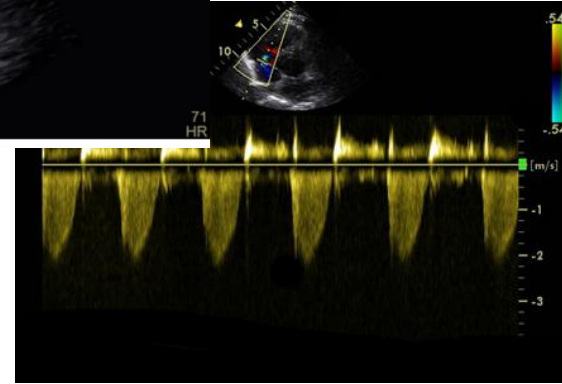
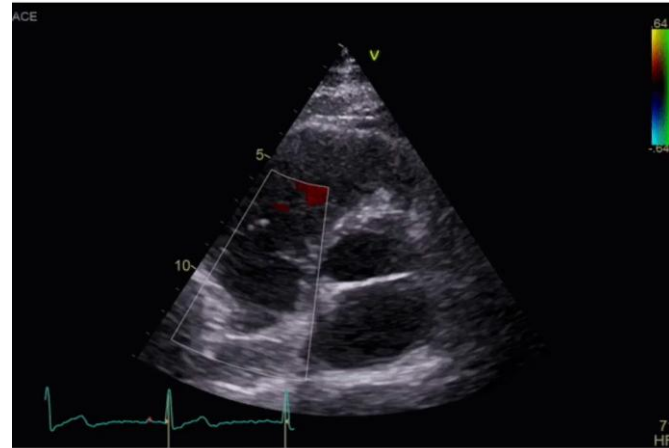
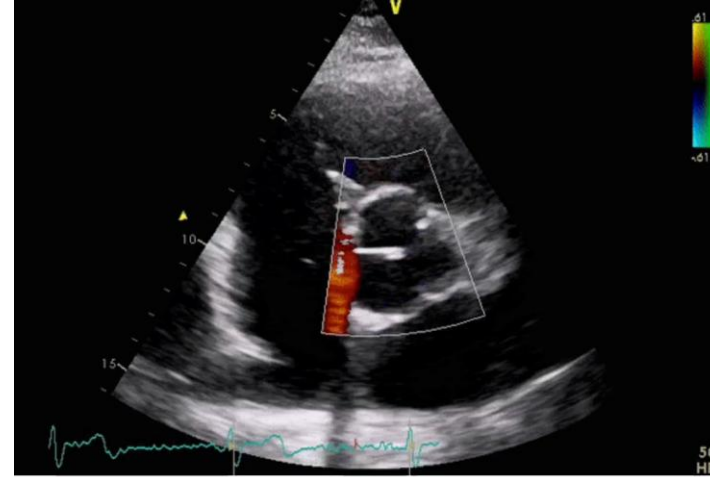
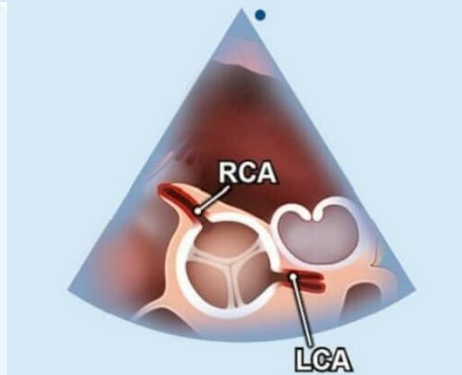
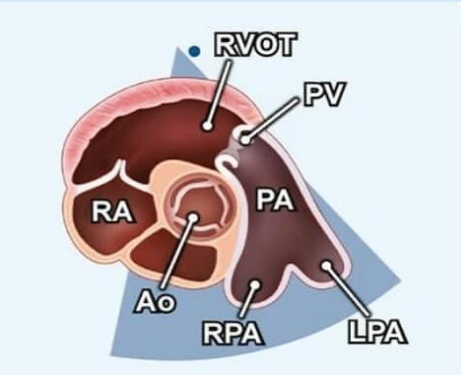
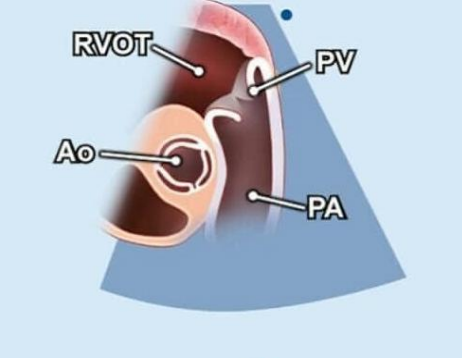
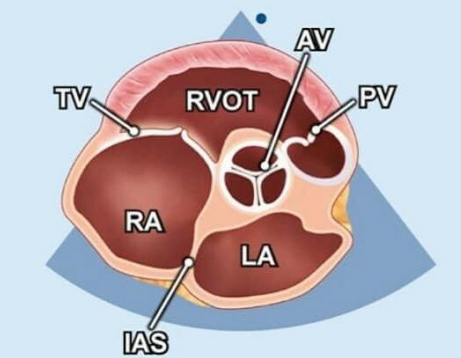
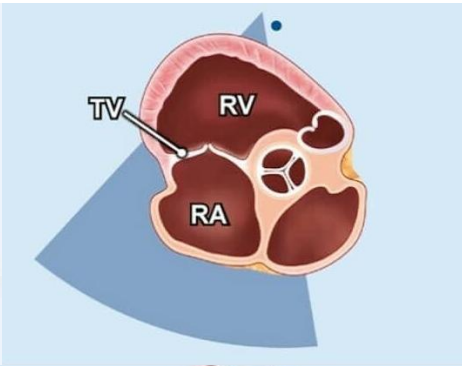
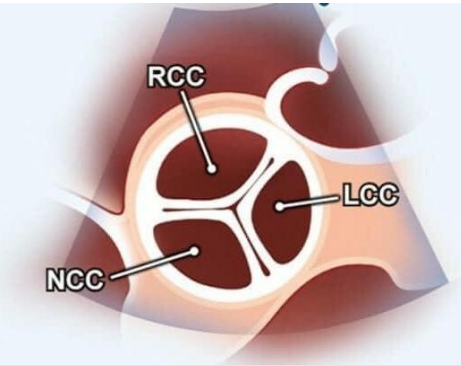
PARASTERNAL AX SCURT - MARI VASE



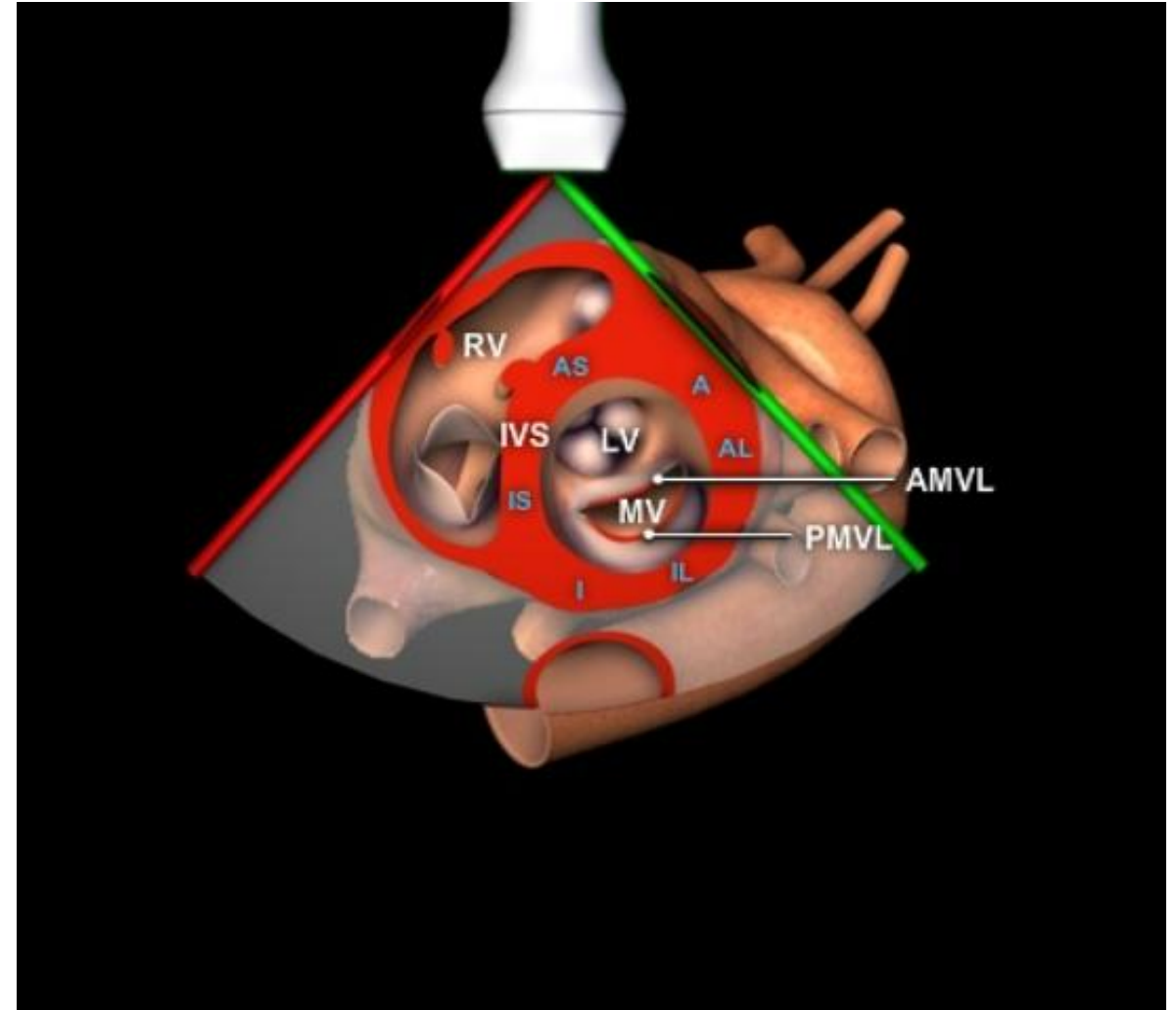
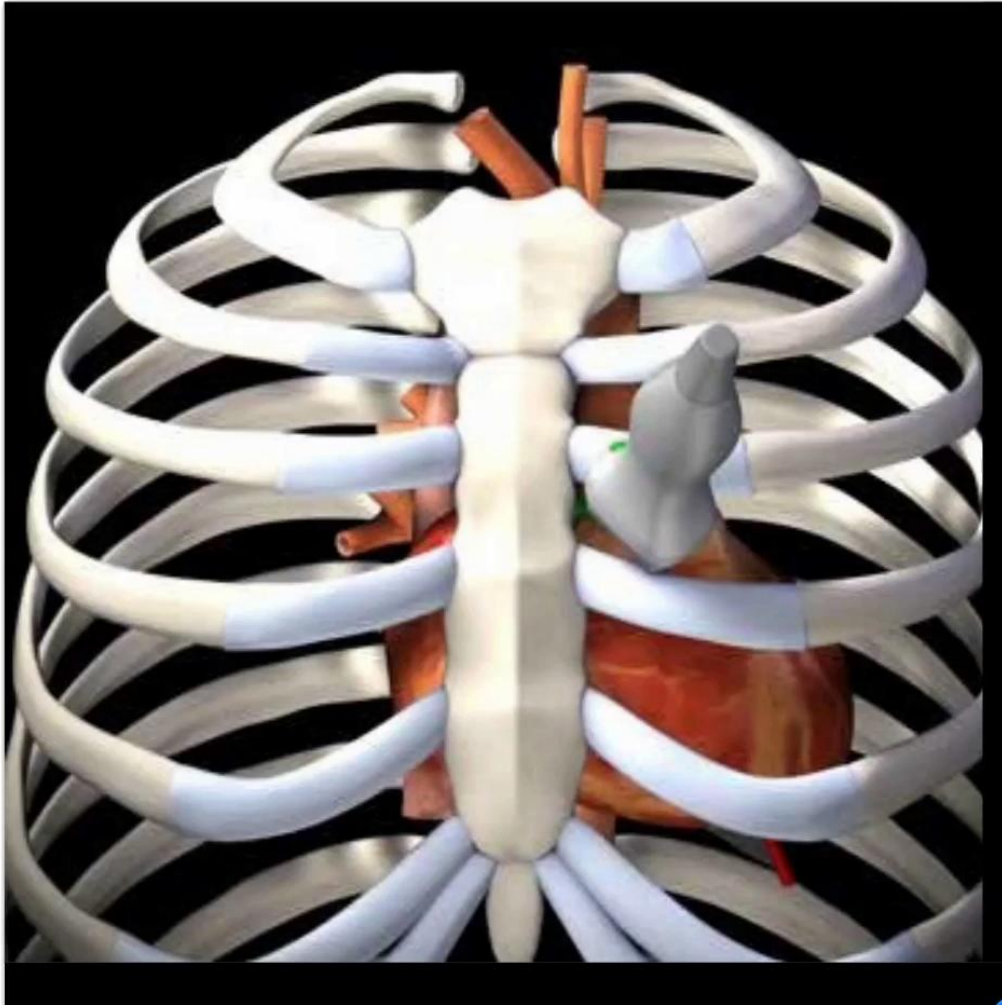
PARASTERNAL AX SCURT - MARI VASE



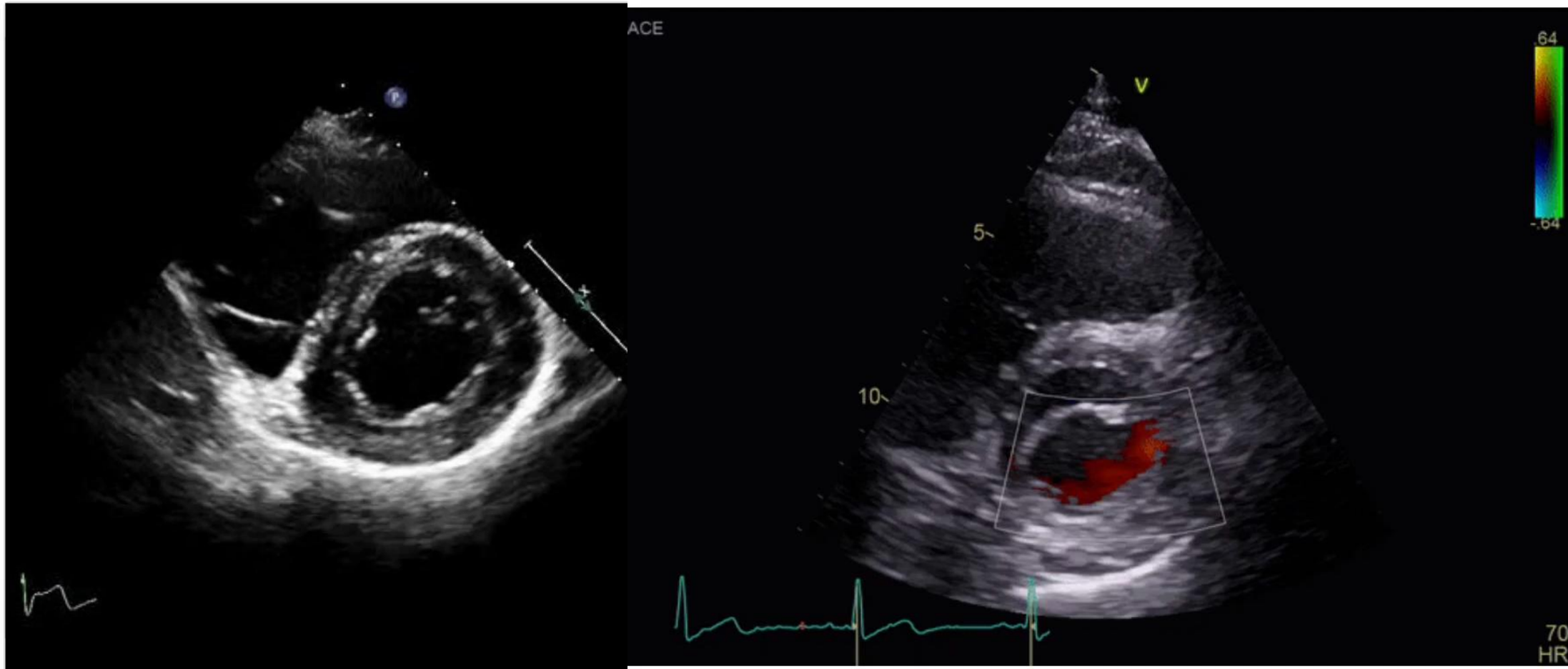
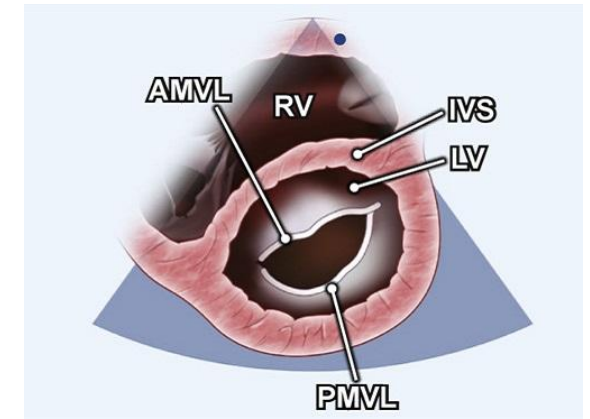
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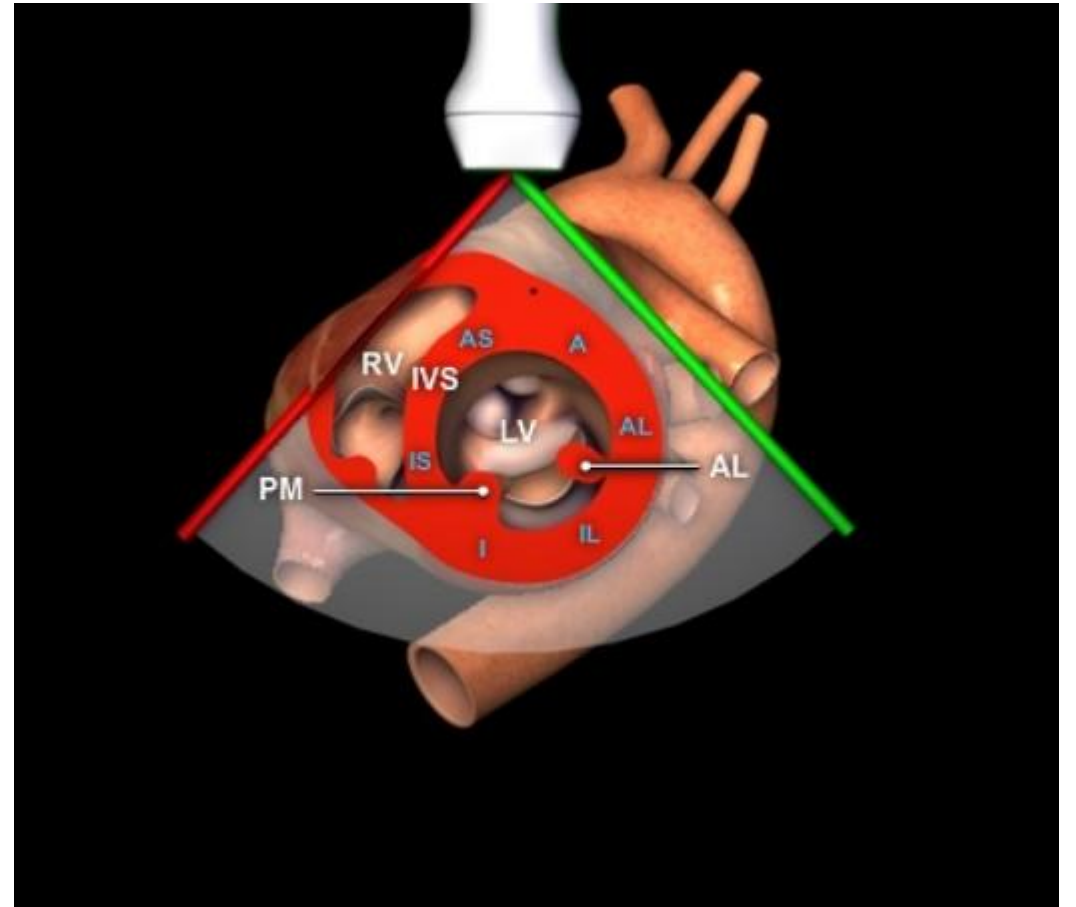
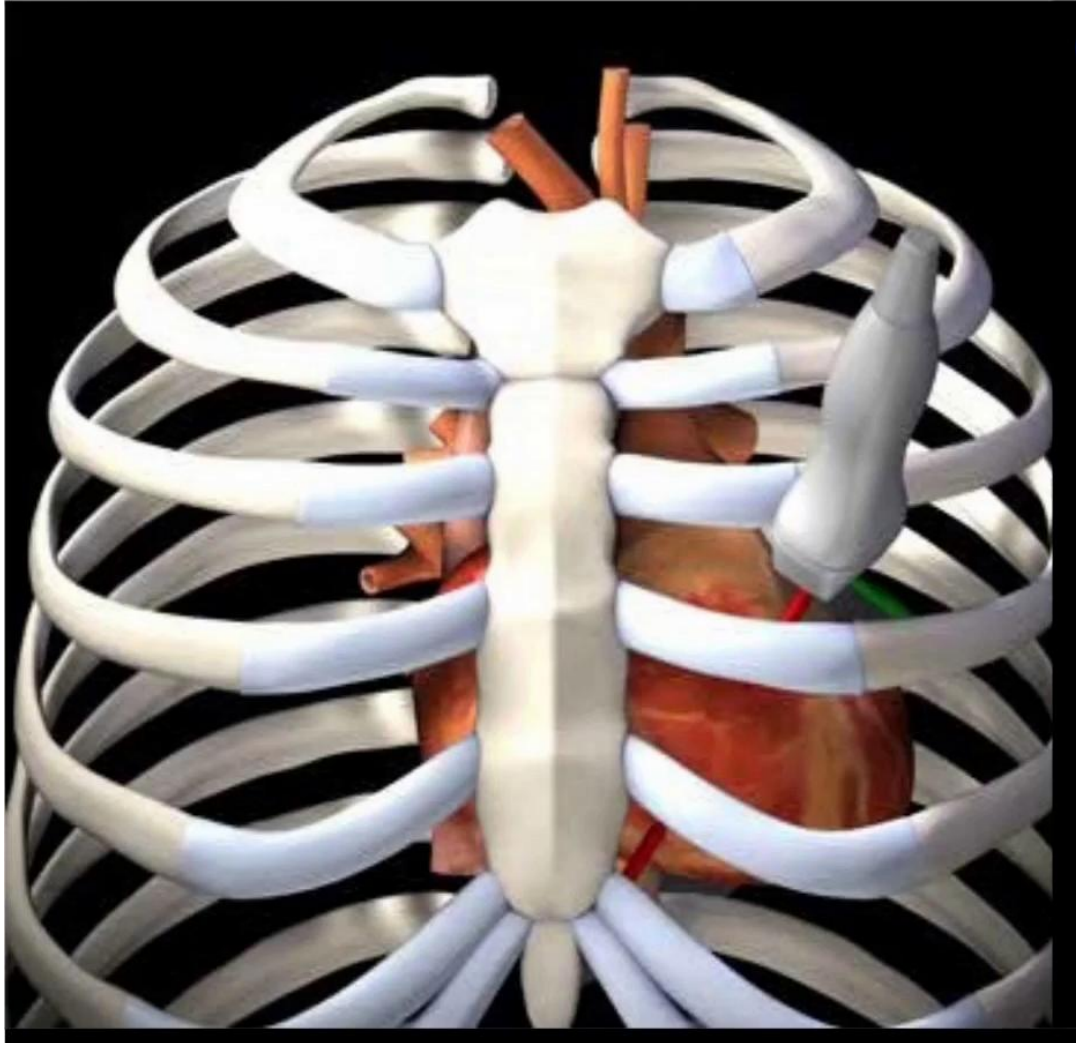
PARASTERNAL AX SCURT - VALVA MITRALA



