Improving People's Lives Through Innovations in Personalized Health Care

Stress Echo:
Looking Beyond the Wall Motion

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(No disclosures)

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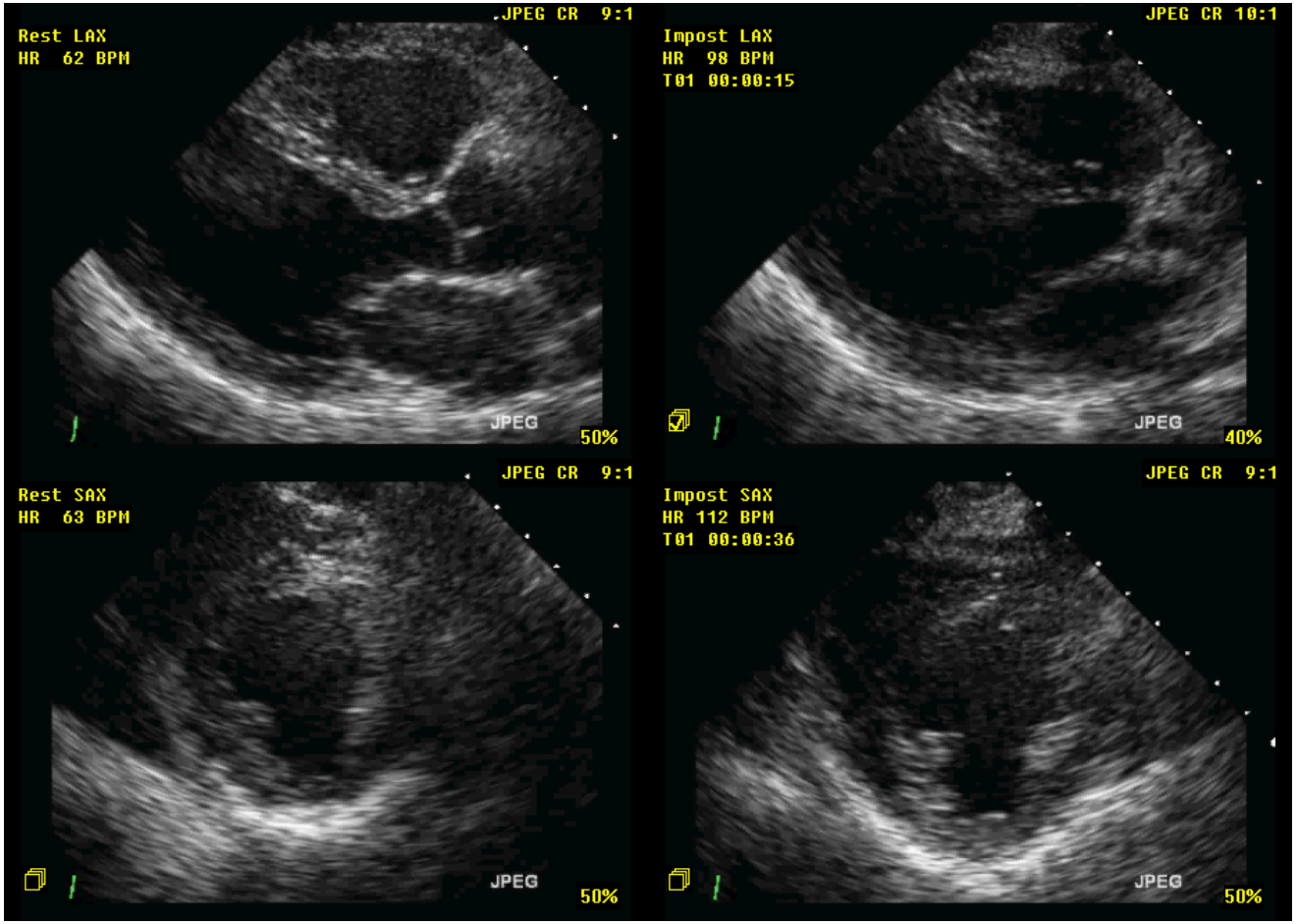
Heart and Vascular Center

