ECHOCARDIOGRAPHY

…From a Sonographer's Perspective

THE NOTEBOOK 8

Chapter IVa: Transthoracic Echocardiogram

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IVa. TRANSTHORACIC ECHO (TTE)

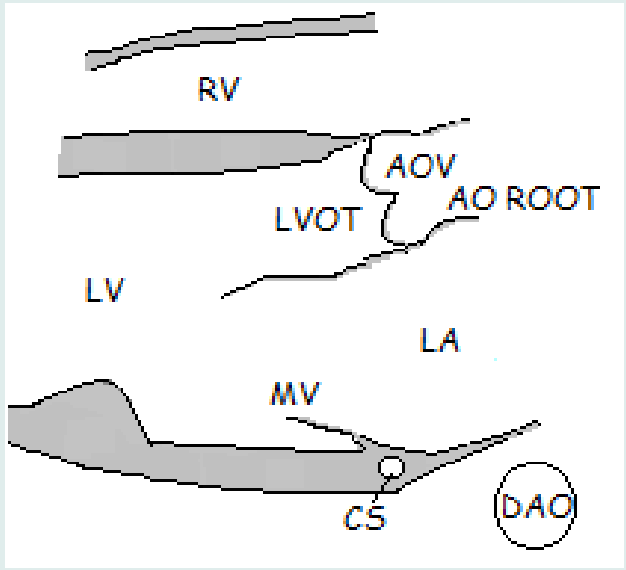
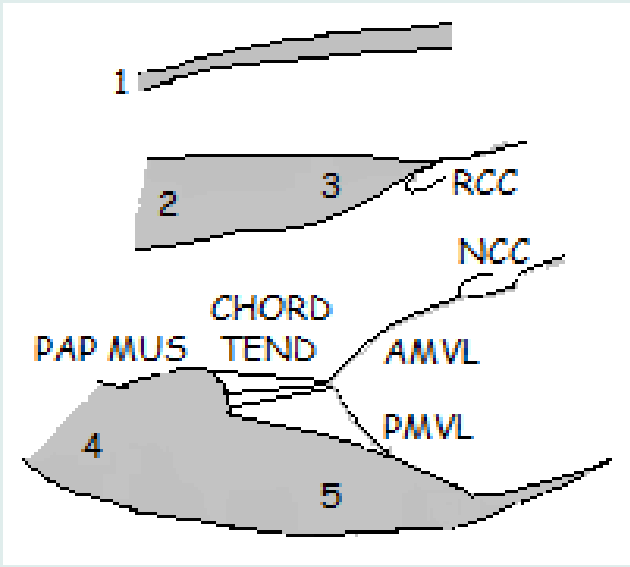
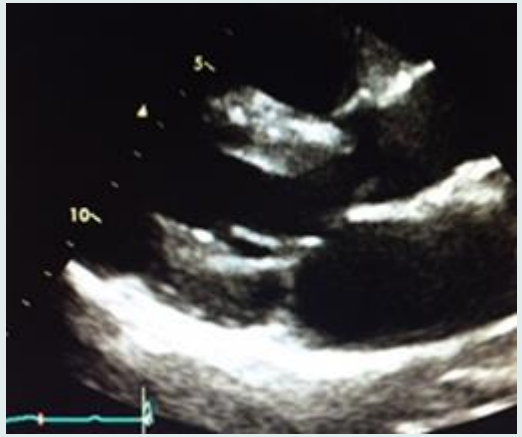
OBJECTIVES

Upon completion of this section, the reader will be able to:

1. Discuss the TTE order, patient verification, EKG placement, patient positioning, and scanning options.
2. Recognize when a limited TTE is advised and some common indications.
3. Define different methods of calculating the LVEF.
4. Stay up-to-date and integrate the latest TTE guidelines, required dimensions, and routine calculations.
5. Identify and interpret normal cardiac anatomy.
6. Suggest what needs to be ruled out during TTE.