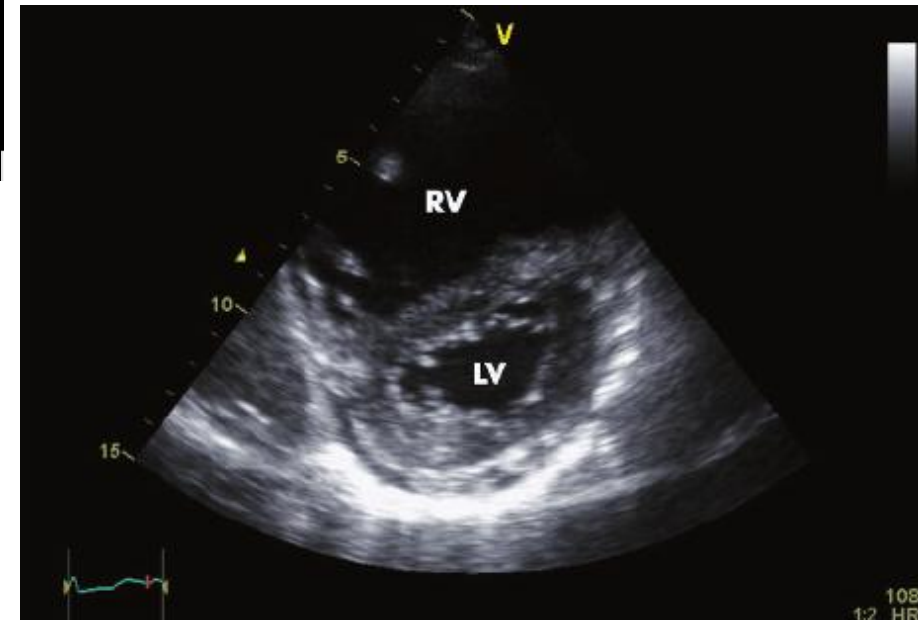
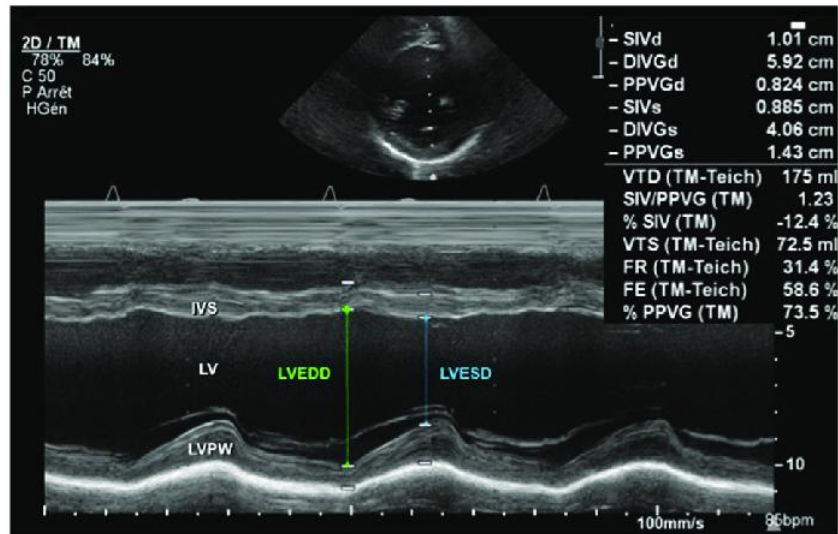
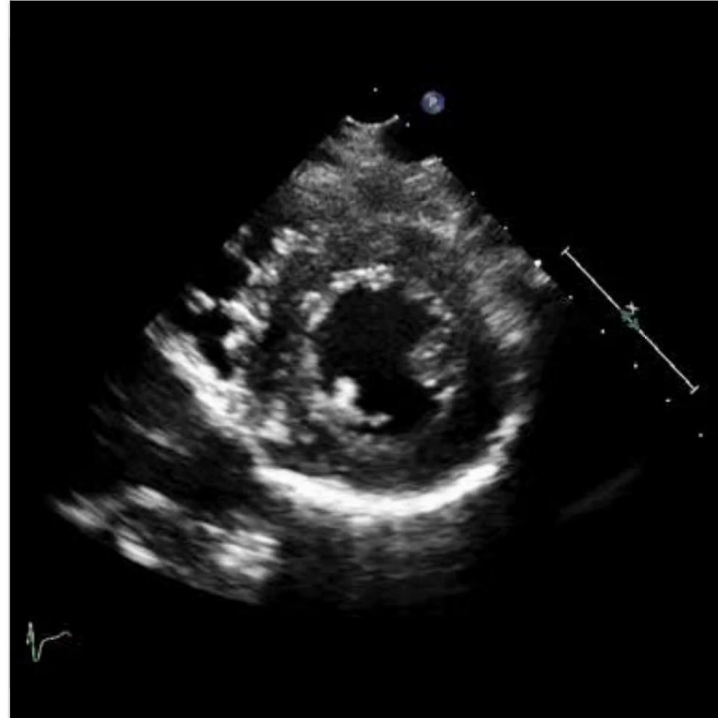
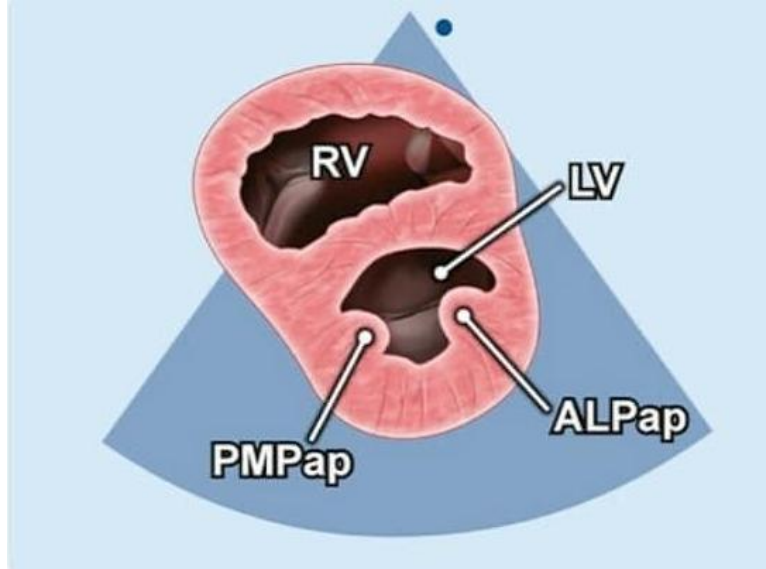
PARASTERNAL AX SCURT - VALVA MITRALA



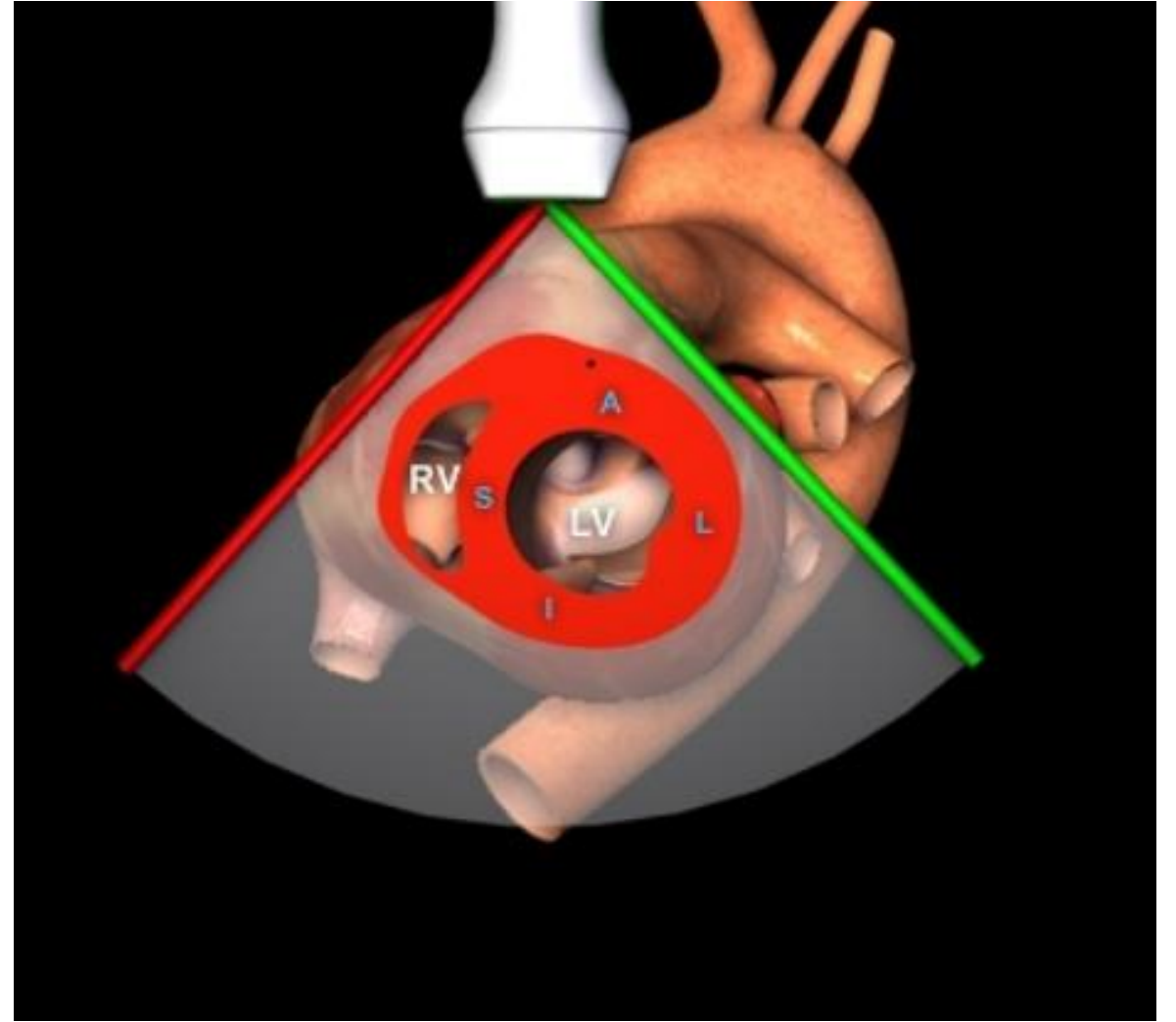
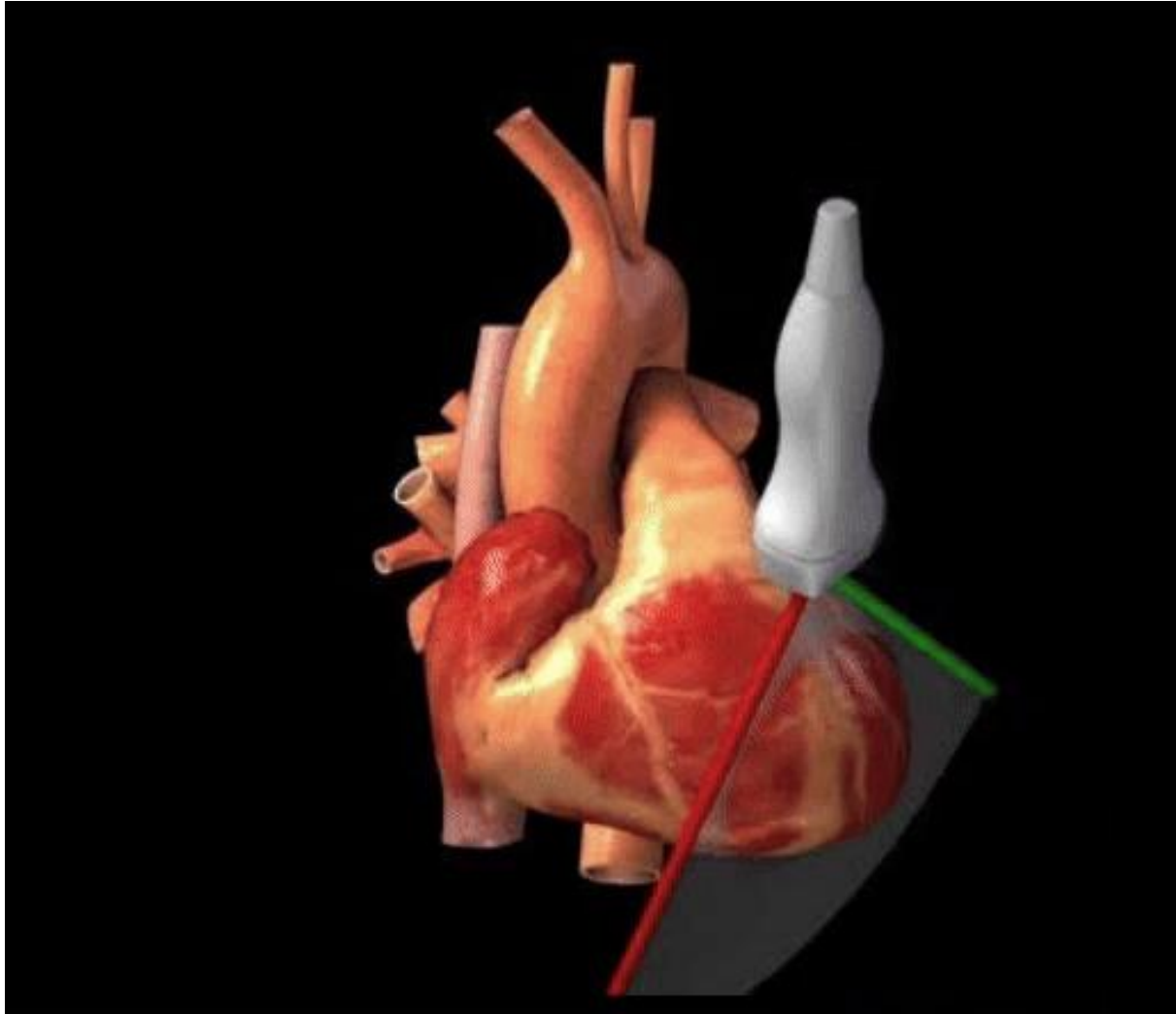
PARASTERNAL AX SCURT - MUSCHI PAPILARI