Case 1

- 63 yo man with vague substernal discomfort
- Decreased exercise tolerance over past month
- Prior PCI to LAD 18 mos ago
- “Negative” cath for similar Sx 14 mos ago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JPEG CR 9:1
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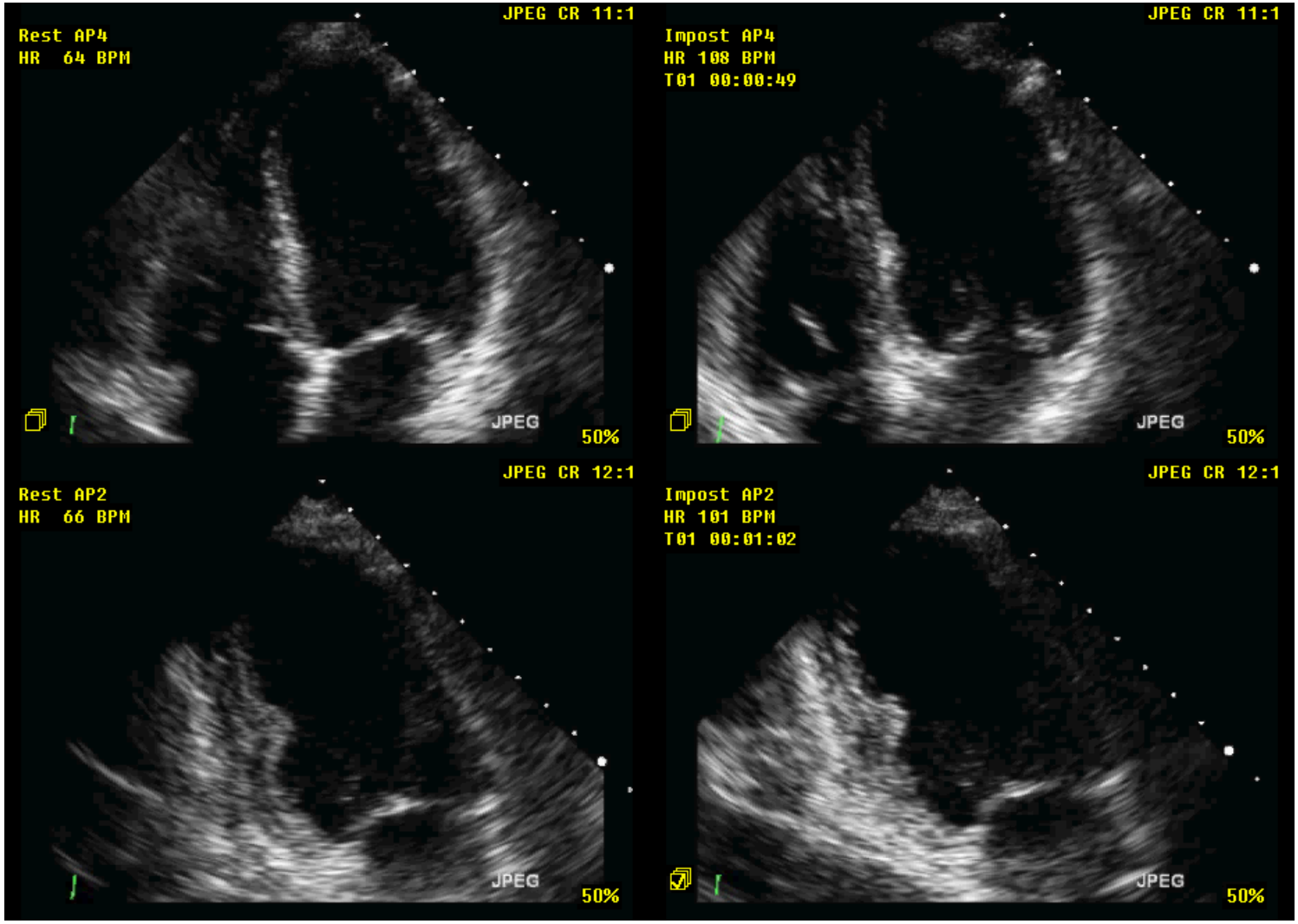
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JPEG CR 12:1
Rest AP2
HR 66 BPM
JPEG
50%
JPEG CR 12:1
Impost AP2
HR 101 BPM
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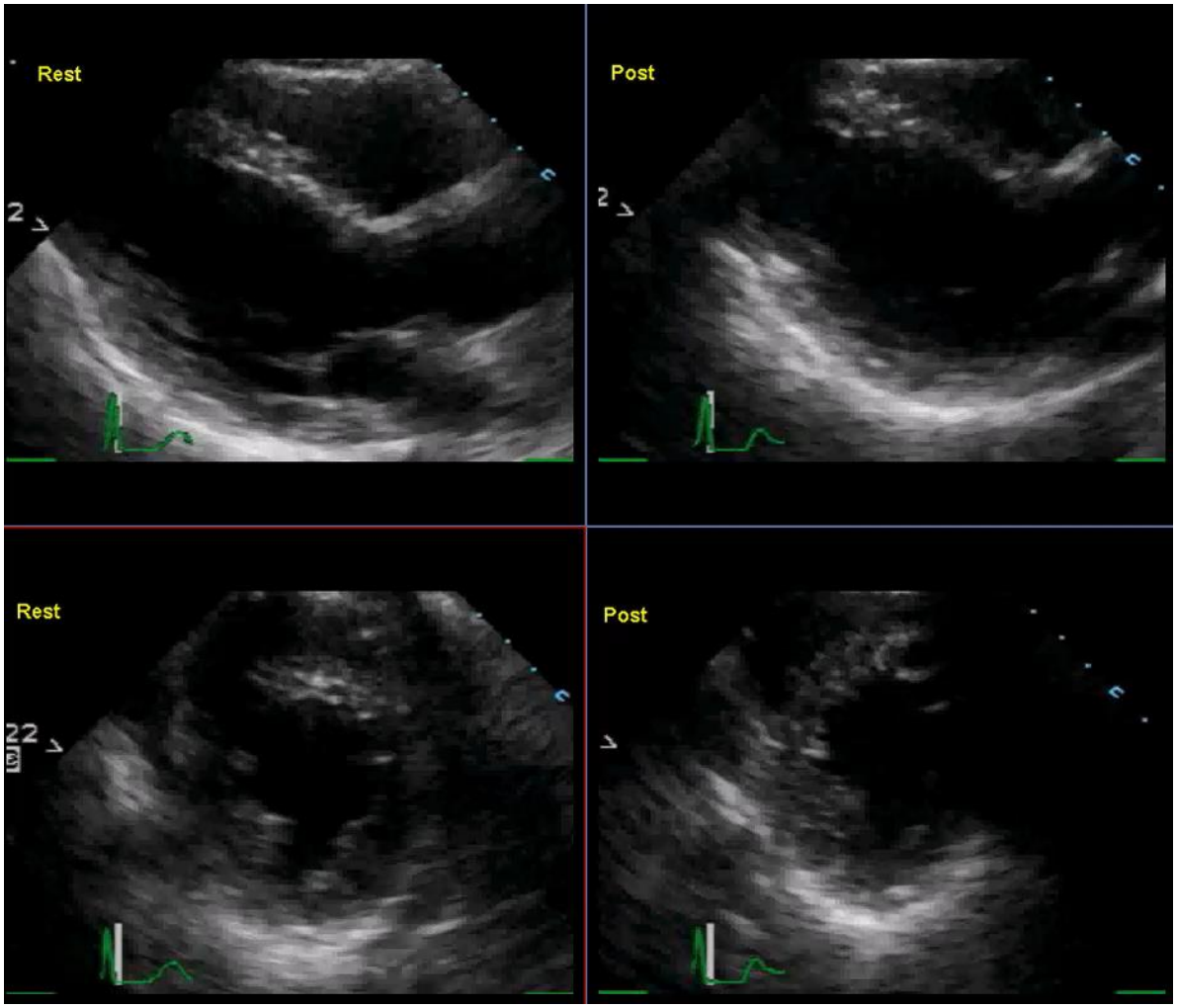
JPEG
50%

