



ECHOCARDIOGRAPHY...

From a Sonographer's Perspective:

THE NOTEBOOK 7

Chapter IV: The Transthoracic Echocardiogram

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ECHO...THE NOTEBOOK 7 & THE WORKBOOK 7
are approved by the SDMS as a self-instructional activity for

26 SDMS CME credits

until 16 April 2019 & hopefully longer!

Please visit www.echonotebook.com or check out the
yellow pages in the back of THE WORKBOOK for details!

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IV. THE TRANSTHORACIC ECHO (TTE)

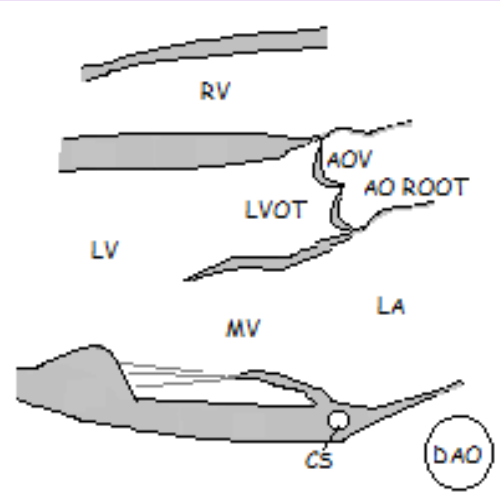
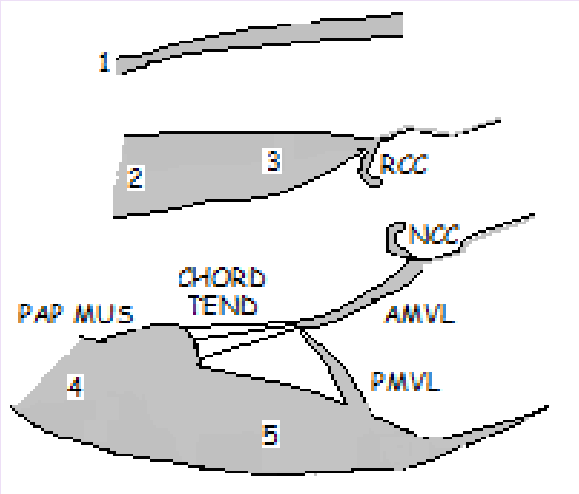
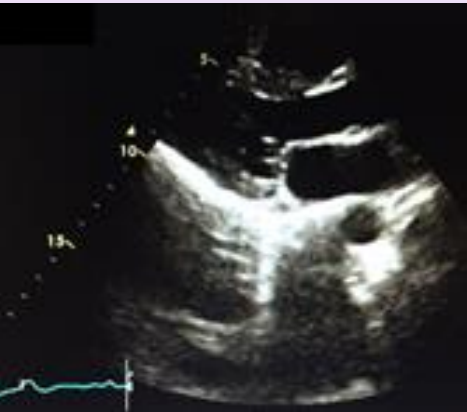


OBJECTIVES

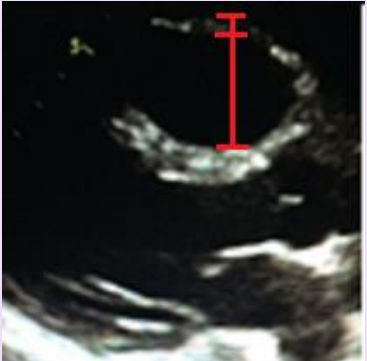


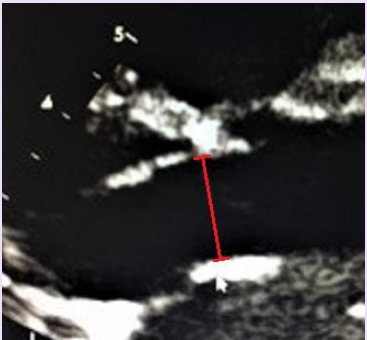
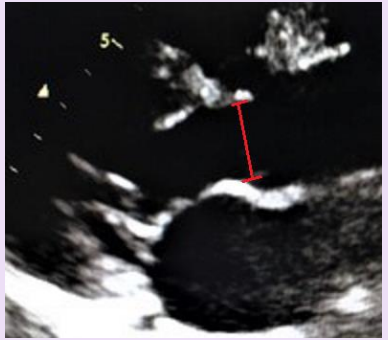
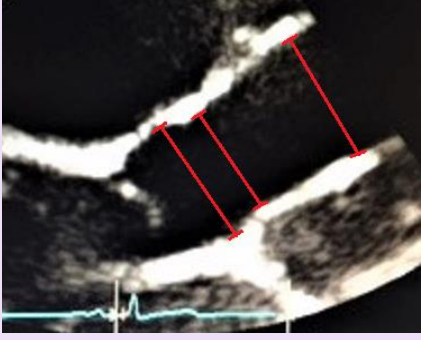
Upon completion of this section, the reader will be able to