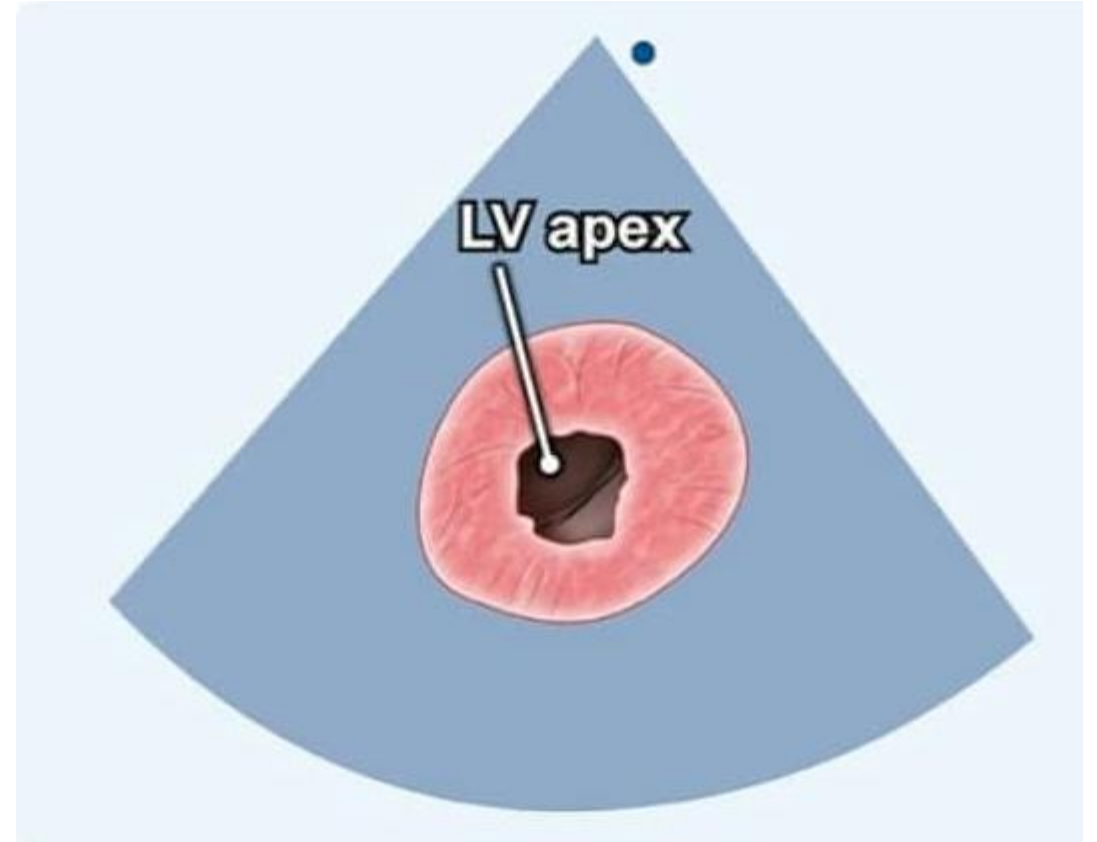
PARASTERNAL AX SCURT - MUSCHI PAPILARI



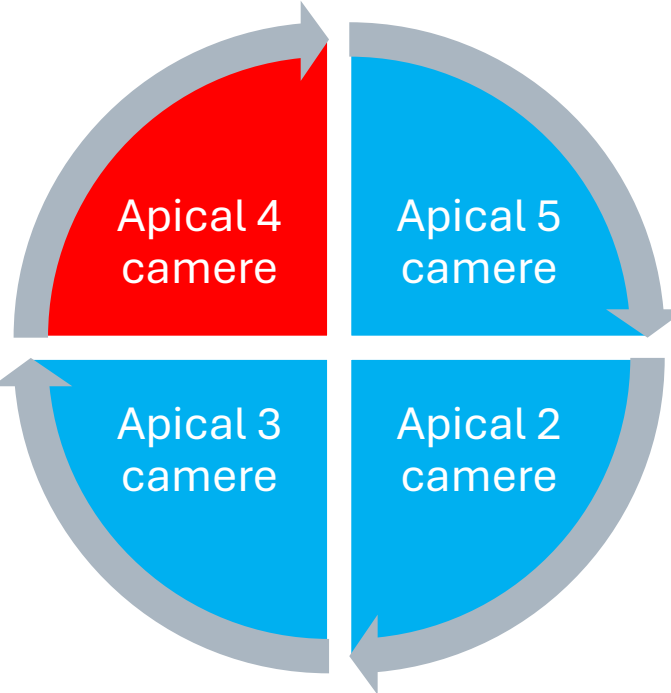
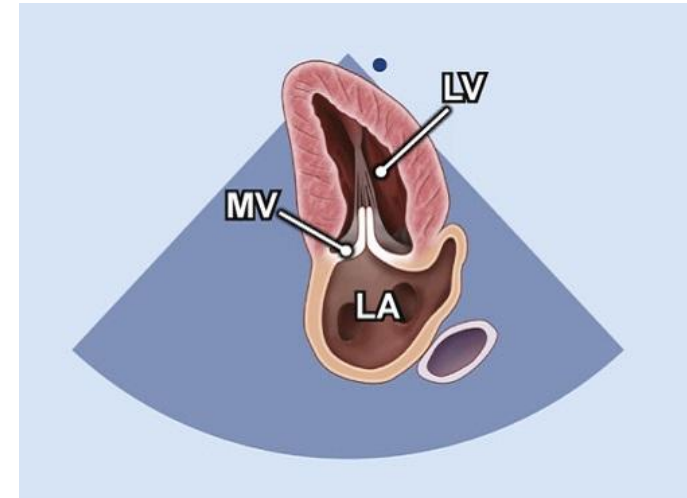
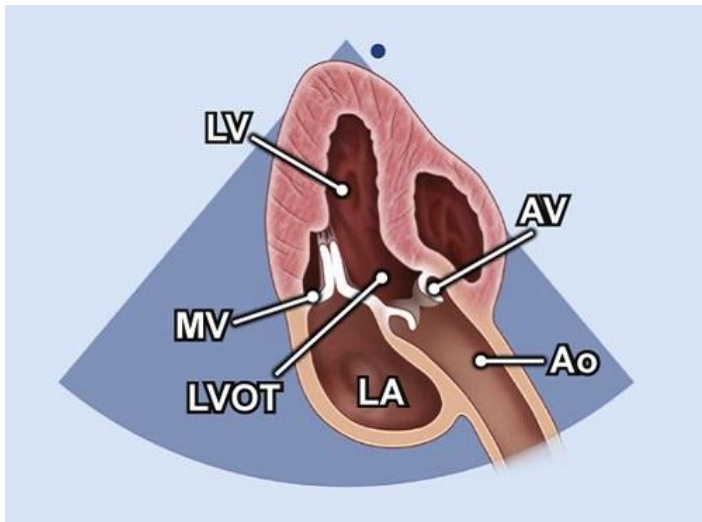
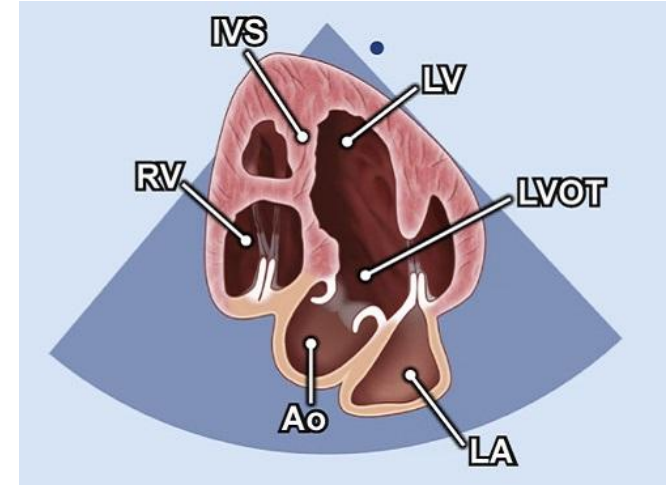
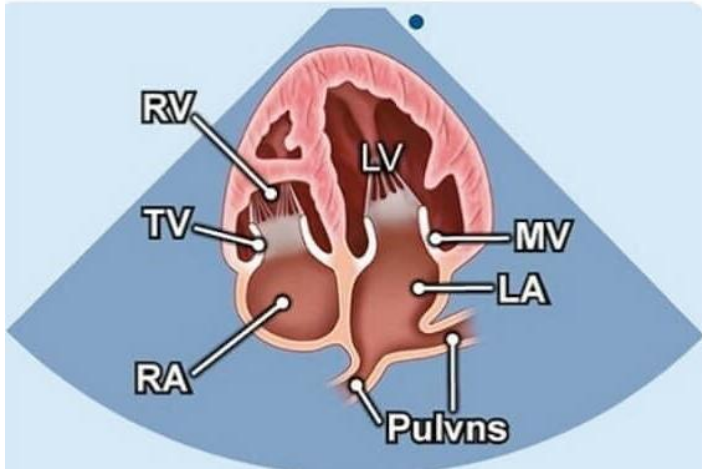
PARASTERNAL AX SCURT - APEX



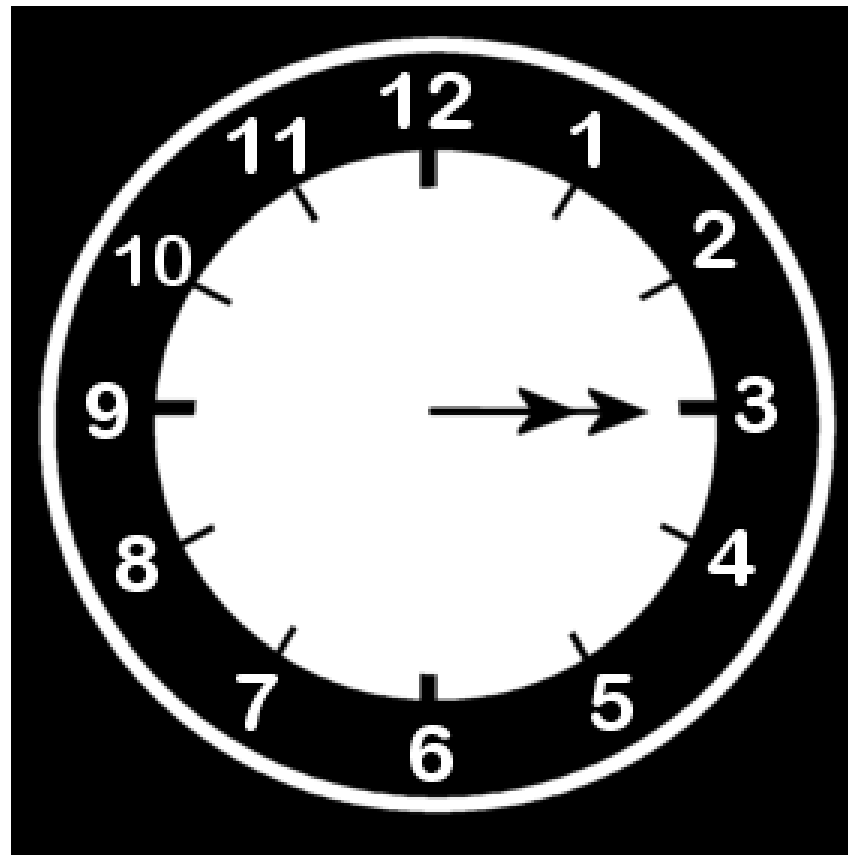
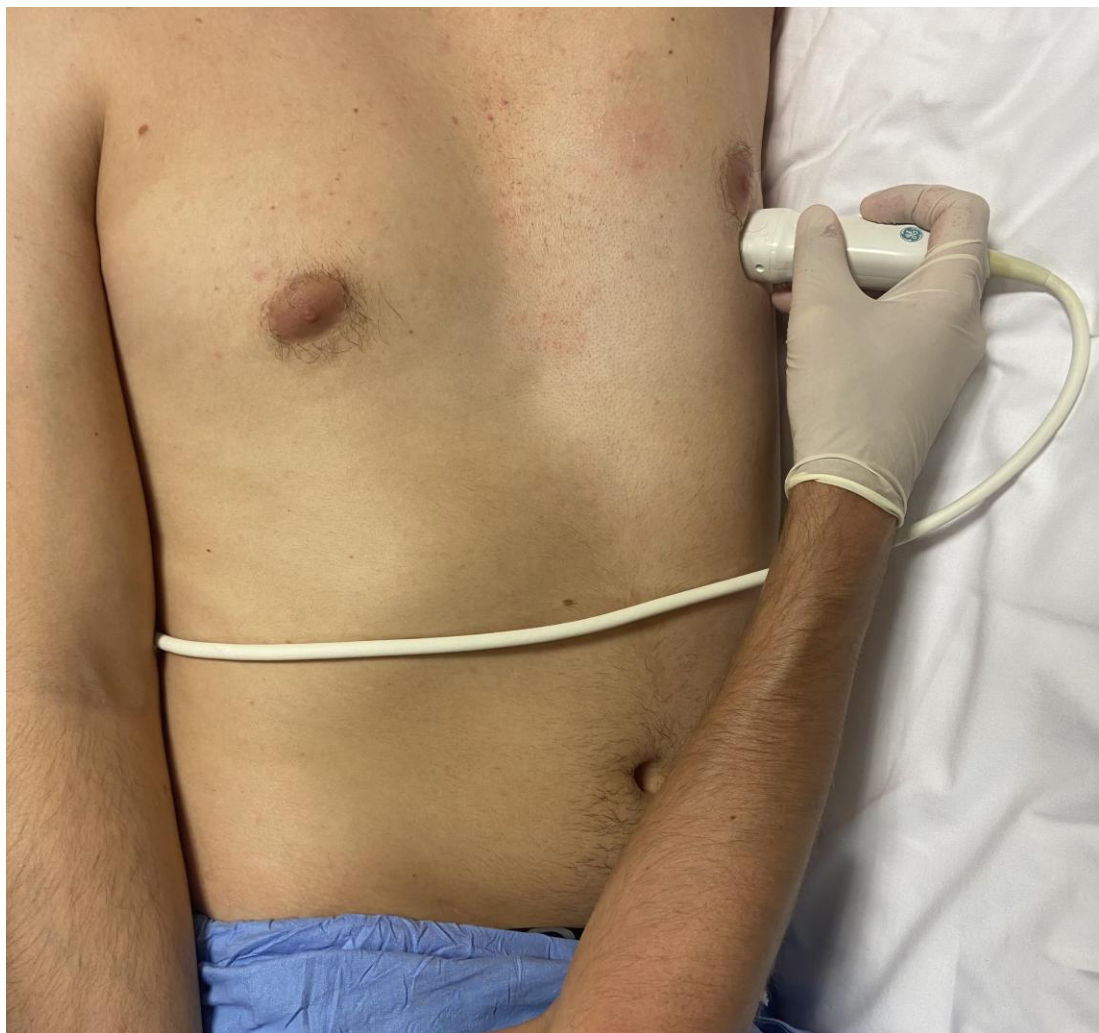
PARASTERNAL AX SCURT - APEX



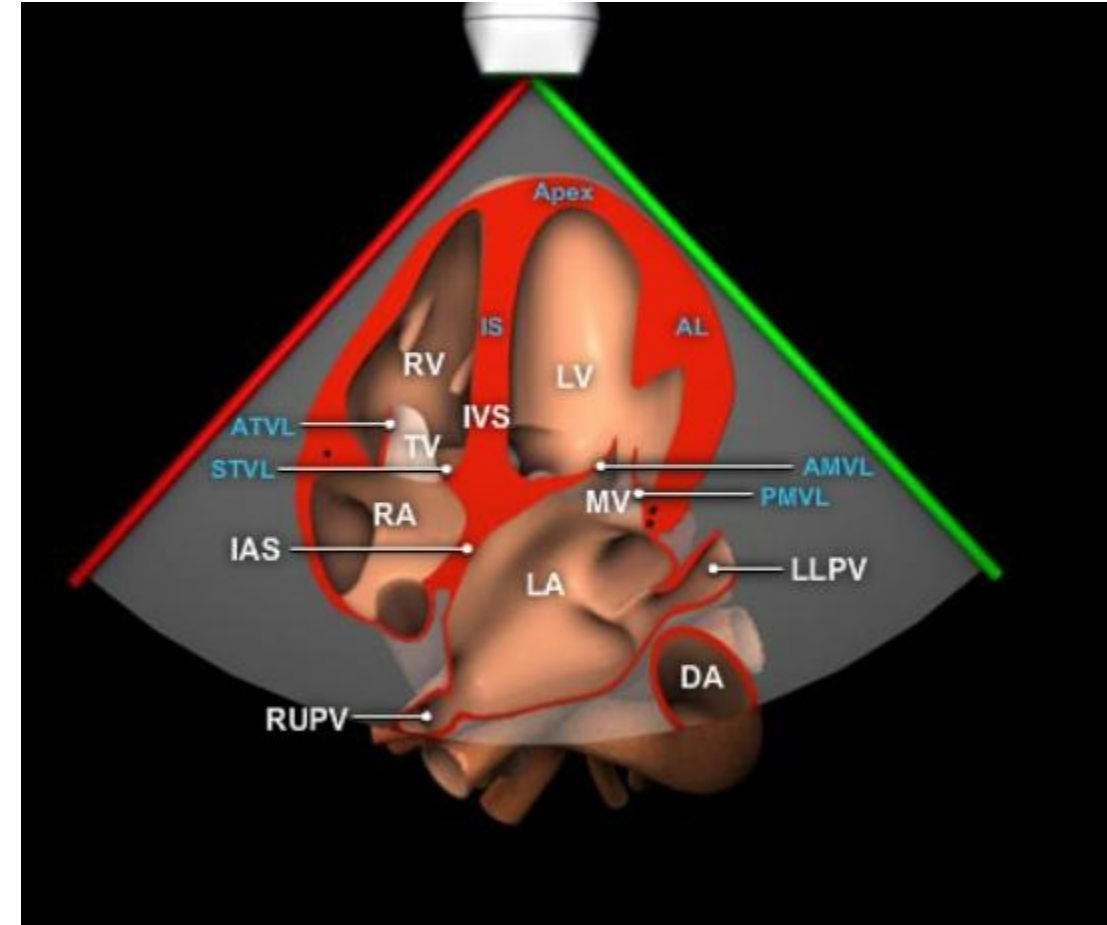
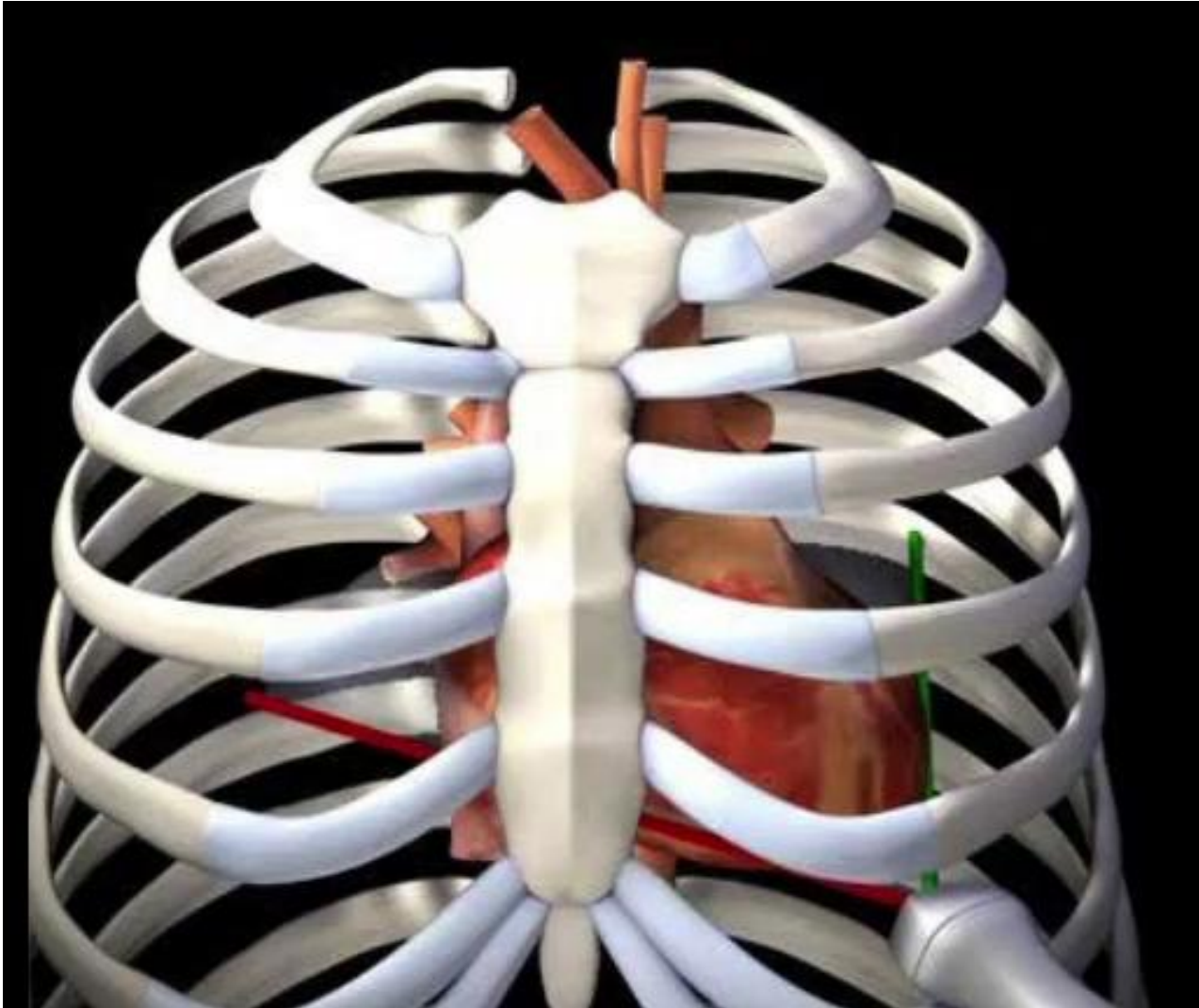
FEREASTRA APICALA