Case 2

- 71 yo woman with recent syncopal spell
- No cardiac history
- Normally active, exercises intermittently
- Recent decrease in exercise duration - dyspnea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Post
Rest
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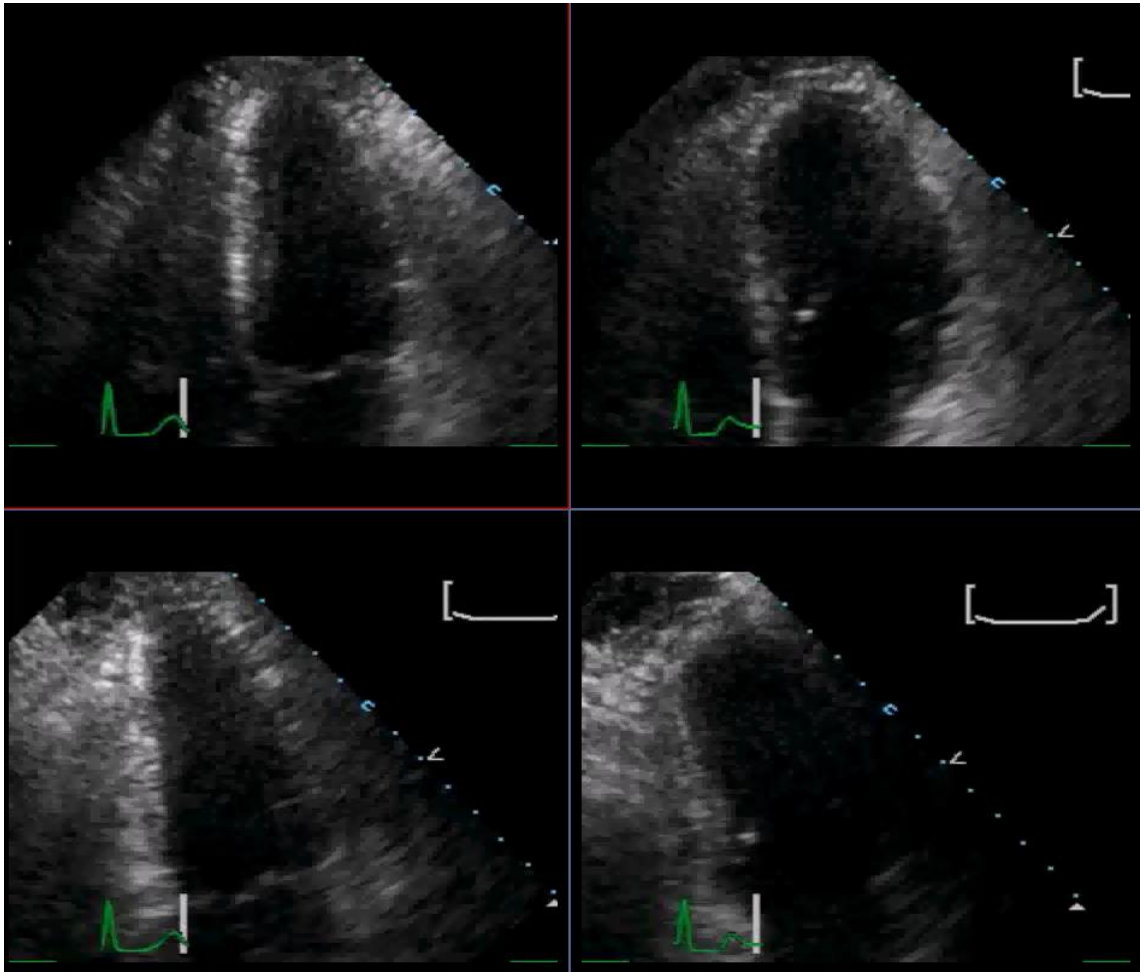
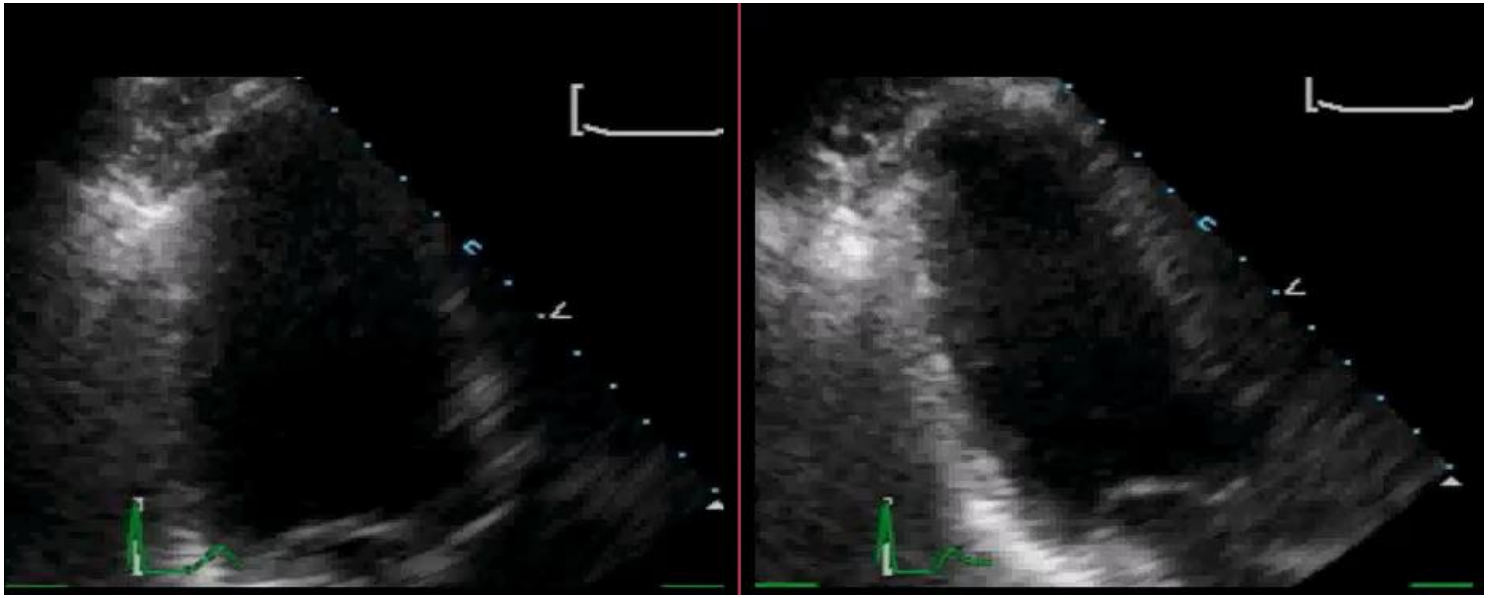