1. Identify the Cardiac Sonographer's role prior to the TTE, including paperwork, patient positioning, & scanning options.
2. Apply the steps of the TTE, including 2D, M-mode, & Doppler of all the views incorporating the cardiac dimensions and routine calculations of the cardiac anatomy.
3. Better understand & recognize the cardiac anatomy and interpret the findings.
4. Acquire & interpret the updated LV diastolic function parameters; as well as an introduction to RV diastolic function.
5. Although no longer recommended, recognize, define, & acquire the M-mode dimensions.

NOTES: TTE PREP

- verify order/indication
- gather equipment
- check records/previous echo
- intro & reason for visit
- enter/verify patient's data
- gown
- EKG
- adjust bed height
- left vs right hand scanning
- patient position
- consider...
 - ✓ policy & procedure
 - ✓ flexibility
 - ✓ abnormal findings
 - ✓ utilize zoom/enlarge
 - ✓ optimize settings
 - ✓ if necessary call for assistance!

| VIEW | PROTOCOL | IMAGES |
|---|---|---|
| <p>LAX LV</p> <ul style="list-style-type: none"> • 4th ICS • indicator toward right shoulder | <p>1) Increase depth</p> <ul style="list-style-type: none"> • entire cardiac structure & surroundings <p>2) Decrease depth</p> <ul style="list-style-type: none"> • chamber size • wall thickness • global function • valve function | <div style="display: flex; justify-content: space-around;">   </div> <p style="text-align: right; color: purple; font-style: italic;">POP QUIZ! Label the wall segments #1 – 5.</p> <div style="display: flex; justify-content: space-around; margin-top: 20px;">    </div> |

| VIEW | PROTOCOL | IMAGES | | |
|-----------------------|--|--|--|--|
| LAX LV & LAX AO | <p>3) 2D dimensions</p> <ul style="list-style-type: none"> • RVFW • RV • IVS • LVIDd • PWT • LVIDs • LA • LVOT • AOV annulus • sinus of Valsalva • sinotubular junction • proximal AAO |  |  |  |
| | |  |  |  |

POP QUIZ!



What phase(s) of the cardiac cycle
are the dimensions acquired?