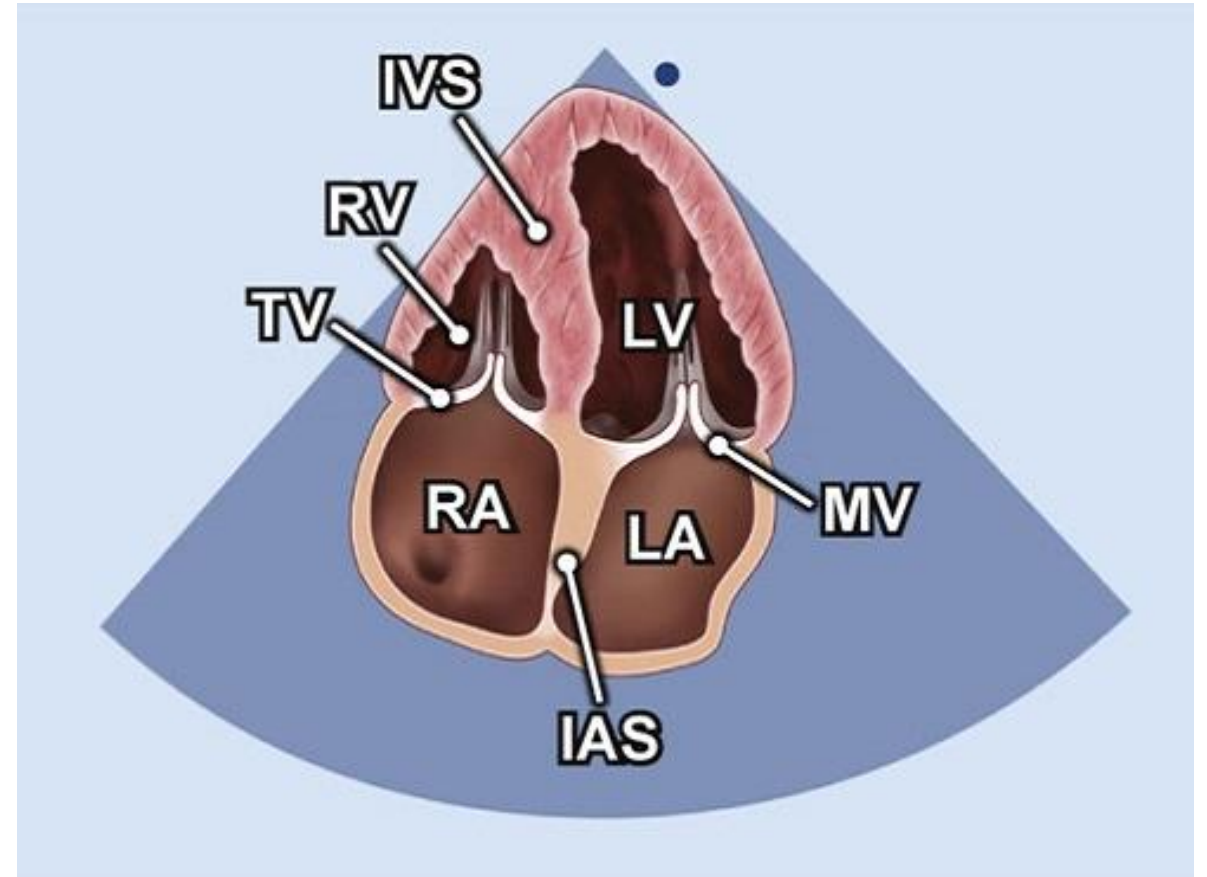
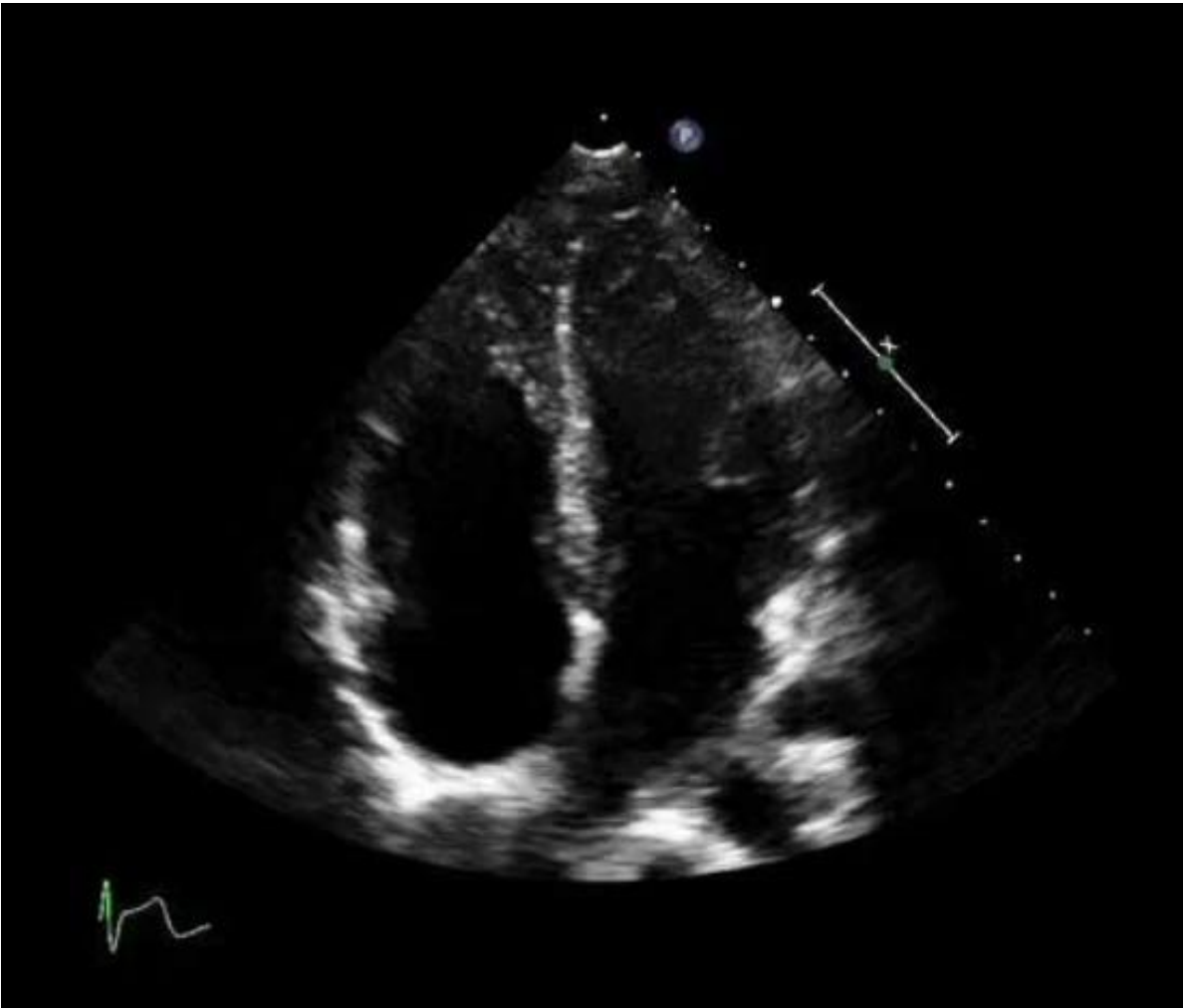
FEREASTRA APICALA



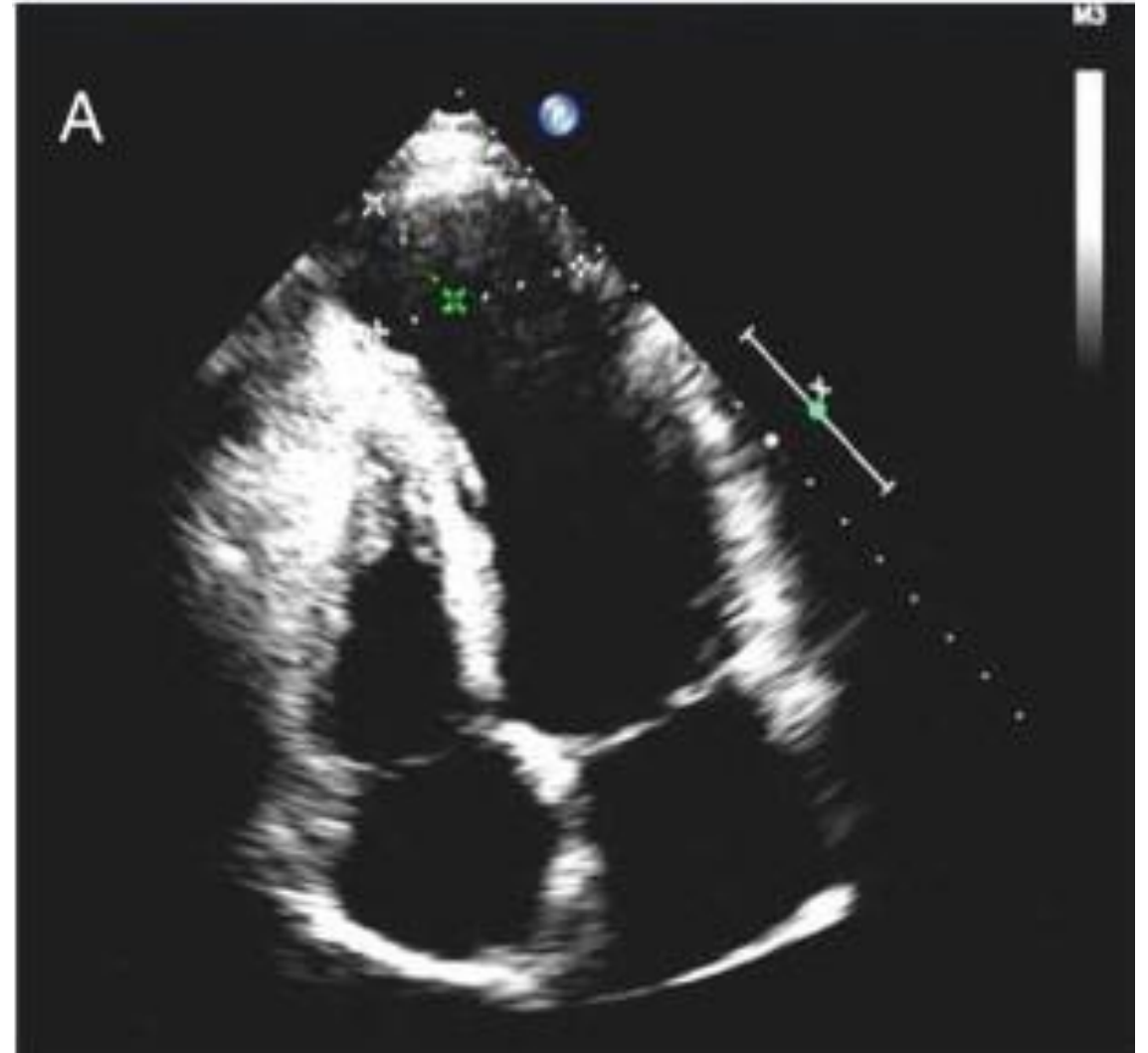
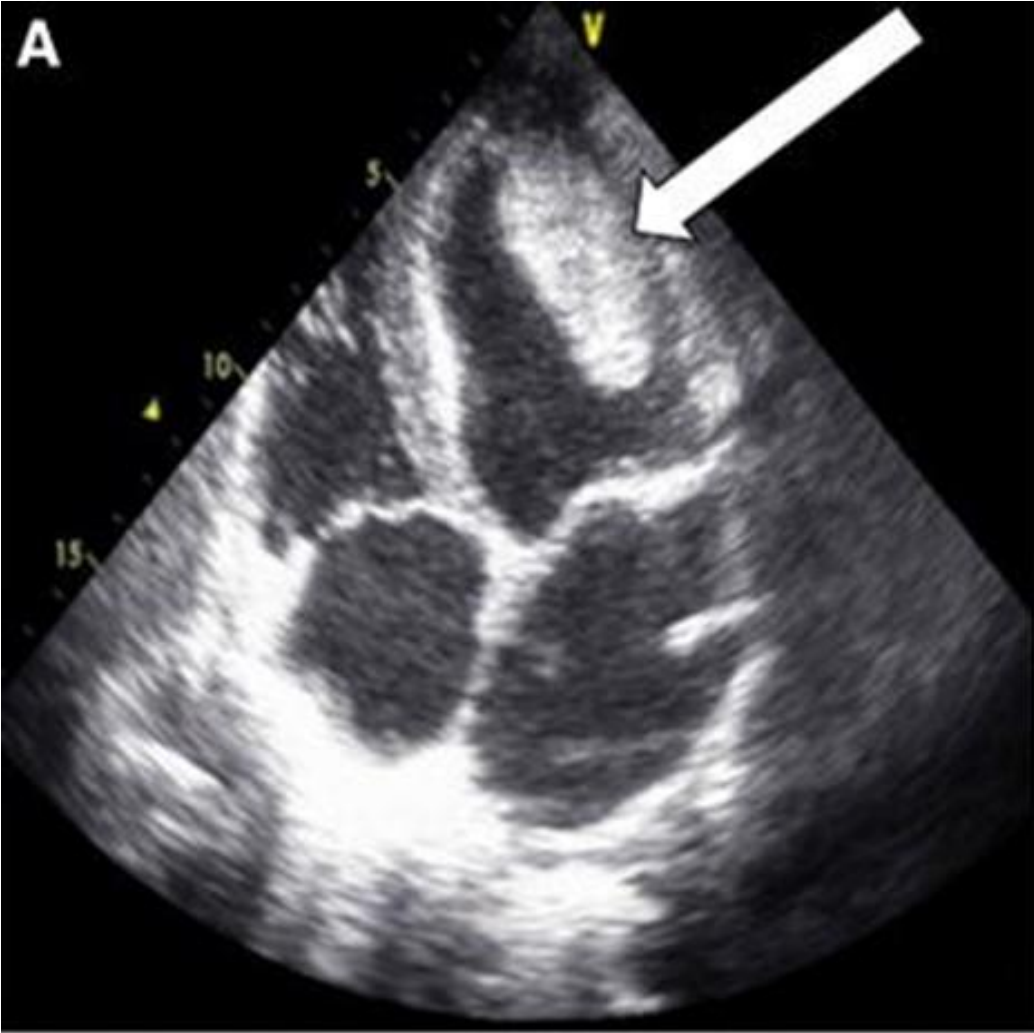
FEREASTRA APICALA



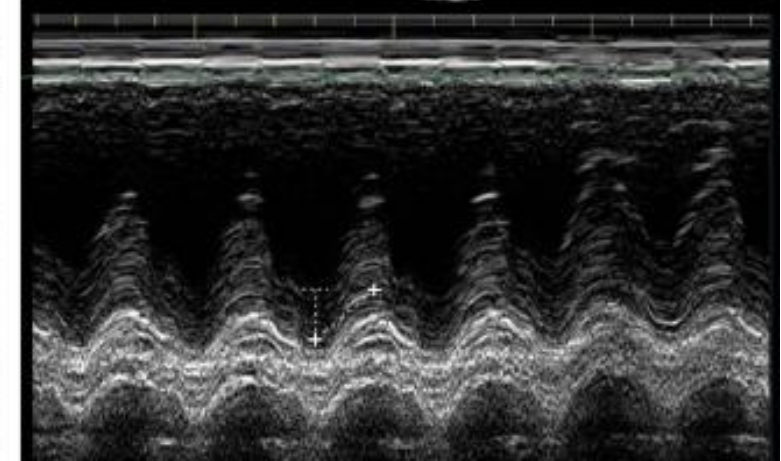
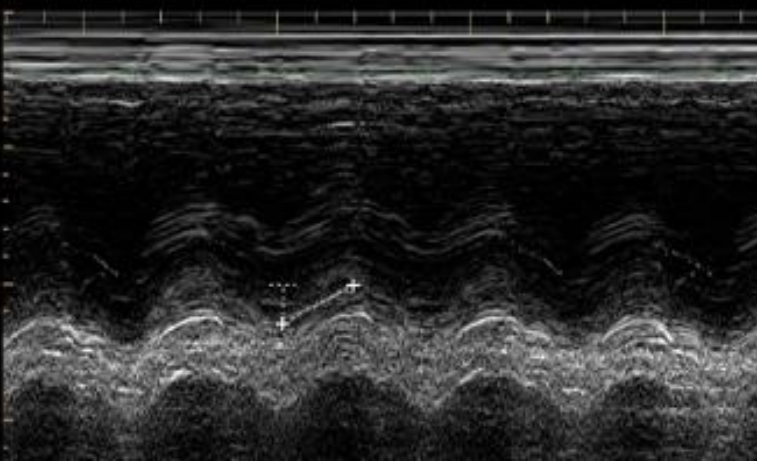
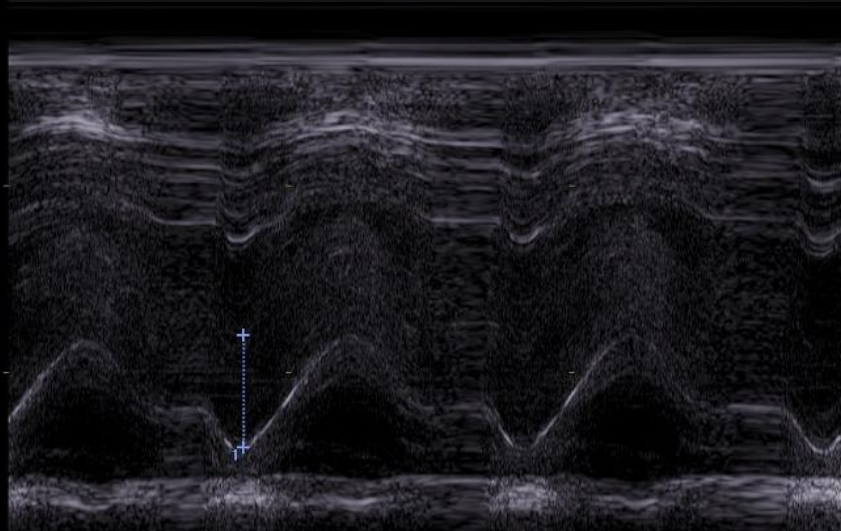
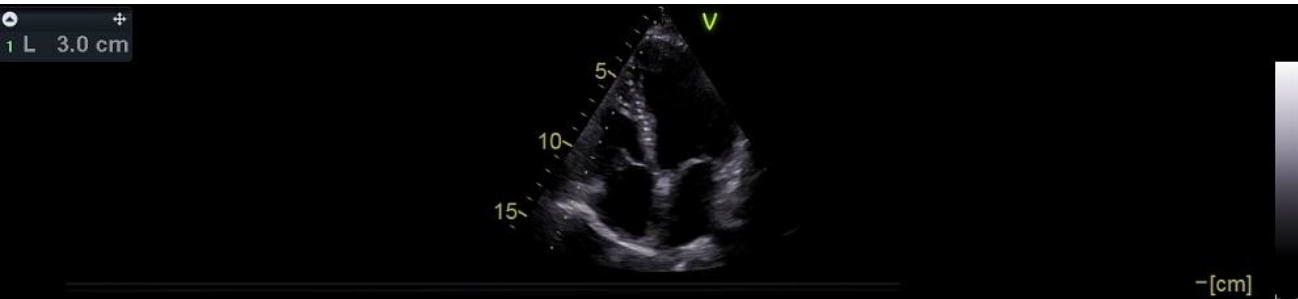
APICAL 4 CAMERE