Both of these studies were interpreted as showing anterior ischemia.

What are the important differences between the 2 studies?

1. Ischemic threshold
2. Extent of the WMA
3. Change in LV volume
4. Rate of recovery

Lesson #1

Wall motion is the most important thing!

When?

Where?

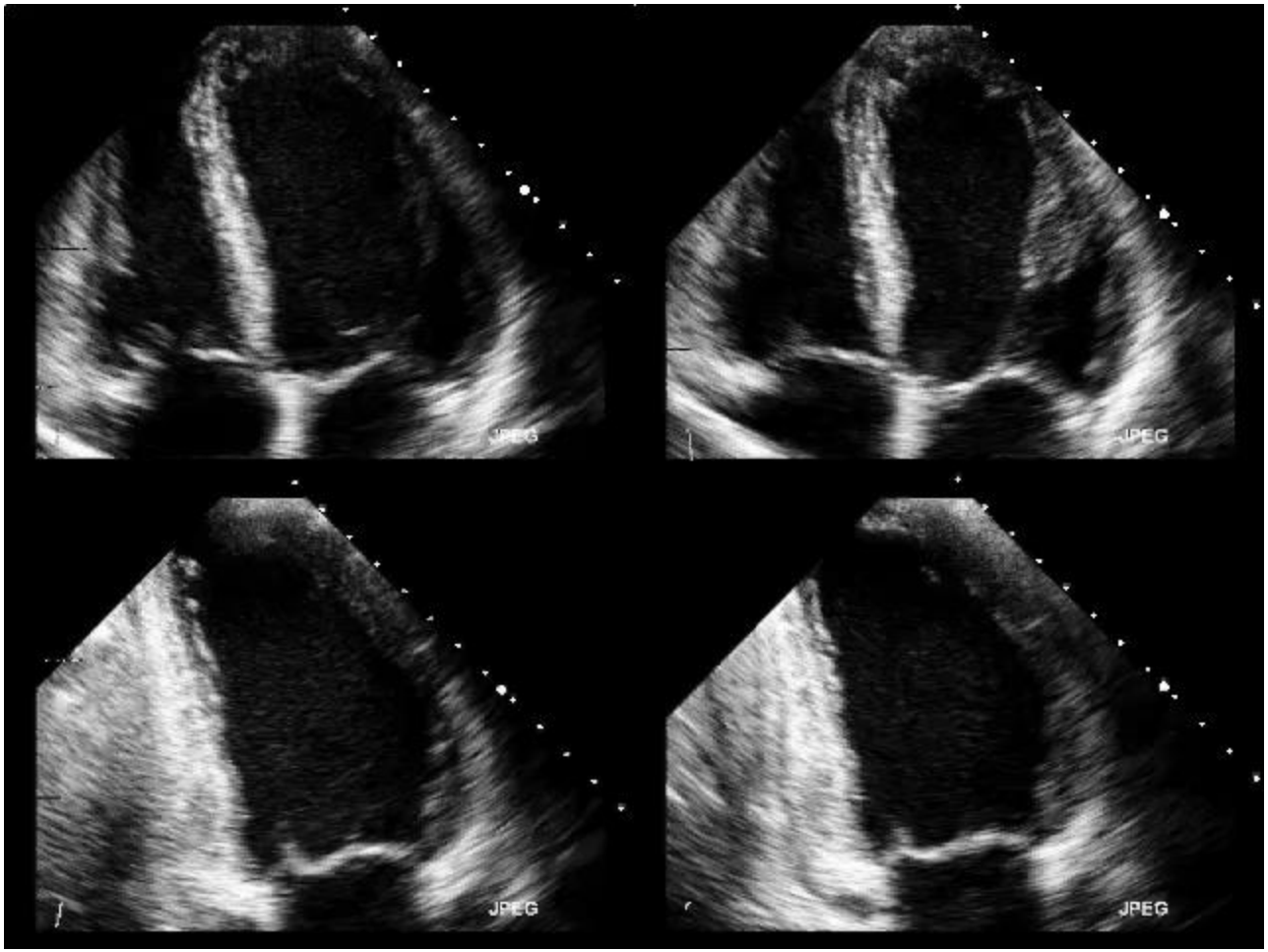
How much?

How does it affect the LV?

When does it resolve?

Case 3

- 48 yo woman with atypical chest pain
- No prior history
- Risk factors are DM, Htn
- Normal ECG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	HR	BP
Rest	68	140/80
3 min	88	160/85
6 min	104	200/90
9 min	133	245/90

Lesson #2

There's more to stress echo than just wall motion….

- Duration of exercise
- Resting EF
- Heart rate achieved
- BP response
- Rapidity of normalization
- LV volume response
- Coronary distribution

Proven Prognostic Importance

- Stress ECG results….