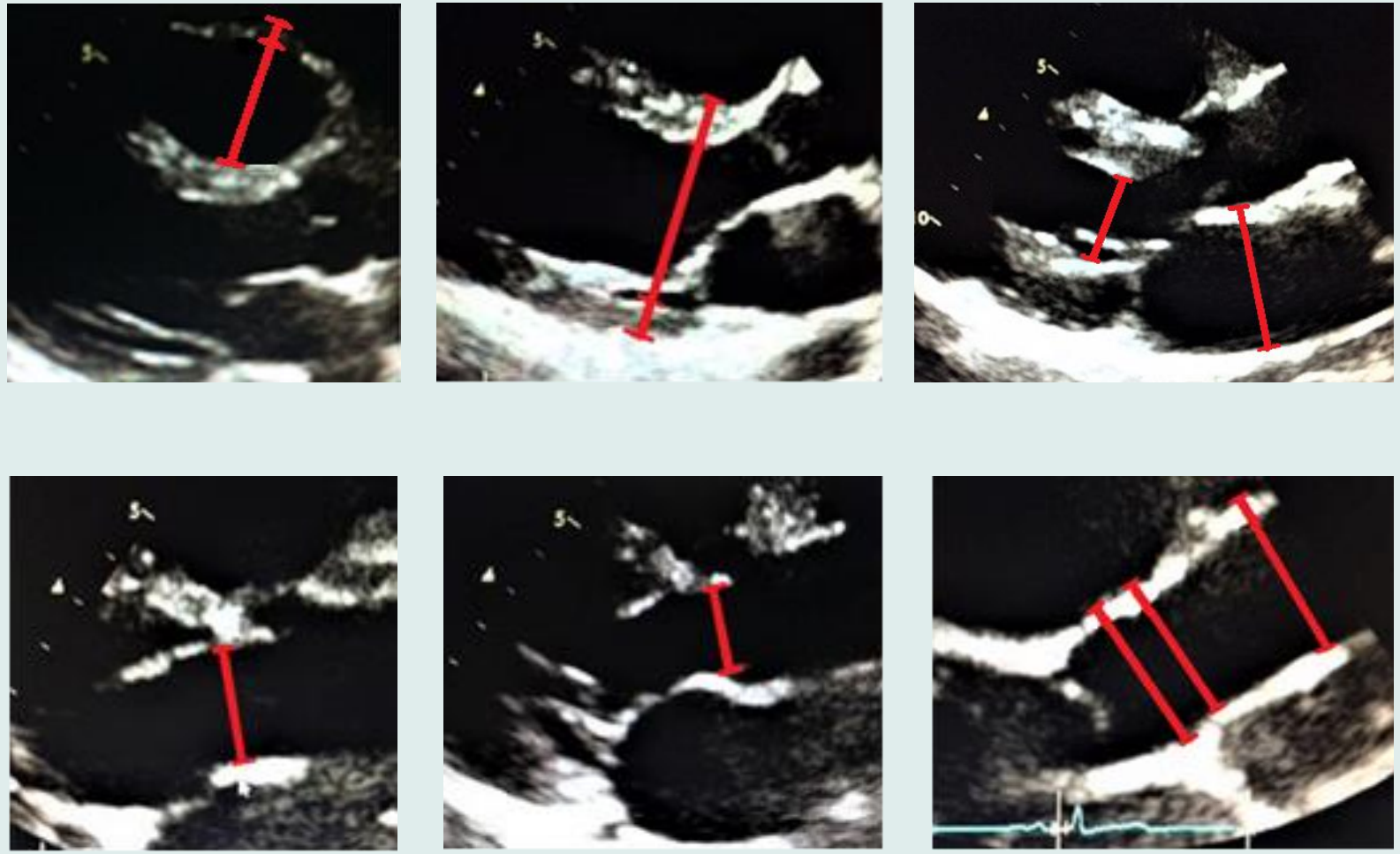
PARASTERNAL LAX & SAX

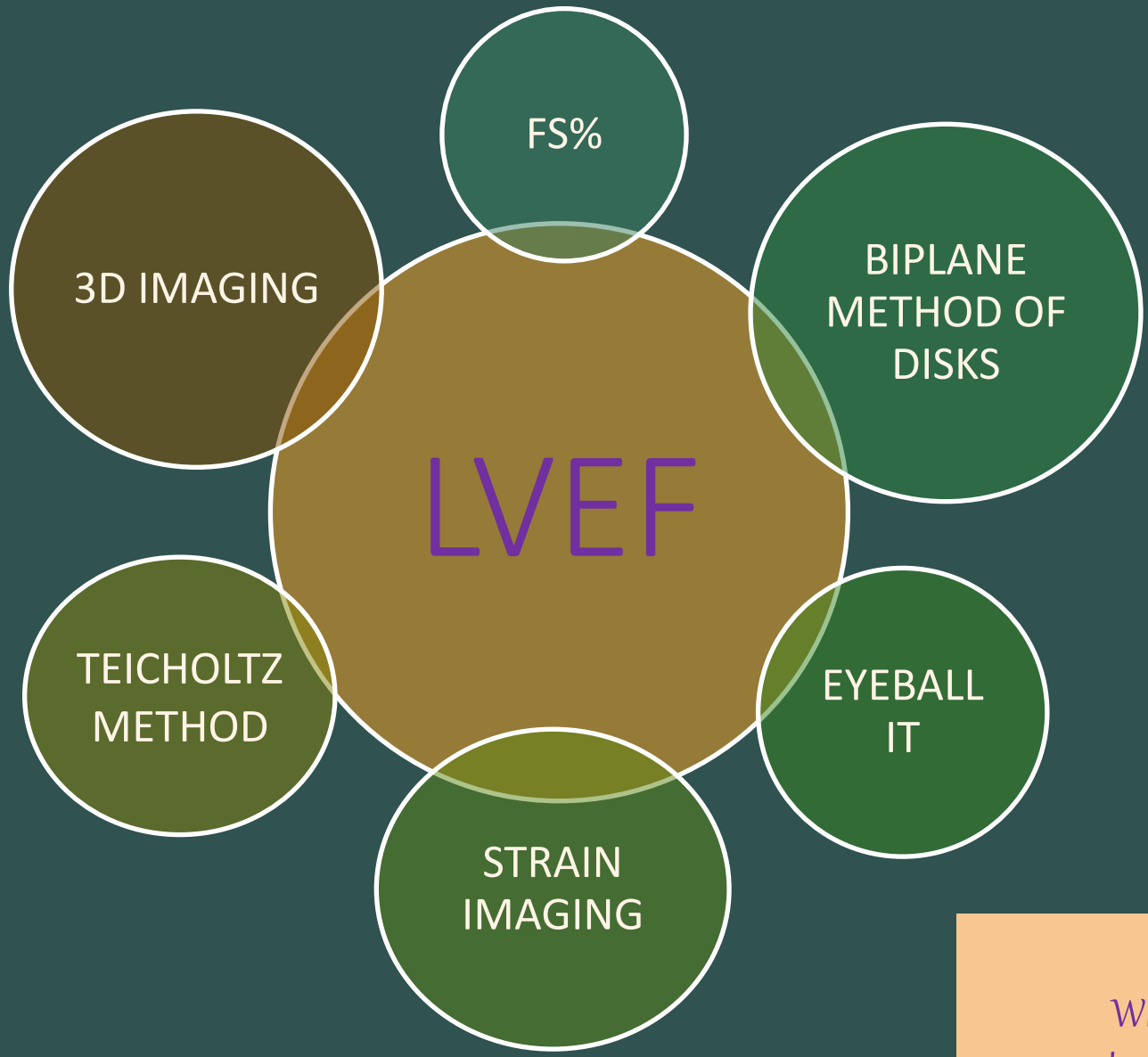
PARASTERNAL WINDOW

VIEW	PROTOCOL	IMAGES
LAX LV	1) Increase depth • entire cardiac structure & surroundings 2) Decrease depth • chamber size • wall thickness • global function • valvular function	 POP QUIZ! Label the wall segments #1 - 5.    