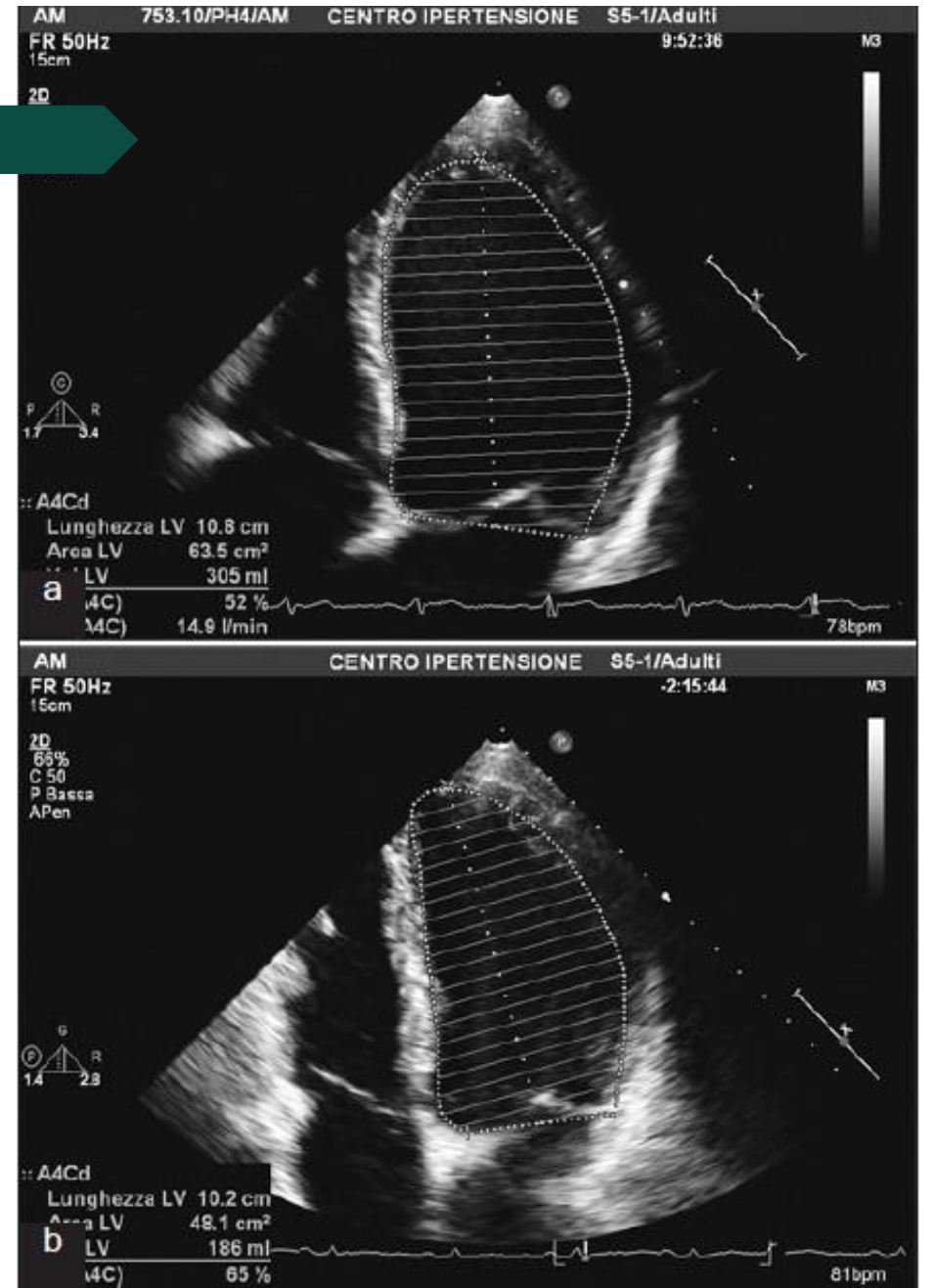
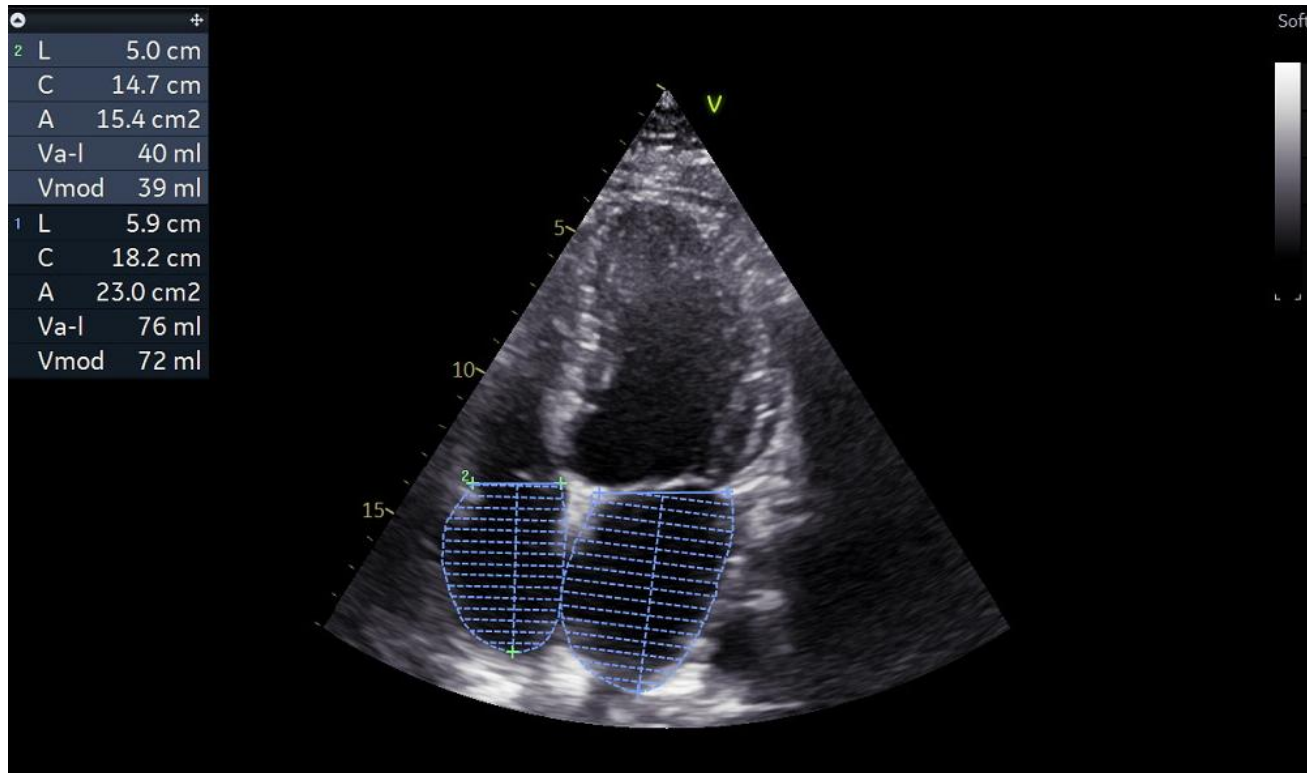
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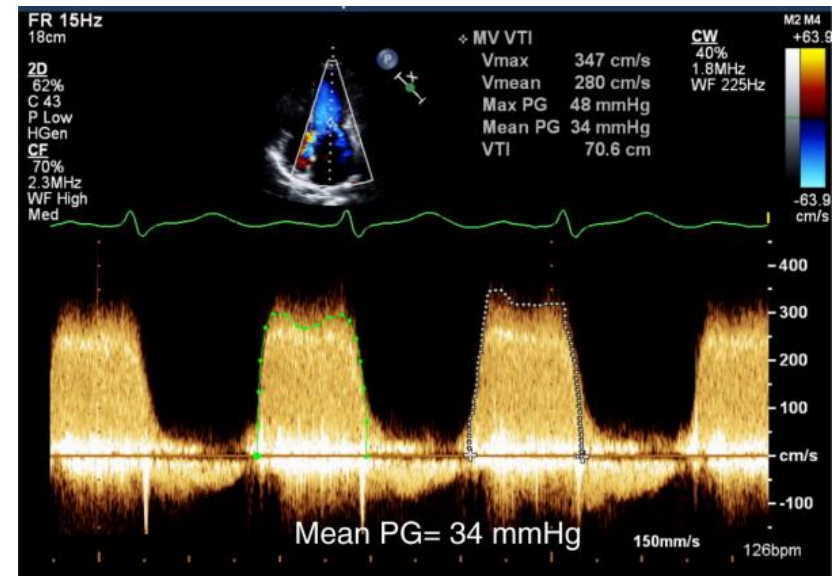
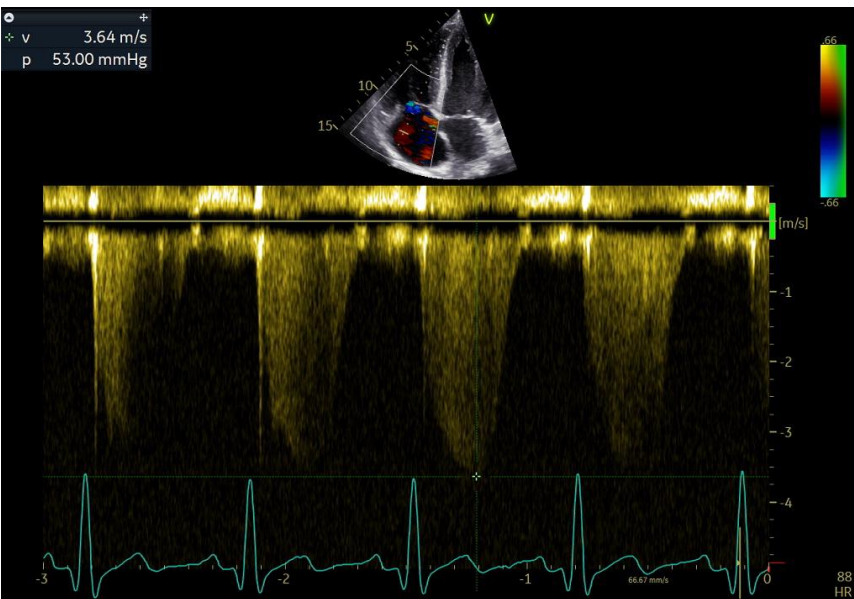
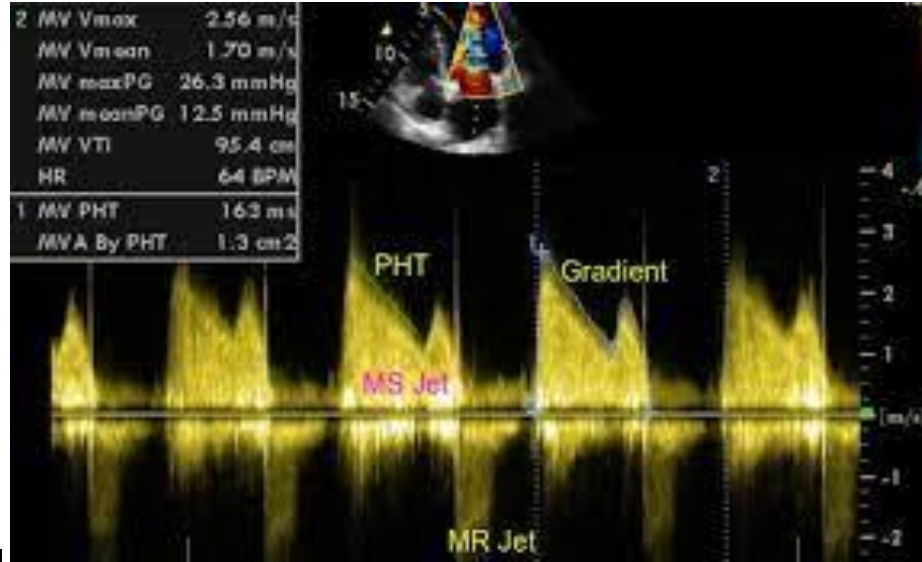
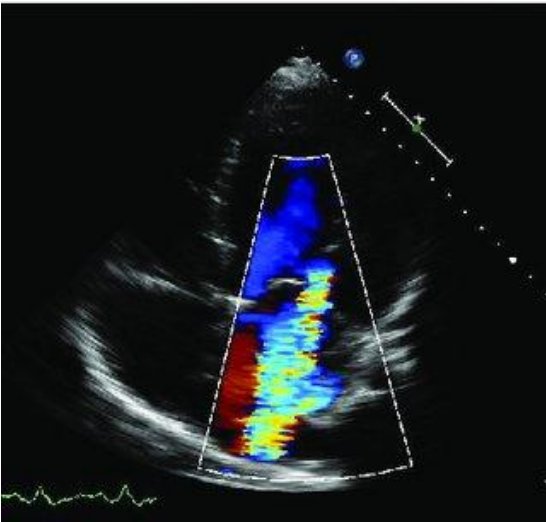
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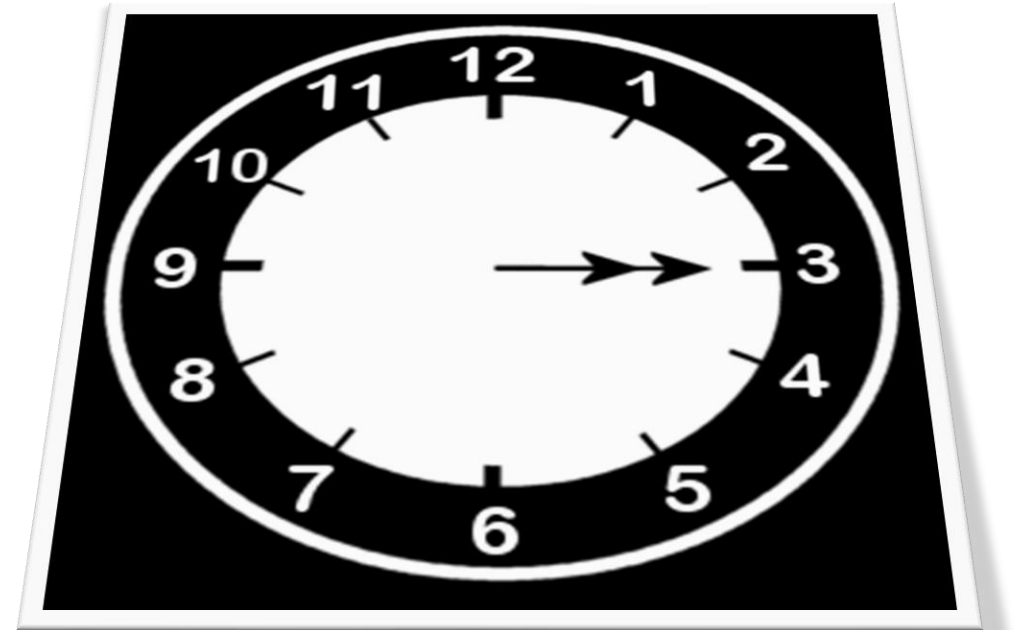