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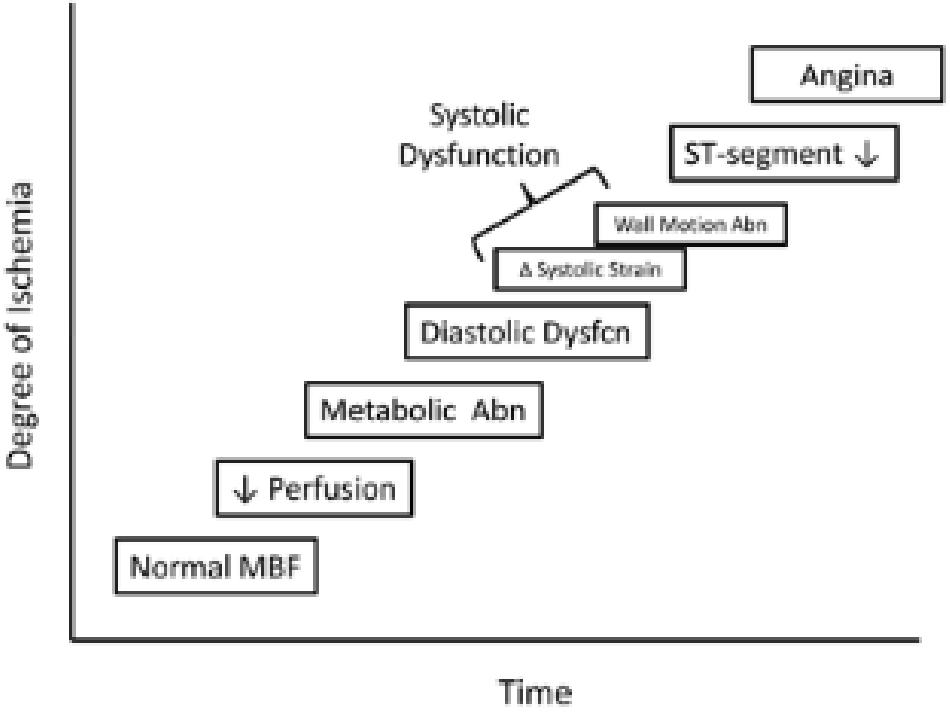