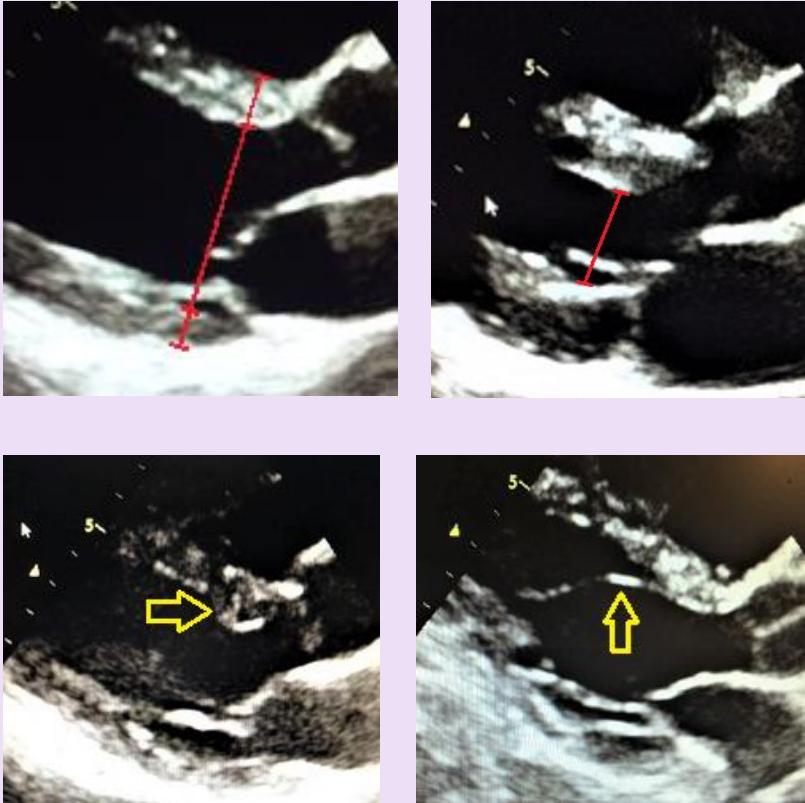
NOTES: LVEF

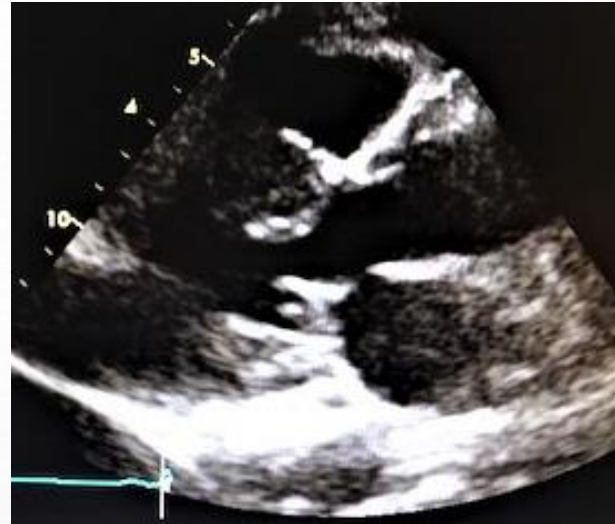
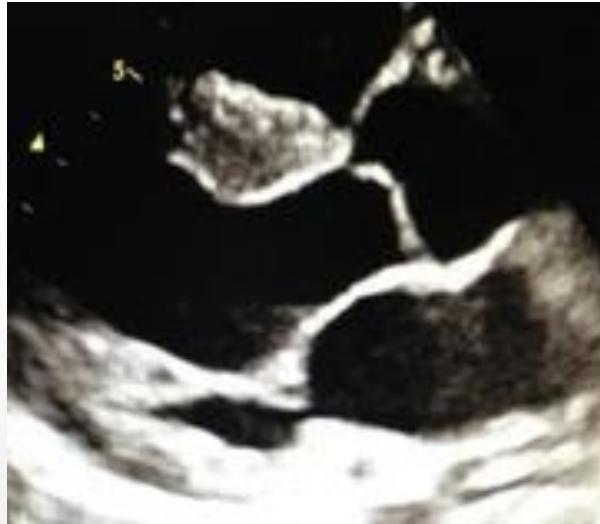
- visually estimate LVEF – useful, need experience
 - Teicholtz linear method – out of date
 - Biplane method of disk summation – recommended!
-
- ✓ EDV
 - ✓ ESV

POP QUIZ!

What does LVEF measure?

| VIEW | PROTOCOL | IMAGES |
|--------|---|---|
| LAX LV | <p>4) RV anterior wall</p> <ul style="list-style-type: none"> • thin • squeezes concentrically • end-diastolic RV wall thickness (1 – 5 mm) <p>5) RV</p> <ul style="list-style-type: none"> • most anterior chamber • smaller than LV • complex crescent shape • moderator band • end-diastolic RVOT_{prox} diameter (20 – 30 mm) |  <p>POP QUIZ! What does the arrow reveal?</p>  |

| VIEW | PROTOCOL | IMAGES |
|--|---|--|
| <p>LAX LV</p> <p>Acquire LV dimensions perpendicular to cardiac structures, in a straight line, at or immediately below tips of MV leaflets, with calipers placed at myocardial wall/cavity interface & wall/pericardium interface.</p> <p>(ASE guidelines, J Am Soc Echocardiogr 2015;28:1-39)</p> | <p>6) IVS & INF LAT WALL</p> <ul style="list-style-type: none"> • 1:1 ratio • thicker than RV walls • squeeze concentrically • sigmoid shaped septum • end-diastolic IVS & INF LAT WALL (aka PWT) dimensions (women 6 – 9 mm & men 6 – 10 mm) <p>7) LV</p> <ul style="list-style-type: none"> • posterior & lateral to RV • forms apex • ellipsoid • larger & less trabeculated than RV • false tendon • end-diastolic LV dimension (LVIDd) (women 37.8 - 52.2 mm & men 42.0 – 58.4 mm) • end-systolic LV dimension (LVIDs) (women 21.6 – 34.8 mm & men 25.0 – 39.8 mm) |  <p>POP QUIZ! What do the arrows reveal?</p> |



LVH SEVERITY SCALE

| | NORMAL (mm) | MILD LVH (mm) | MOD LVH (mm) | SEVERE LVH (mm) |
|-------|-------------|---------------|--------------|-----------------|
| MEN | 6 - 10 | 11 - 13 | 14 - 16 | ≥ 17 |
| WOMEN | 6 - 9 | 10 - 12 | 13 - 15 | ≥ 16 |

POP QUIZ!

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