POP QUIZ!

What phase of the cardiac cycle are the dimensions acquired?

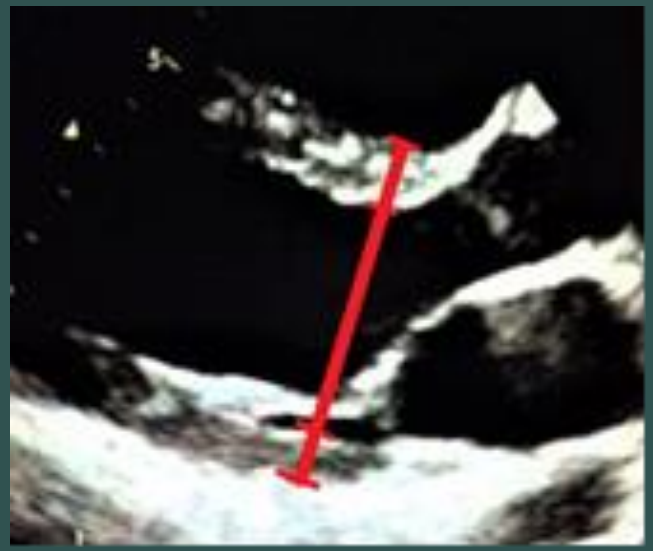
VIEW	PROTOCOL	IMAGES
LAX LV & LAX AO	3) 2D linear dimensions • RV wall • RVOTprox • IVS • LVIDd • PWT • LVIDs • LA • LVOT • AOV annulus • sinuses of Valsalva • sinotubular junction • proximal AAO	



POP QUIZ!
What does LVEF measure &
what methods are discouraged?

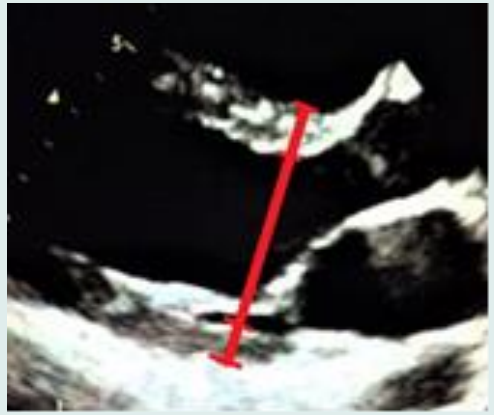
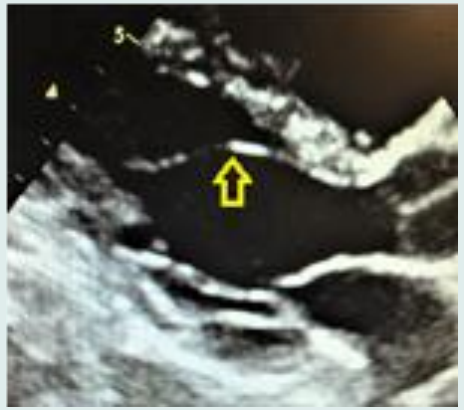
VIEW	PROTOCOL	IMAGES
LAX LV	4) Anterior wall of RV • thin • squeezes concentrically • end-diastolic RV wall thickness (1 - 5 mm) 5) RV • most anterior chamber • smaller & more trabeculated than LV • complex crescent shape—tricky to measure • moderator band • end-diastolic RVOTprox diameter (20 - 30 mm)	

POP QUIZ!
What does the arrow indicate?