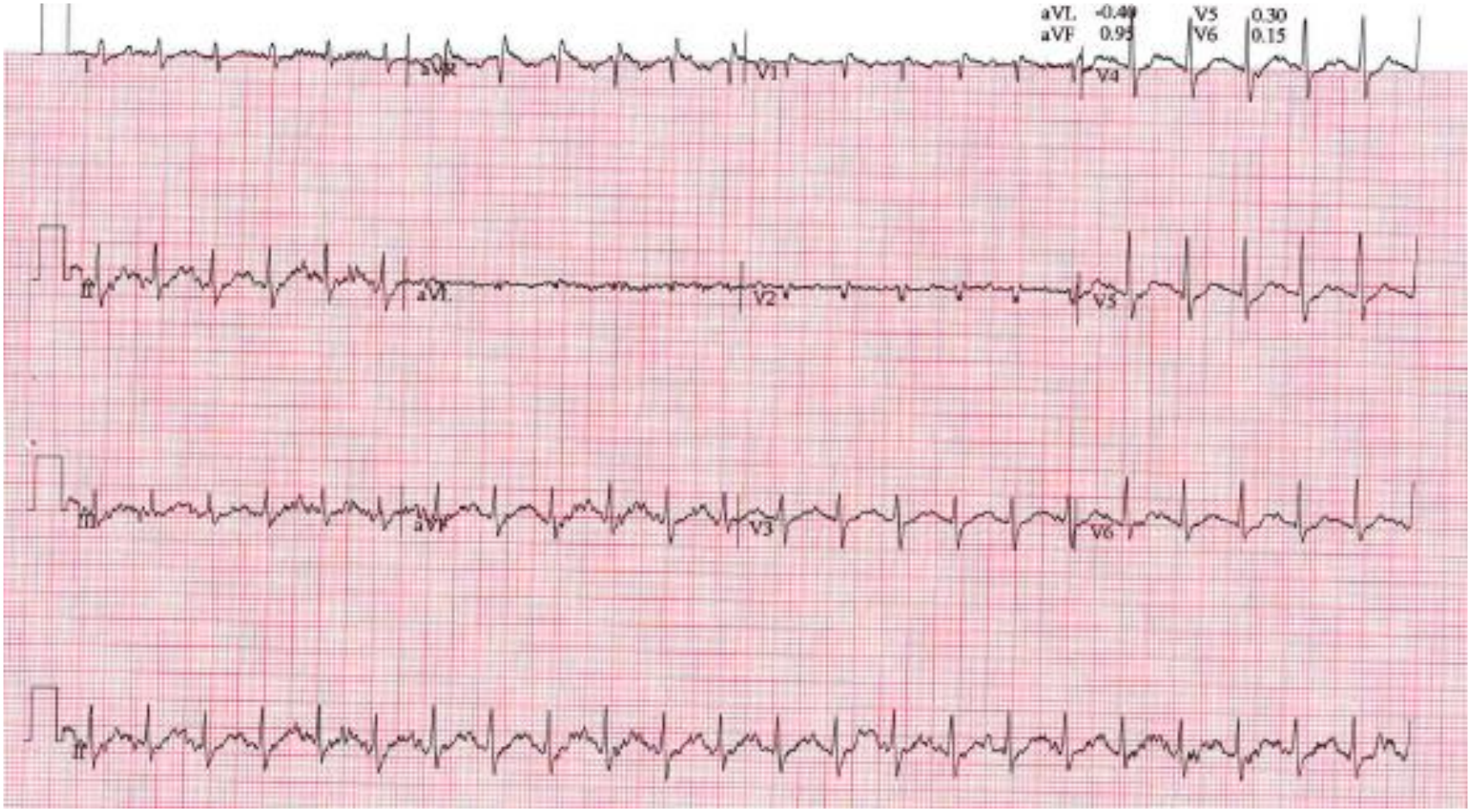
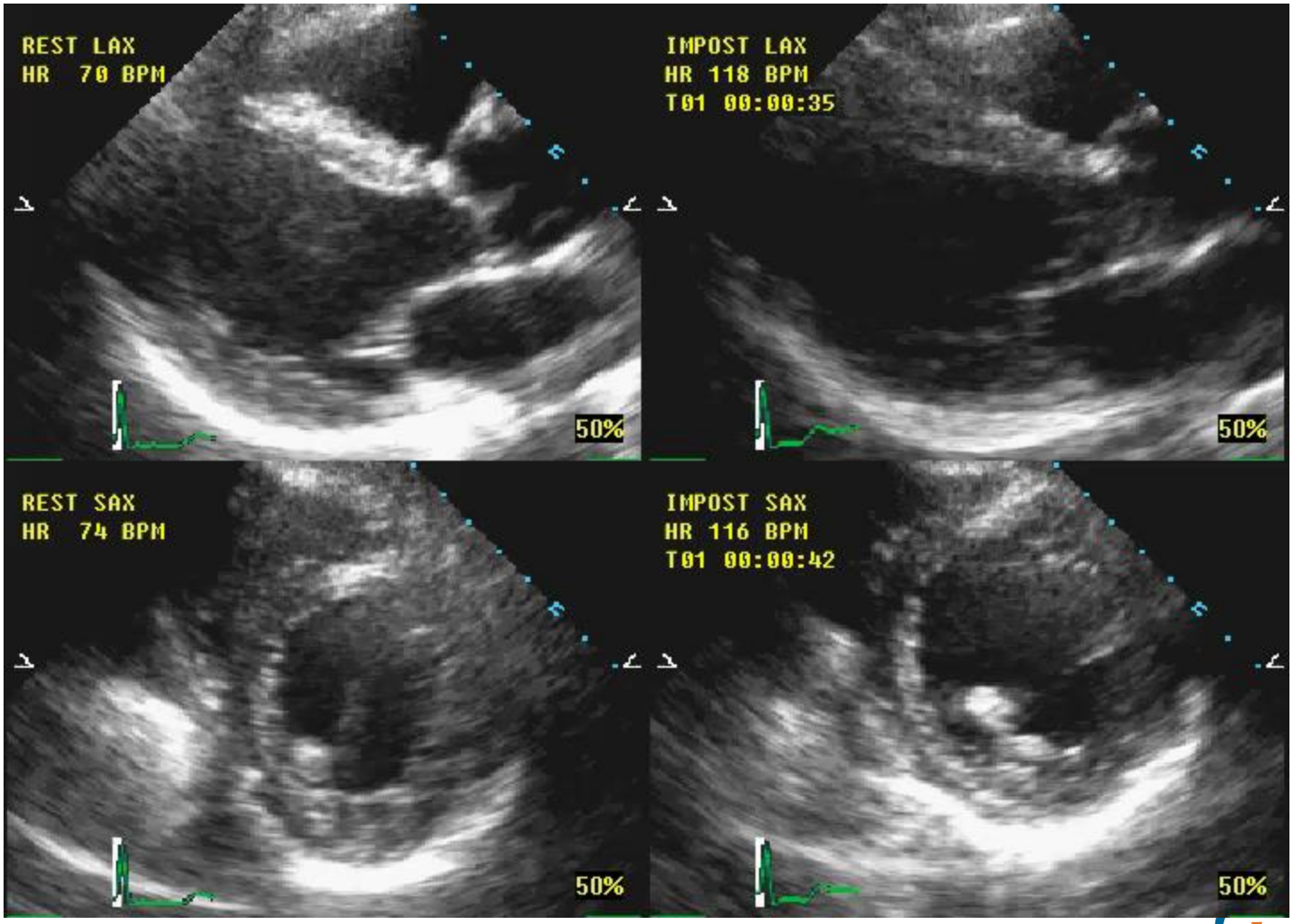