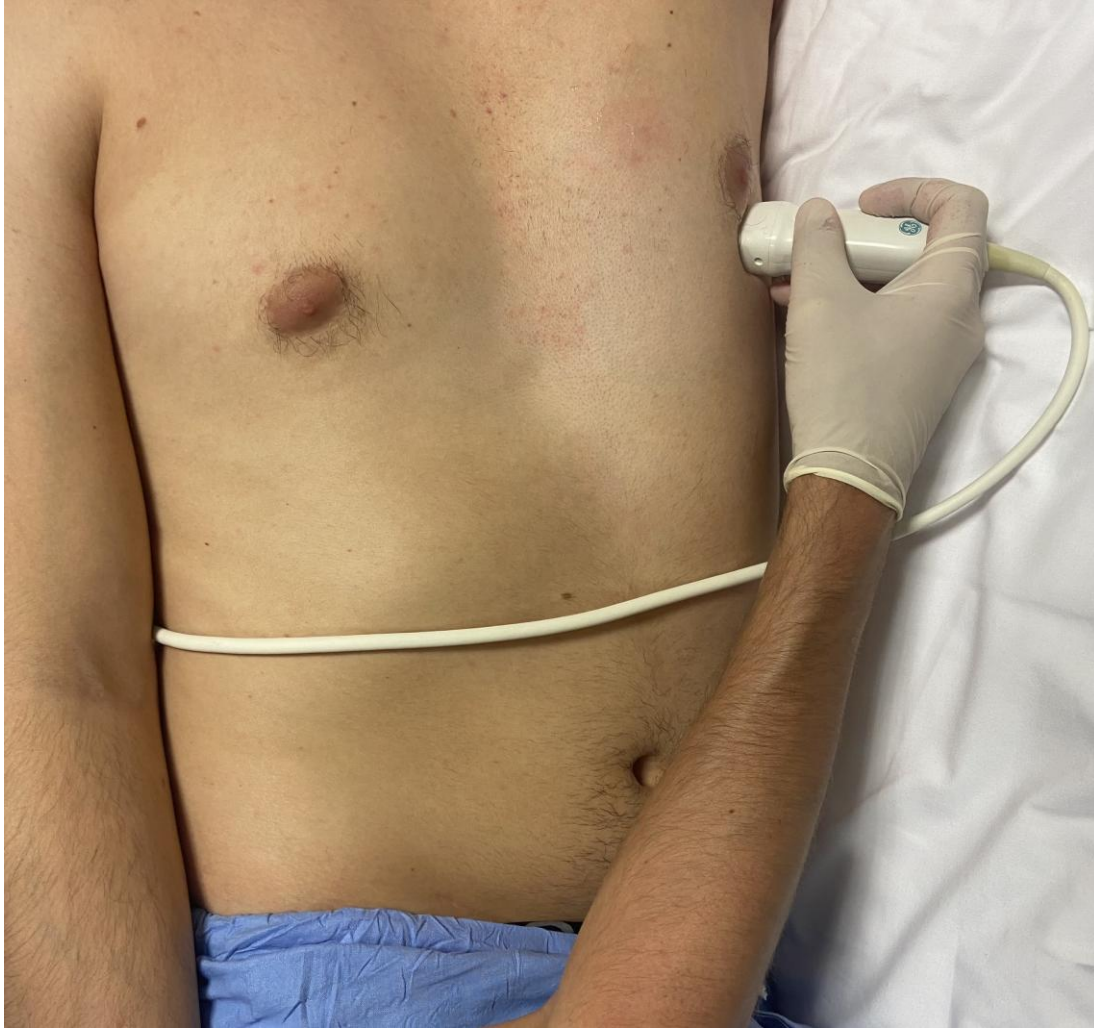
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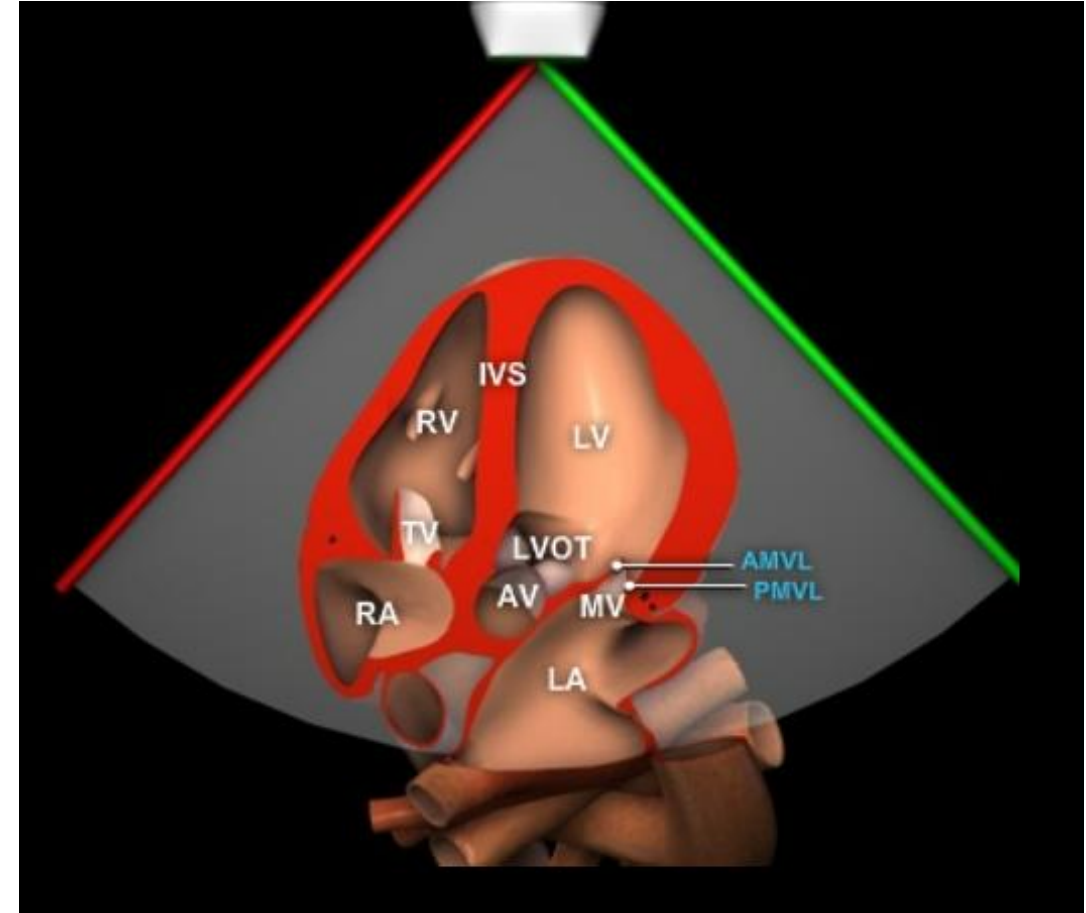
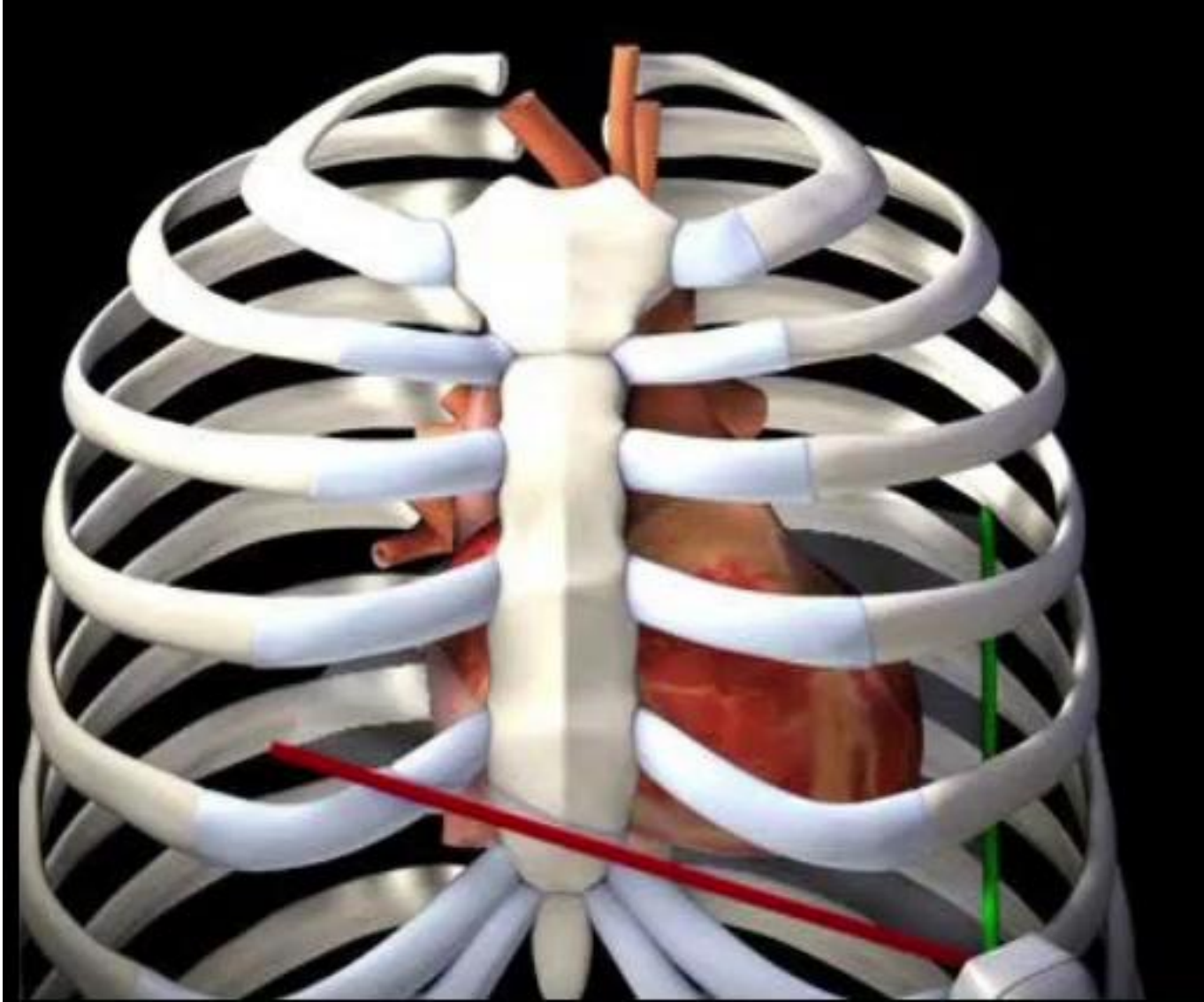
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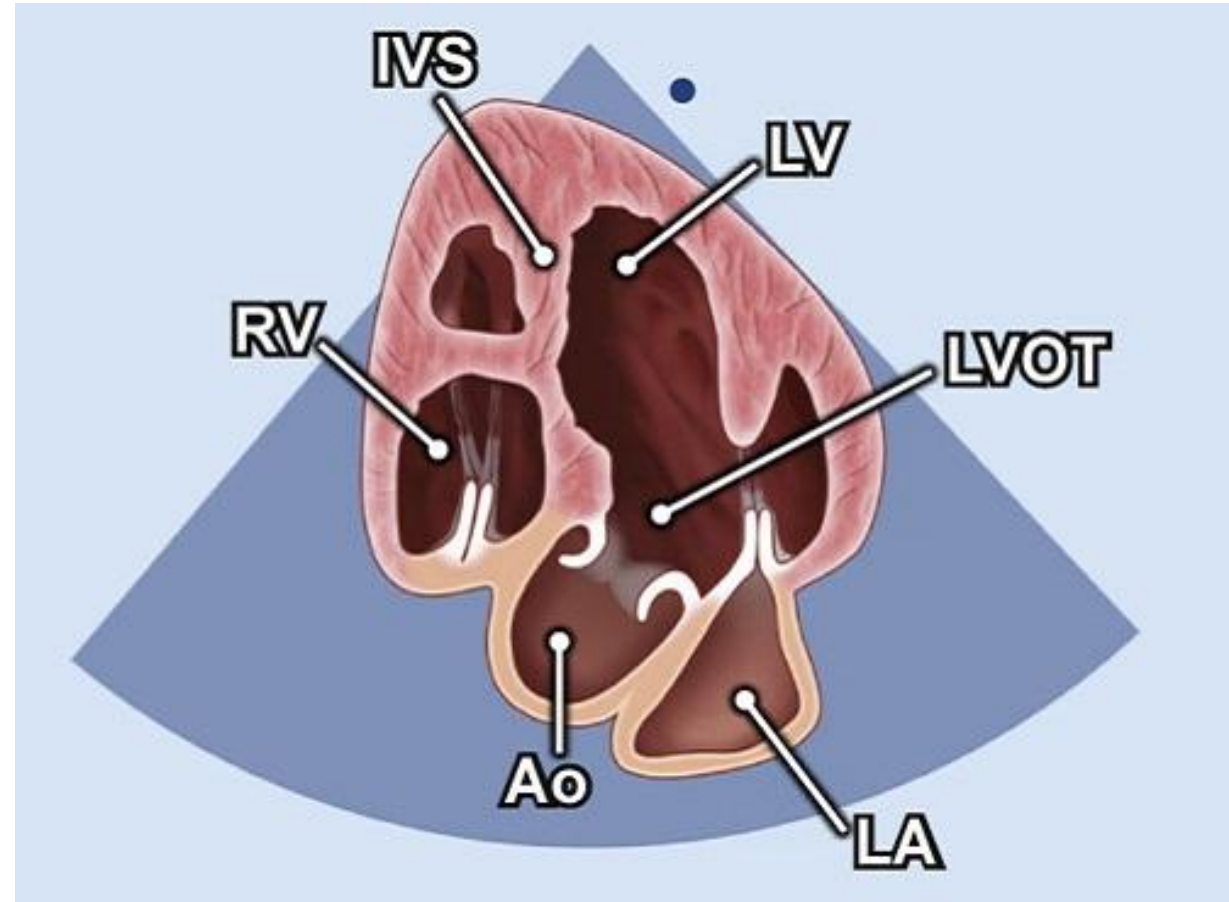
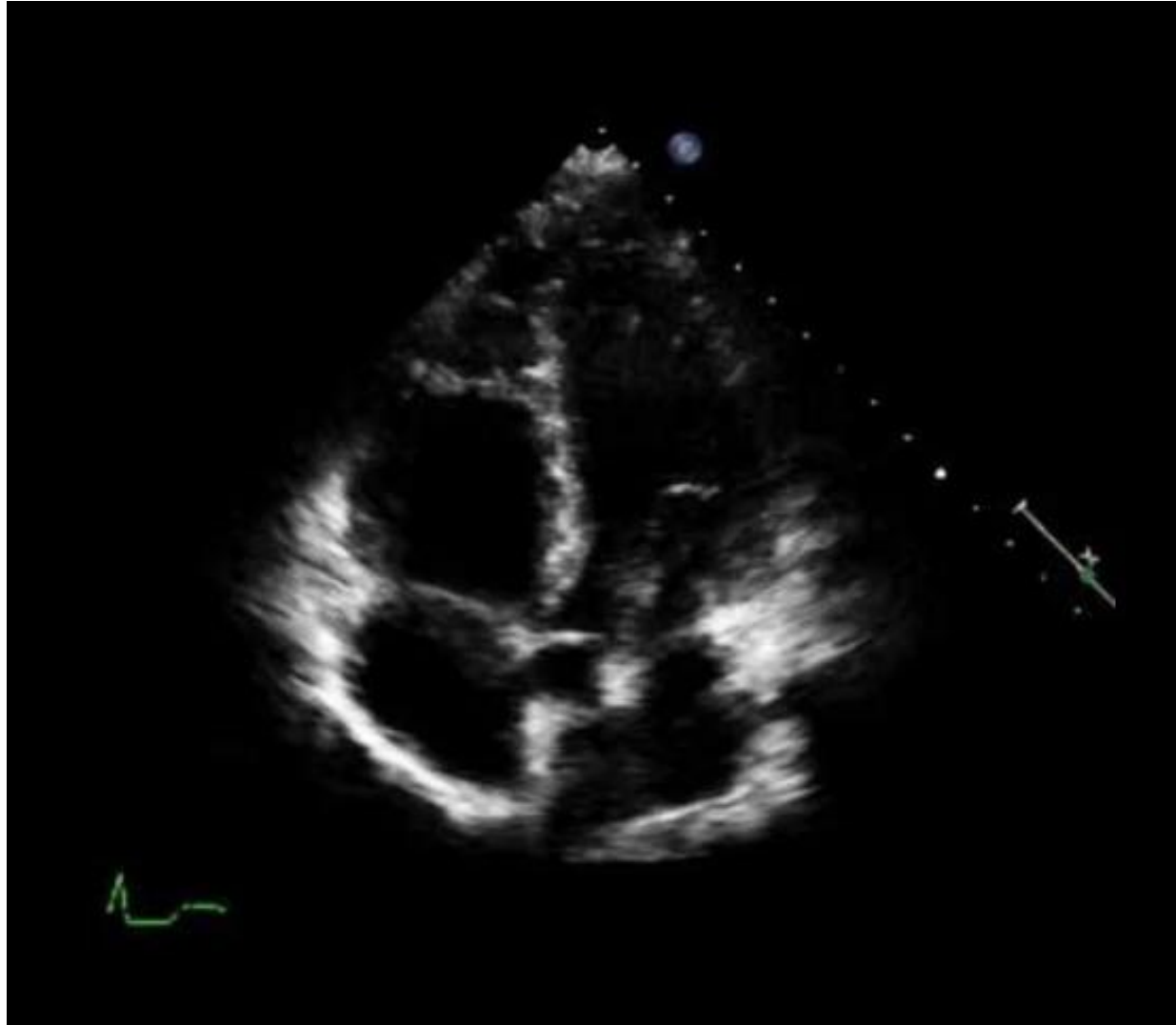
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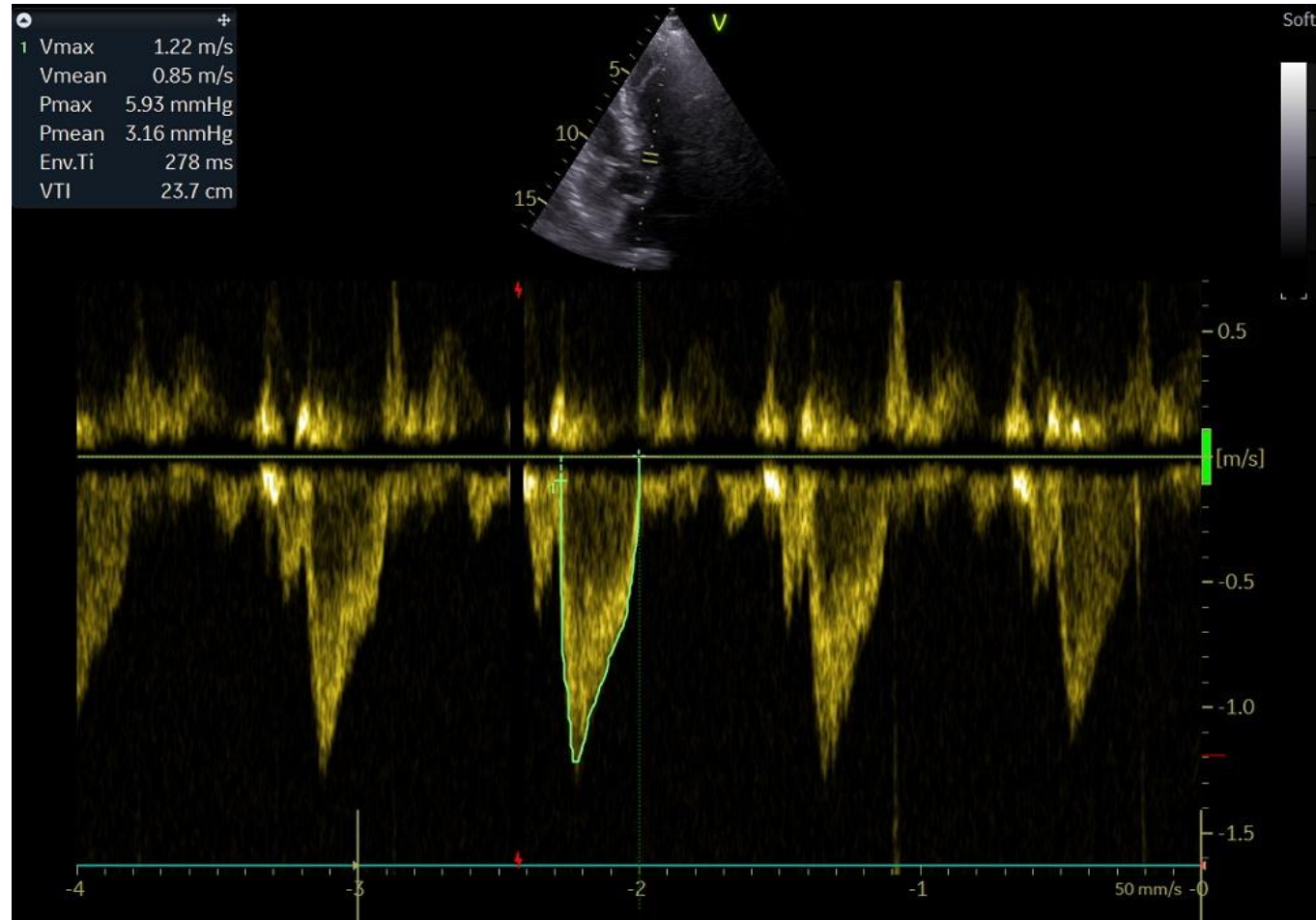
APICAL 5 CAMERE