According to the ASE Guidelines,

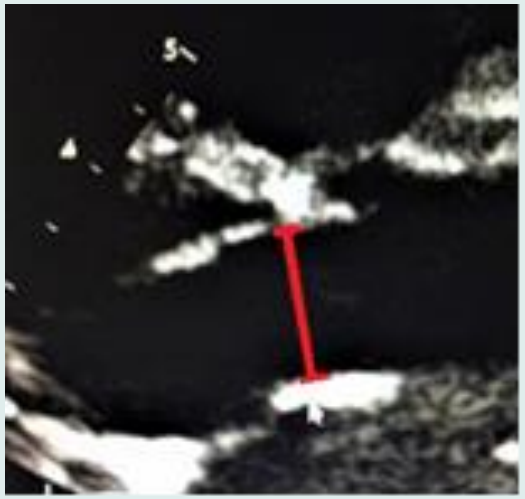
- *acquire LV dimensions perpendicular to the structures,*
- *in a straight line,*
- *at or immediately below the tips of the MV leaflets,*
- *with calipers placed at myocardial wall/cavity interface & wall/pericardium interface.*

VIEW	PROTOCOL	IMAGES
LAX LV	6) IVS & LVPW • 1:1 ratio • thicker than RV walls • squeeze concentrically • sigmoid-shaped septum • end-diastolic IVS & PWT dimensions (female 6 - 9 mm, male 6 - 10 mm) 7) LV • largest chamber • posterior & lateral to RV • ellipsoid shape • larger, more conical & less trabeculated than RV • false tendon • LVIDd (female 38 - 52 mm, male 42 - 58 mm) • LVIDs (female 22 - 35 mm, male 25 - 40 mm)	  POP QUIZ! What do the arrows indicate?  

LVH SEVERITY SCALE				
	NORMAL (mm)	MILD LVH (mm)	MOD LVH (mm)	SEVERE LVH (mm)
MALE	6 - 10	11 - 13	14 - 16	≥ 17
FEMALE	6 - 9	10 - 12	13 - 15	≥ 16

POP QUIZ!

If the IVS & PWT measure 15 mm, what is the degree of LVH?

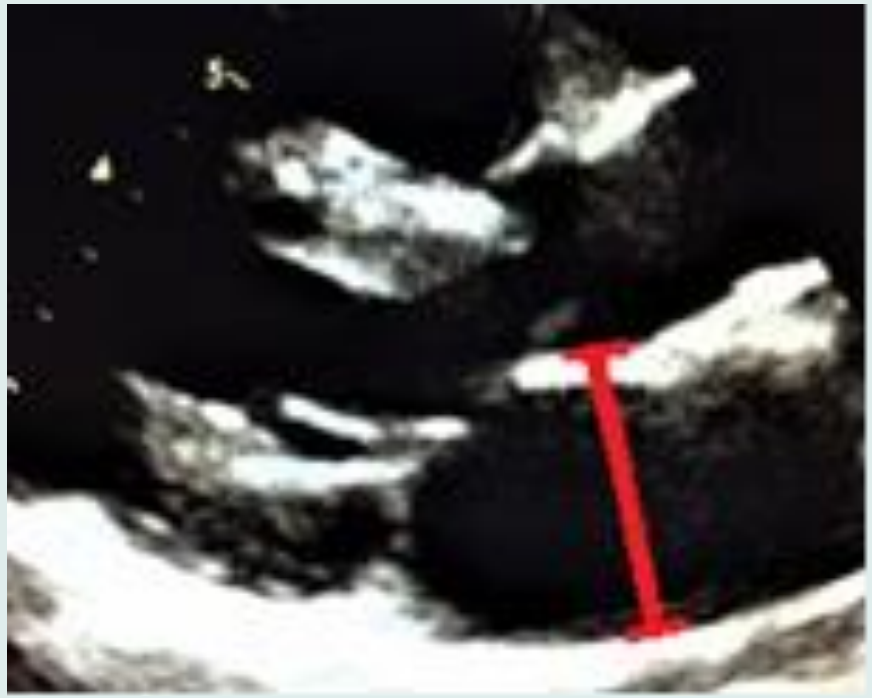
VIEW	PROTOCOL	IMAGES
LAX LV	8) LVOT • unobstructed • laminar flow • zoom & adjust gains • mid-systolic LVOT diameter (18 - 22 mm)	

POP QUIZ!
Where exactly is the
LVOT diameter acquired?