Angina
Systolic Dysfunction
ST-segment ↓
Wall Motion Abn
& Systolic Strain
Diastolic Dysfcn
Metabolic Abn
↓ Perfusion
Normal MBF
Degree of Ischemia
Time

Case 4

- 58 yo man with atypical Sx
- Multiple ED visits for chest pain and palpitations
- Multiple risk factors
- Prior normal TME



Peak exercise, HR 150/min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HR 70 BPM
50%
IMPOST LAX
HR 118 BPM
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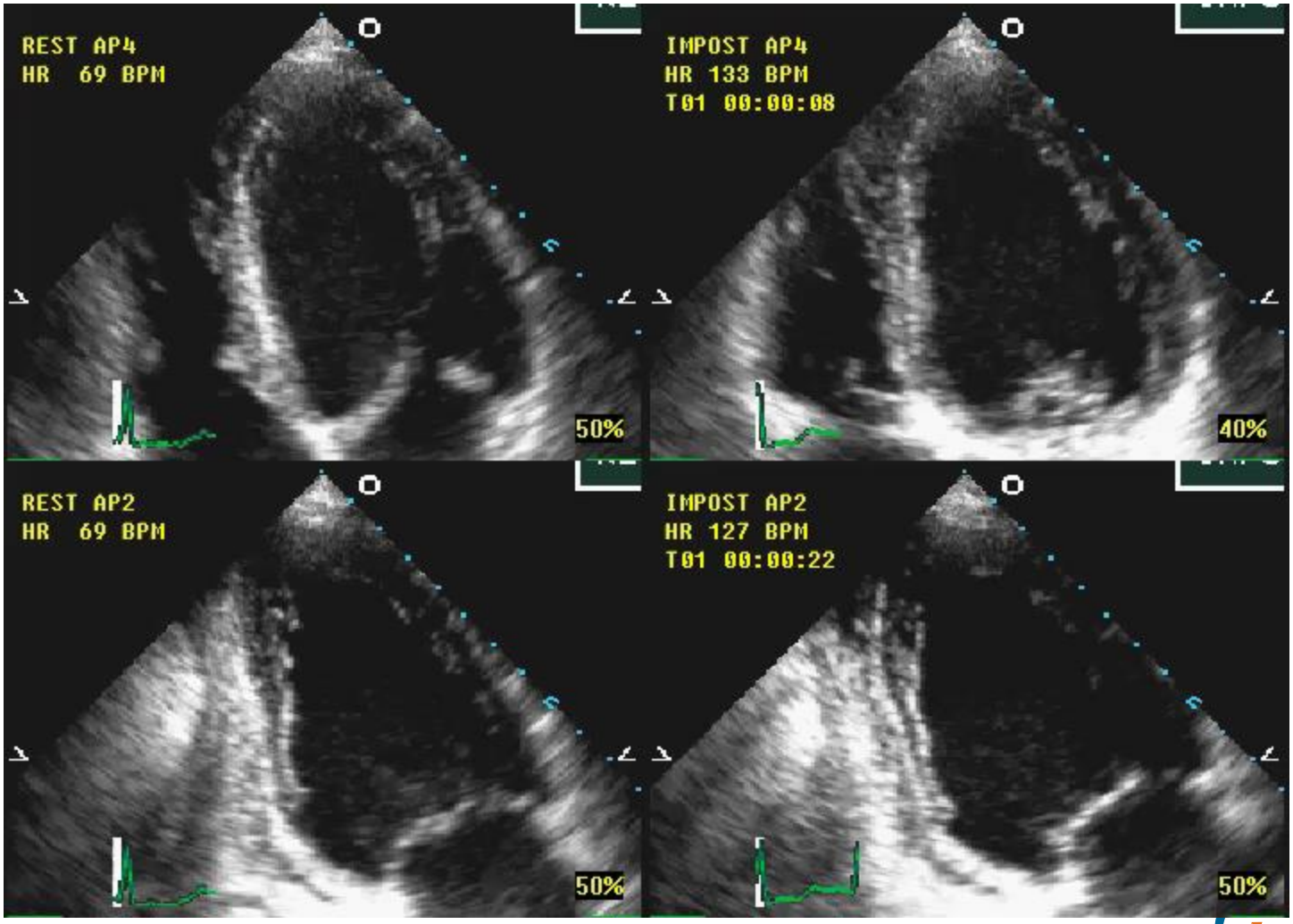
50%
REST SAX
HR 74 BPM
50%
IMPOST SAX
HR 116 BPM
T01 00:00:42
50%