APICAL 5 CAMERE

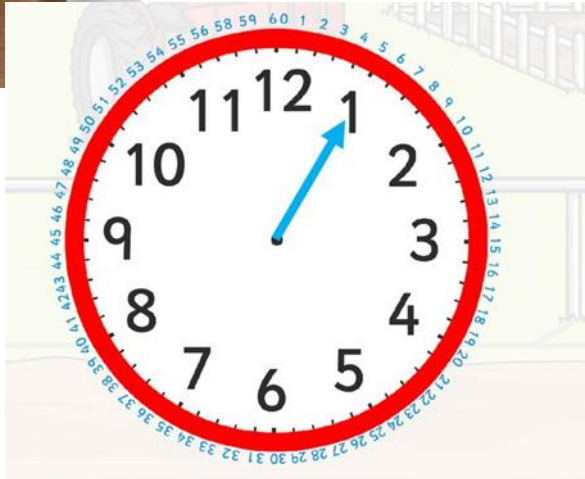


APICAL 5 CAMERE



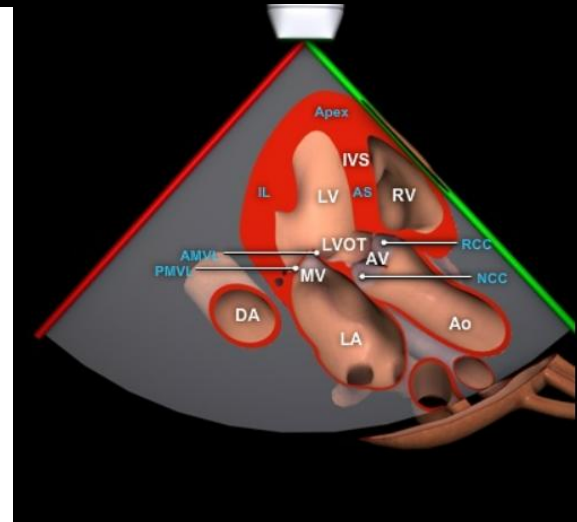
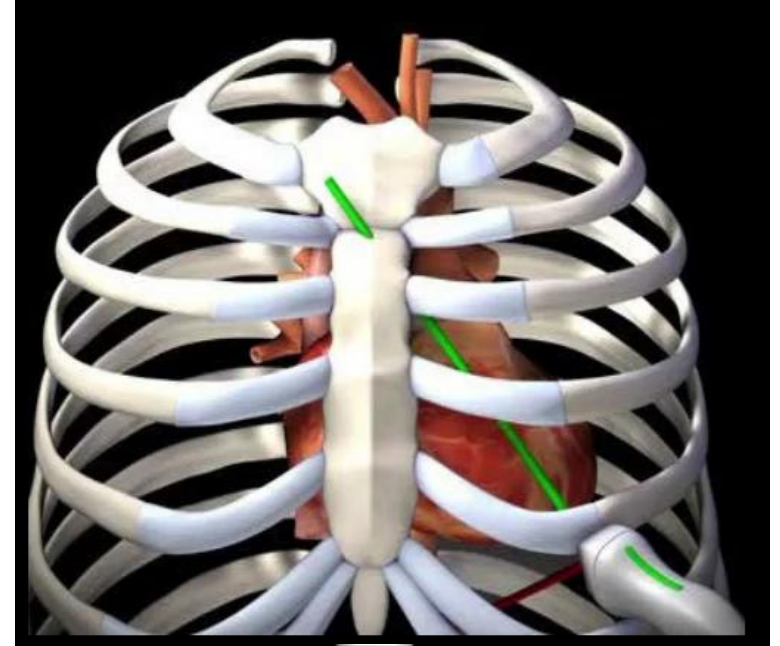
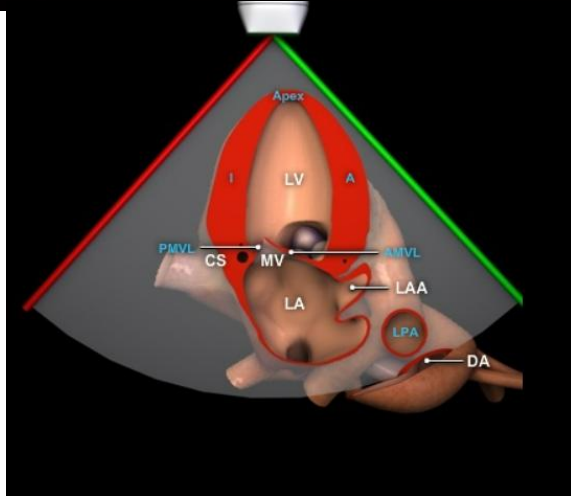
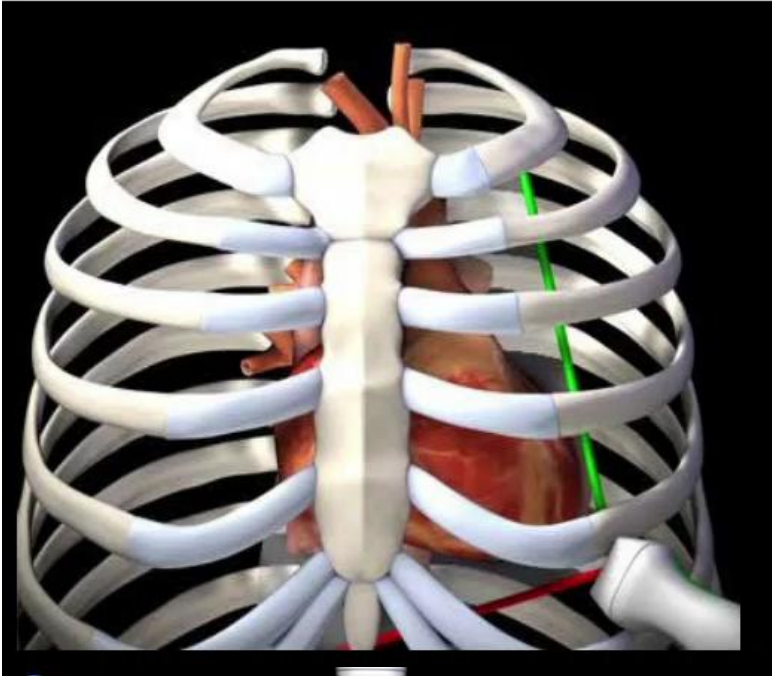
APICAL ...2 CAMERE

3 CAMERE



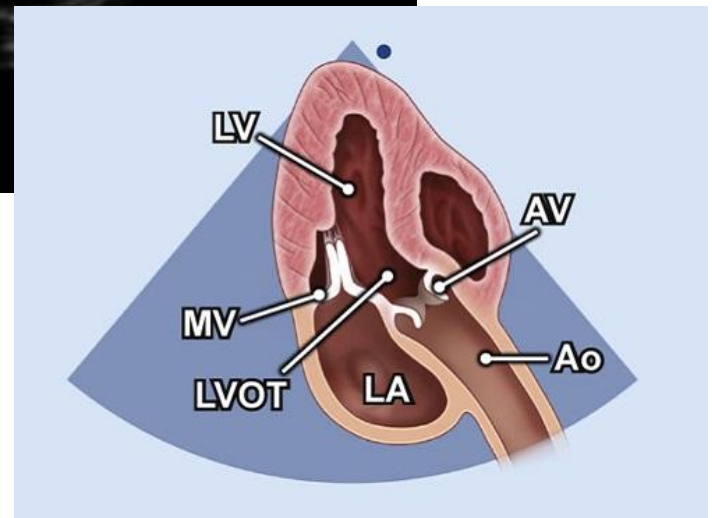
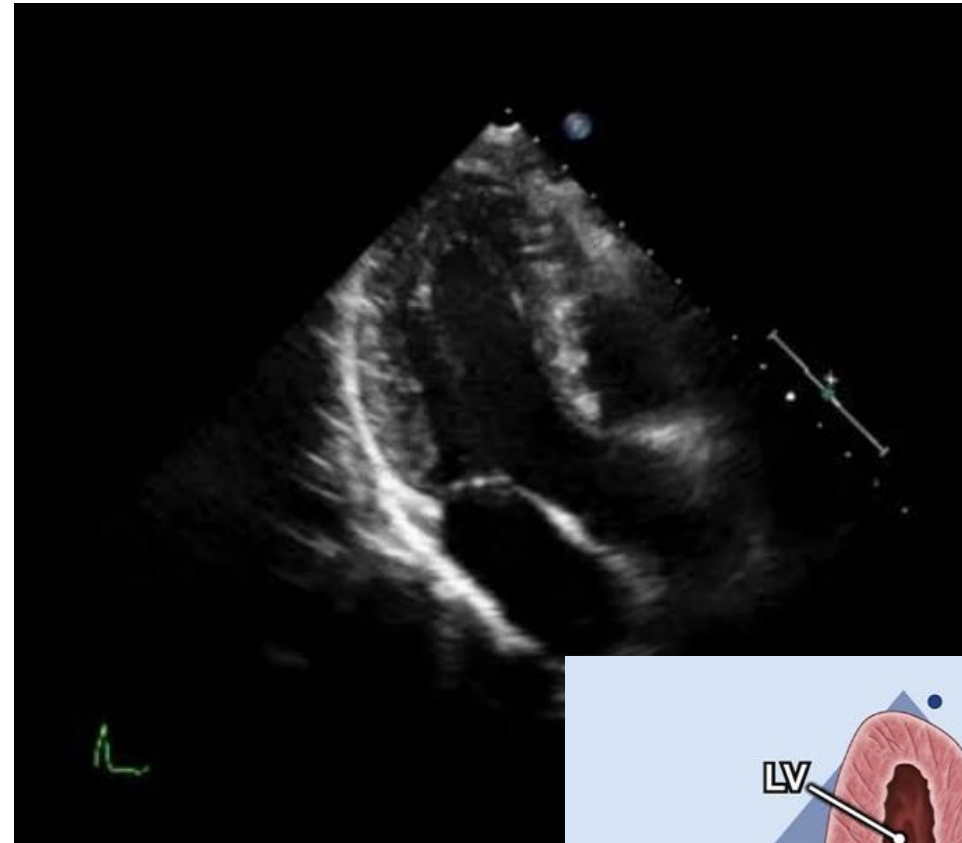
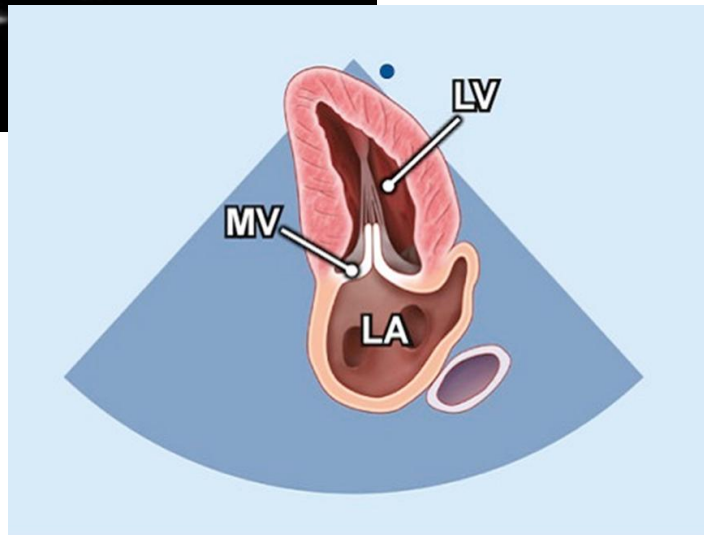
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3 CAMERE

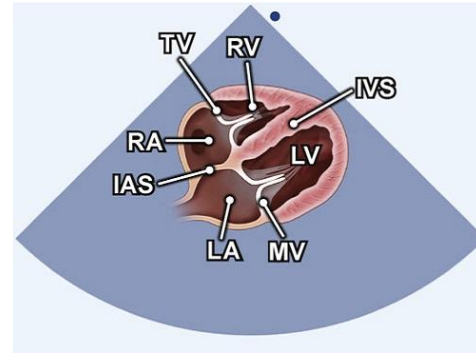


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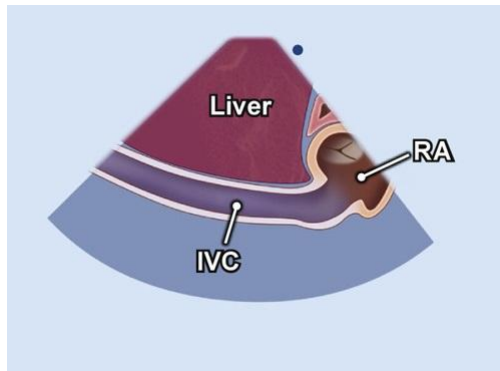
3 CAMERE



FEREASTRA SUBCOSTALA

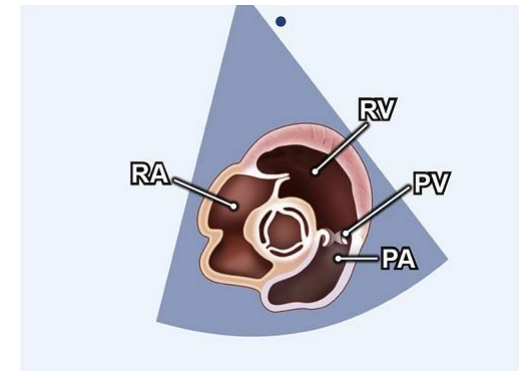


Subcostal 4
camere



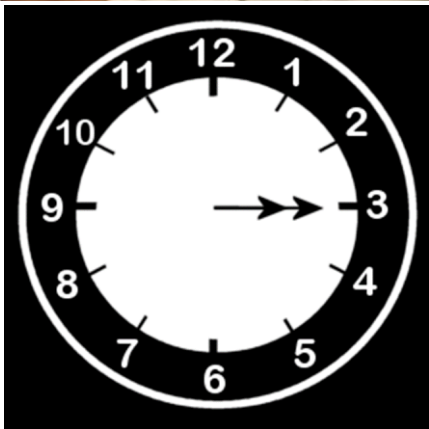
Subcostal ax
lung prin VCI

Subcostal vase
mari



SUBCOSTAL ...4 CAMERE

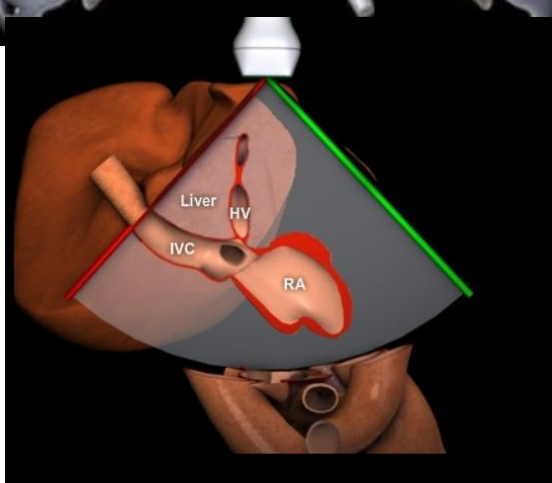
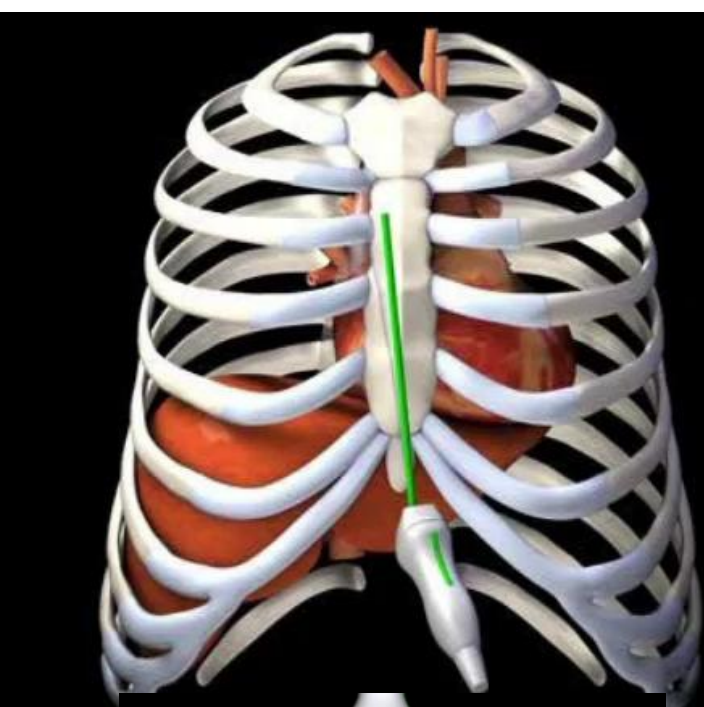
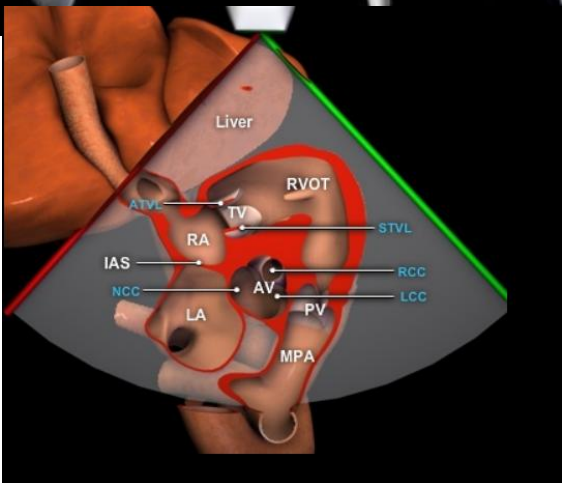
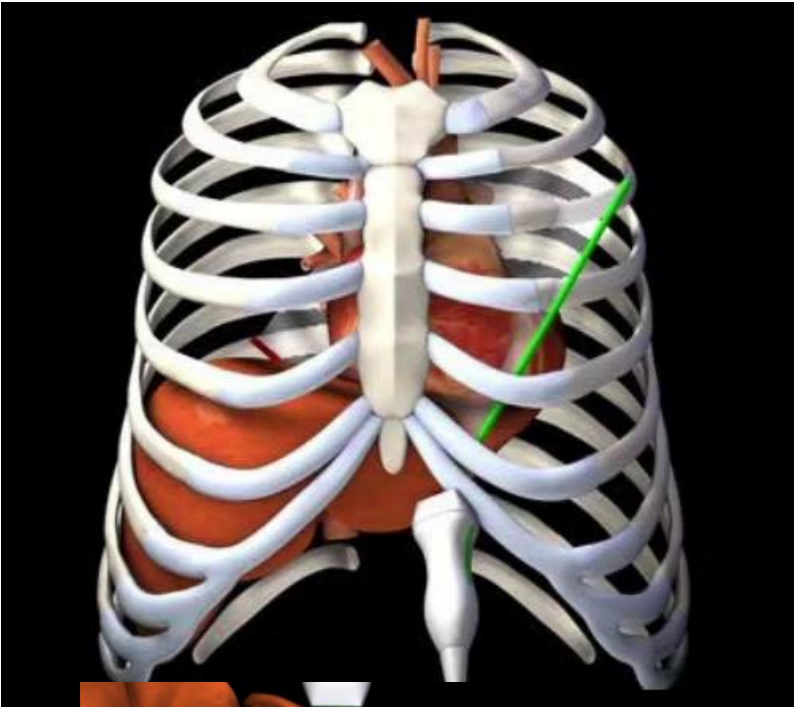
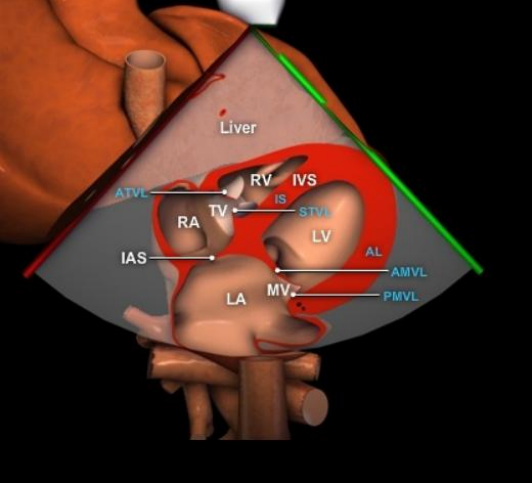
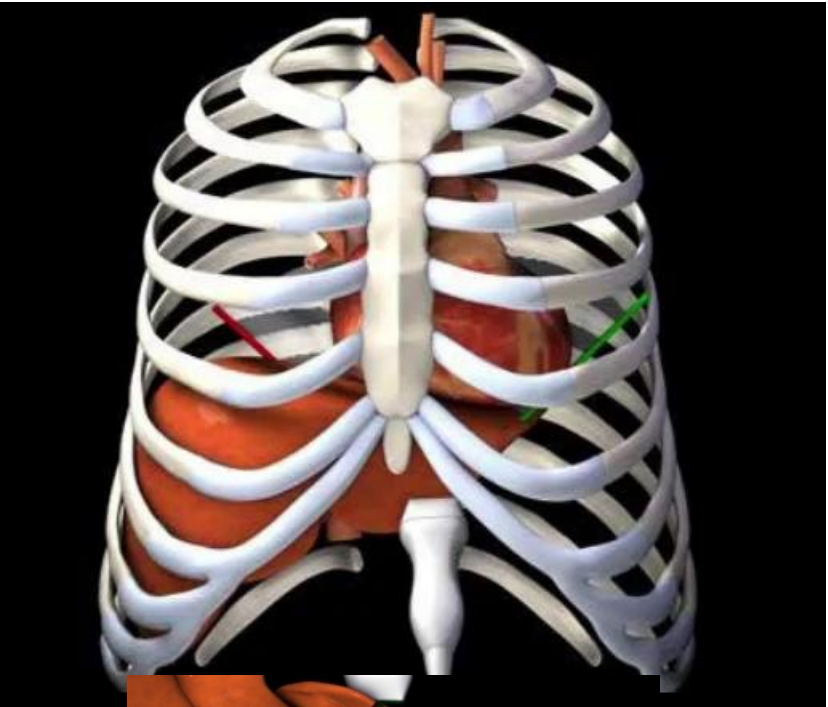
AK LUNG SI VCI