VIEW	PROTOCOL	IMAGES
LAX LV	9) AMVL & PMVL • thin & pliable • unrestricted opening • continuous with posterior wall of AO • AMVL more mobile • no MVP/MAC	 

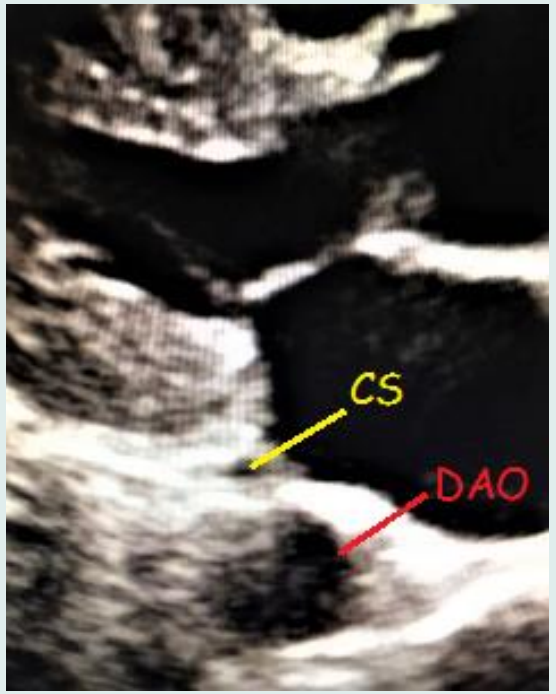
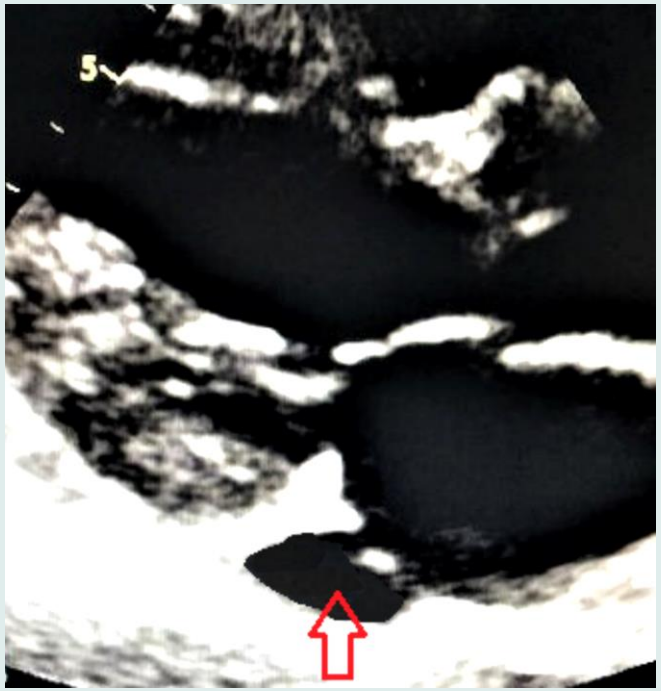
POP QUIZ!

What does the blue line indicate?

VIEW	PROTOCOL	IMAGES
LAX LV	10) LA • most posterior chamber • reservoir that receives PV4 return • passageway to LV • contractile pump (atrial systole/kick) • size is gender dependent & indexed to BSA • smaller than LV • end-systolic anteroposterior LA linear dimension (female 27 - 38 mm, male 30 - 40 mm) • LA linear dimension vs LAVi	

POP QUIZ!

What percentage of LV filling is provided by the atrial kick?

VIEW	PROTOCOL	IMAGES
LAX LV	11) SAX of CS • 4 - 10 mm • within myocardium • posterior to LA-LV junction • narrows during atrial contraction 12) SAX of DAO • separate structure • posterior to LA	 

POP QUIZ!

What does the arrow indicate?