Imaging / Knobology / Artifacts

2016 ASCEXAM / ReASCE Review Course

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Disclosures

None
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We Have a Problem

• The ASCeXAM evolves
• More questions on optimizing the images
• Easy if you scan – but if you don’t scan…

DUKE: Adams
The Solution

• You being here
• Me being here
• Us working together
Goals

• When to use what controls
• Optimizing the images
• Knowing what your techs are doing or not doing
• Kind of questions on the exam
Pre Lecture Test
Which standard 2D TTE view typically allows viewing of the LAA?

1. parasternal long axis
2. apical 4 chamber
3. subcostal 4 chamber
4. apical 2 chamber
The problem with this image can be corrected using:

a) overall gain
b) TGC controls
c) LGC controls
d) another view
To correct this view the transducer beam should be angled:

a) laterally
b) medially
c) cranially-up an interspace
d) caudally-down an interspace
Where should you position the pulsed wave Doppler sample volume for mitral inflow?

1. at the mitral valve annulus
2. in the middle of the mitral leaflets
3. at the tips of the mitral valve in systole
4. at the tips of the mitral valve in diastole
The best view to measure the RVOT, pulmonic valve and PA flow is:

1. right sternal border
2. subcostal short axis
3. parasternal long axis
4. parasternal short axis
What is an advantage of continuous wave Doppler over pulsed wave Doppler?

a) aliasing
b) range resolution
c) detection of high velocities
d) assessing the severity of regurgitation
When evaluating which of the following is it best to use a low wall filter?

1. aortic stenosis
2. pulmonary veins
3. mitral regurgitation
4. tricuspid regurgitation
What should be done in order to measure the E wave duration?

1. increase the gain
2. find a better window
3. decrease the wall filter
4. increase the wall filter
Now the Lecture
The Challenge

- Get the image
- Optimize the image
2 Common Mistakes

• Over Gaining
  – destroys resolution
Important controls
TEE Proper Gain

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Sonographer says:

- The images looked fine on the machine!
Monitor Mismatch

- Stay away from deep blacks
Monitor too dark
Monitor adjusted
TGC

- Time Gain Compensation
- Evens out the overall image brightness
- Suppresses the strong near field echoes
- Boosts the weaker far field echoes
Bad TGC Settings
2 Common Mistakes

• Over gaining
• Foreshortened LV
Foreshortened
Apical Four-Chamber Image true apex
Maximize RV dimension
No aorta
No coronary sinus

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Image Quality

• Resolution
• Target acquisition
• Display (gray scale)
Image Quality

• Resolution
  – dot / detail size
  – the ability to differentiate two points in space
Image Quality

- Resolution
- Depends on frequency
- Varies throughout the image
Transducer frequency

• **Lower frequency**
  - better penetration (targets)
  - worse resolution

• **Higher frequency**
  - worse penetration (targets)
  - better resolution
Resolution

2.5 MHz  4.0 MHz
Image Quality

• Resolution

• Target acquisition
  - patient image quality
  - worse with higher frequencies
Goals

• Optimizing the images
  – using system controls
  – adjusting the transducer
When they show you this.
The question might be:
You want to center the SAX.
Sector indicator on pts left
For Doppler
Doppler spectral controls
Doppler Spectral

- Gain
- Wall filter
- Baseline shift
- Compression (gray scale)
Low Doppler Gain
High Doppler Gain
Just Right Doppler Gain
Doppler Spectral

- Gain
- Wall filter
  - used to suppress low velocities around the baseline
  - use less wall filter in order to accurately measure low velocity flows
  - use more filter when looking at high velocity jets (MR, AS, etc…)

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Low Wall Filter (75 Hz)
High Wall Filter (200 Hz)
Doppler Spectral

- Gain
- Wall filter
- Baseline shift
Baseline Shifted too Low

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Correct Baseline Shift
Doppler Spectral

- Gain
- Wall filter
- Baseline shift
- Compression (gray scale)
Less Compression

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Goals

• Optimizing the valves
• Using system controls or transducer movements
Not a knobology issue
Difference between annulus and tips on Doppler waveform (L2 & L4).

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Doppler - Mitral

- Apical 4 chamber
- Pulsed, low freq/gain
- Small sample size
- At leaflet tips
Doppler – Pulm. Veins

- Apical 4 chamber
- Pulsed, low freq/gain
- Medium sample size
- 1-2 cm into vein
Parasternal SAX Ao
2005 ASE Chamber Quantification Guidelines

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Goals

• Optimizing the valves
  – Imaging - using system controls or transducer movements
  – Doppler – PW or CW
CW vs PW Doppler

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Doppler – Pulm. Veins

• Apical 4 chamber
• Pulsed, low freq/gain
• Medium sample size
• 1-2 cm into vein
Systematic Approach

- Optimal gray scale
- Adjust the monitor
- Image in view / depth
- Focus point
- TGC – even gray throughout
- Overall gain – do not over gain!!!
- Compress
- ↑↓ TGC/LGC

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Gray Scale

- Contrast resolution
- Softness / brightness
- Post processing
- Persistence
GRAYSCALE

Wide range of gray

Narrow range of gray

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Why is it important?

- Accurate information
- Better diagnosis
- Know limitations
- Pass the exam
Post Lecture Test
Which standard 2D TTE view typically allows viewing of the LAA?

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4. apical 2 chamber

Smiley face
Apical 2 Chamber
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The End