SUBCOSTAL ...4 CAMERE

AX LUNG

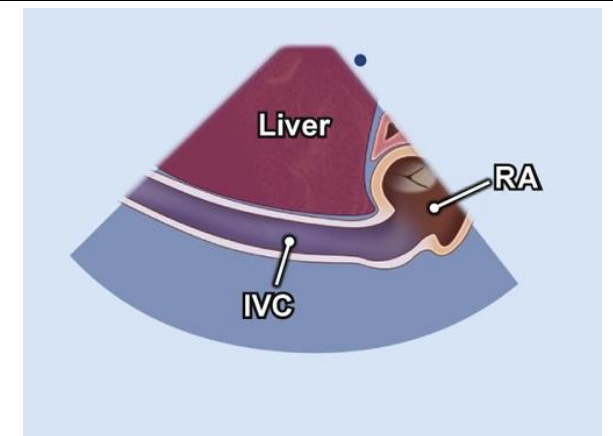
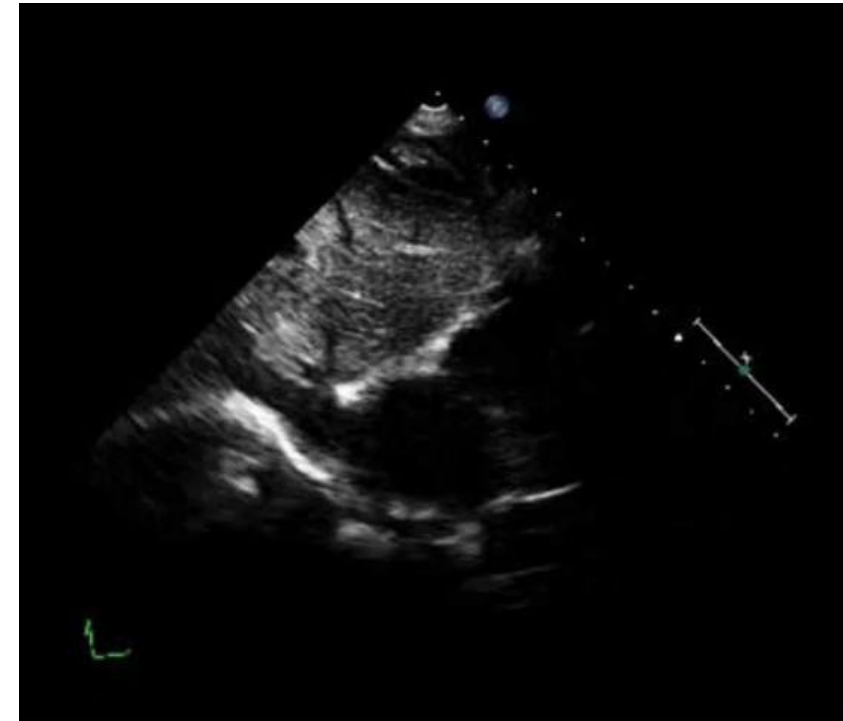
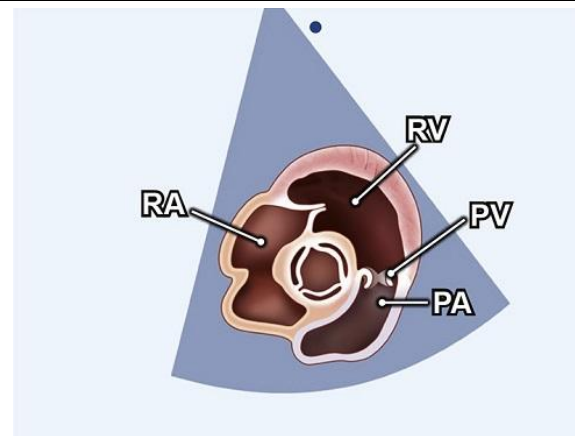
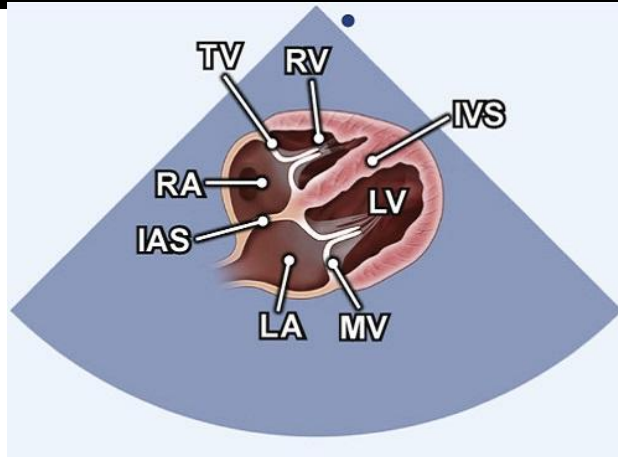
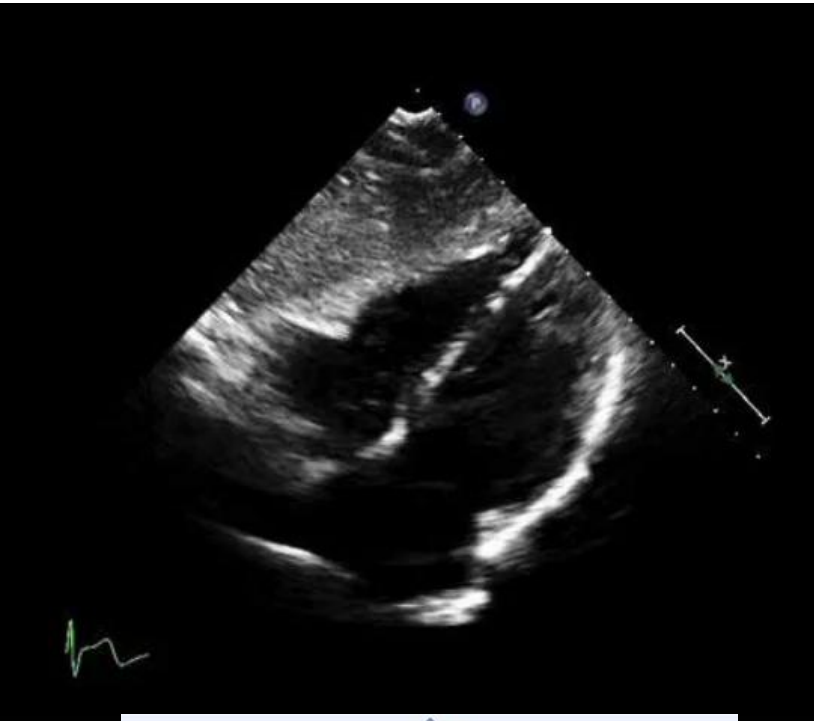
VCJ



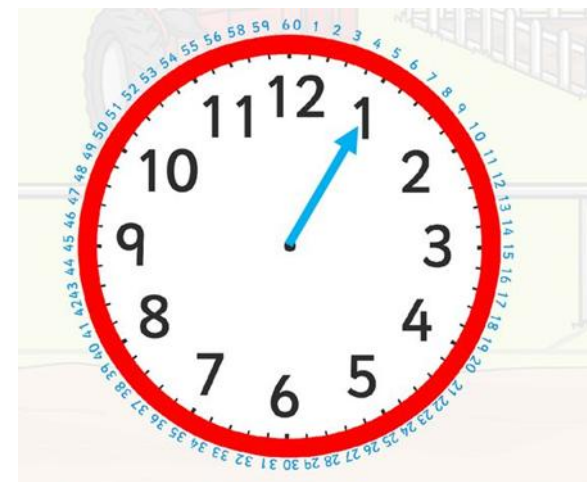
SUBCOSTAL...4 CAMERE

AX LUNG

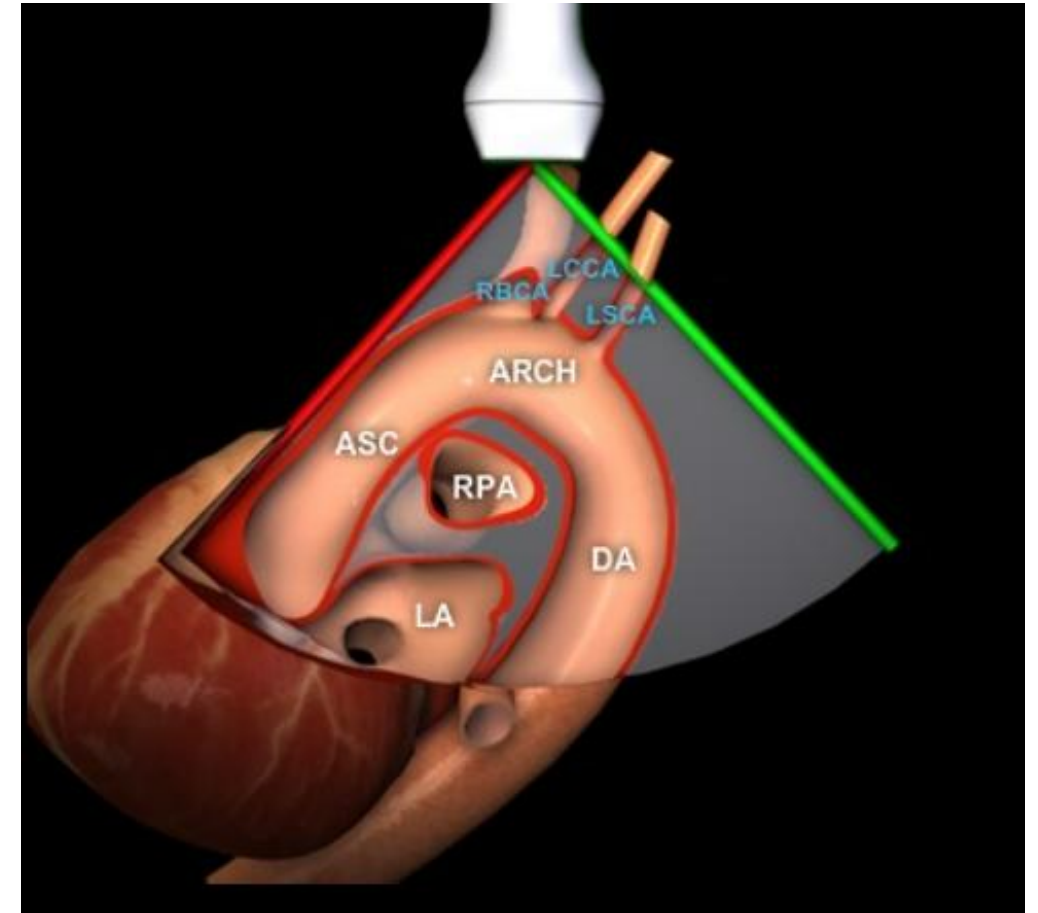
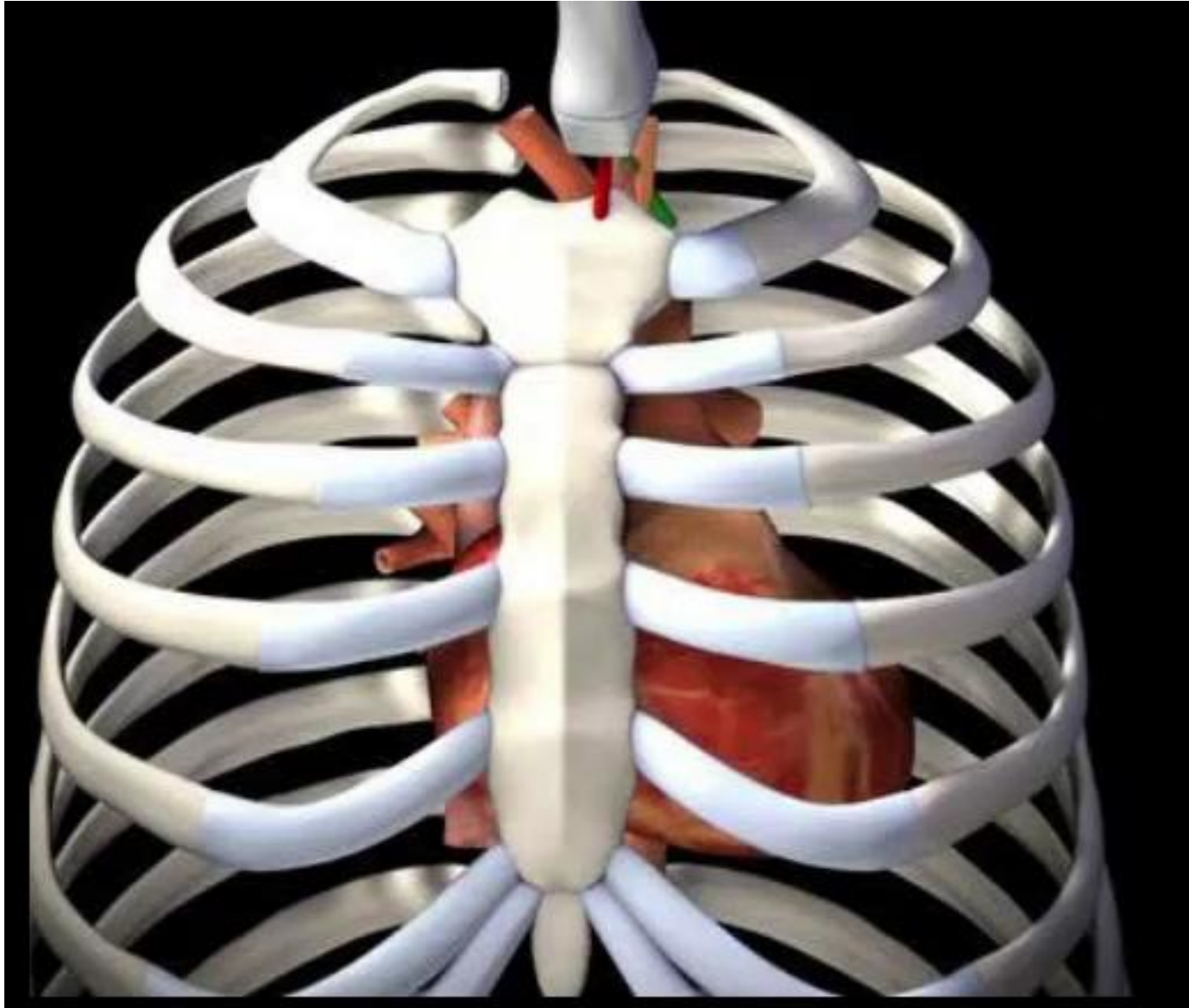
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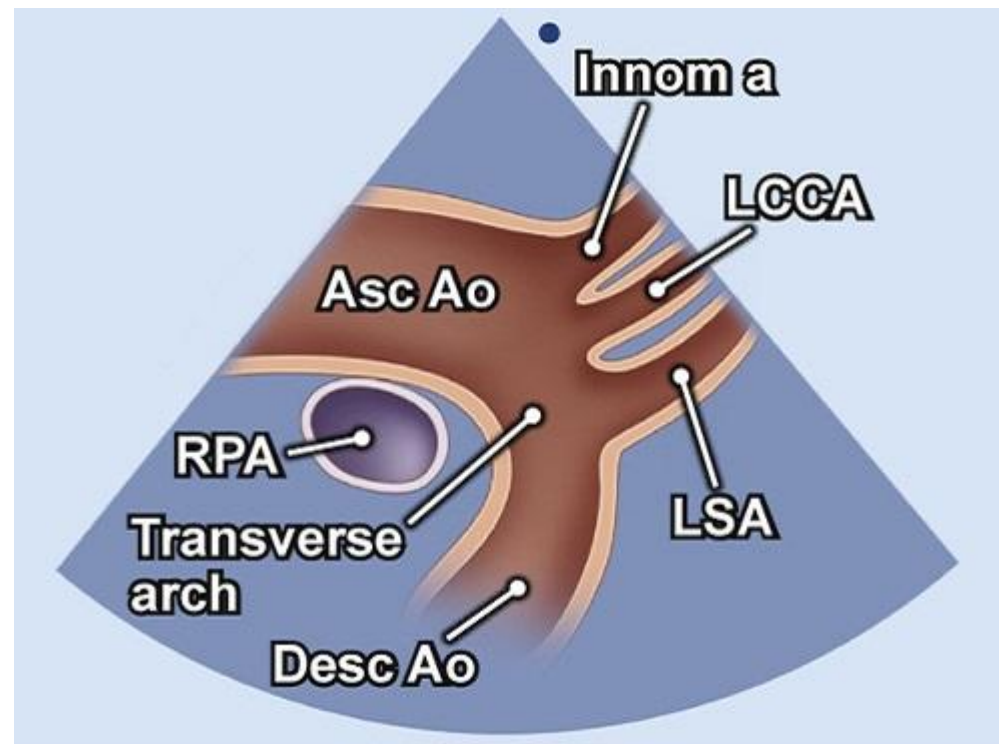
FEREASTRA SUPRASTERNALA



FEREASTRA SUPRASTERNALA



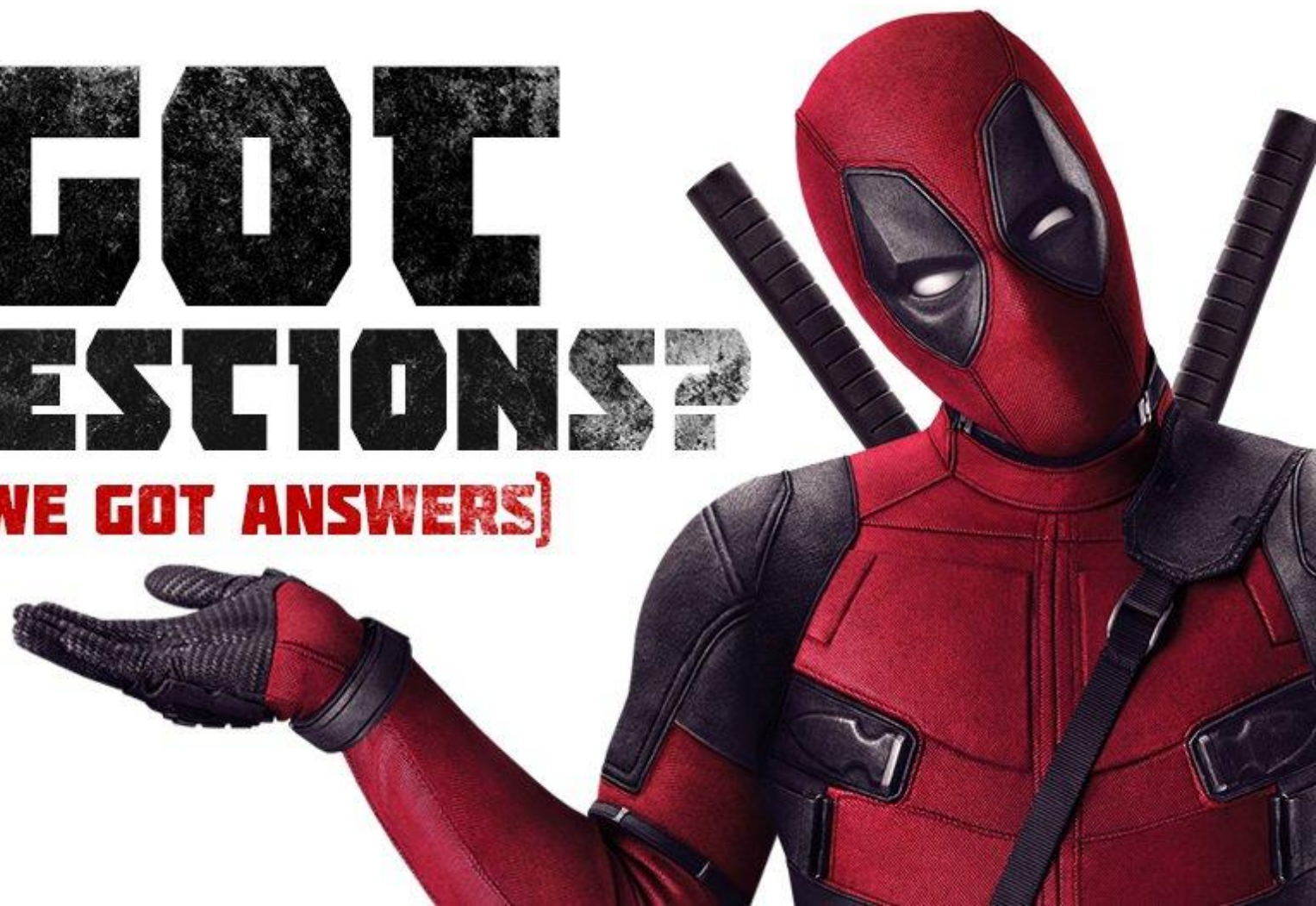
Fereastra suprasternal





Prezența

**GOT
QUESTIONS?**
(WE GOT ANSWERS)



Facultatea de Medicina.
(Universitatea Veche.)