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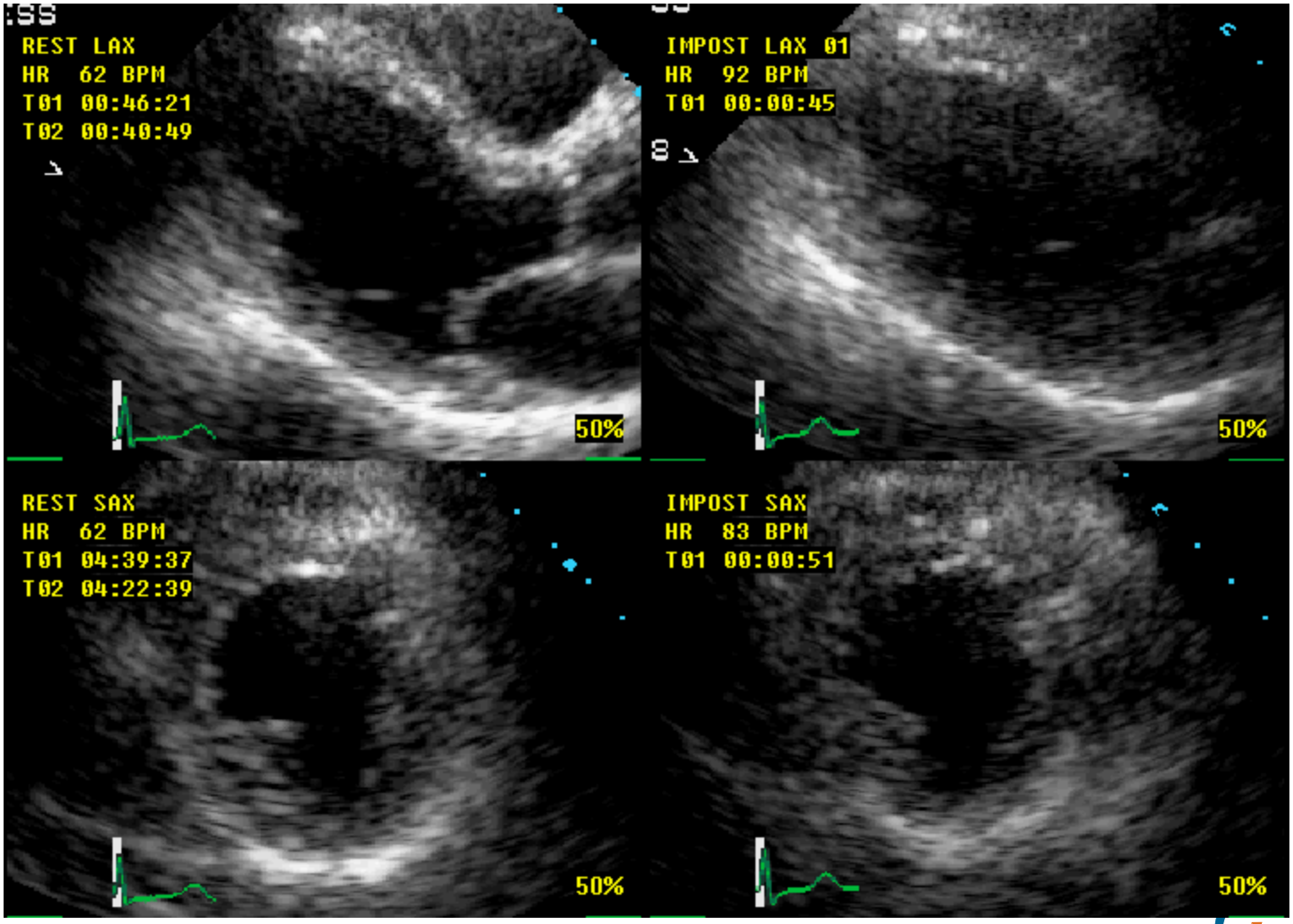
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HR 62 BPM
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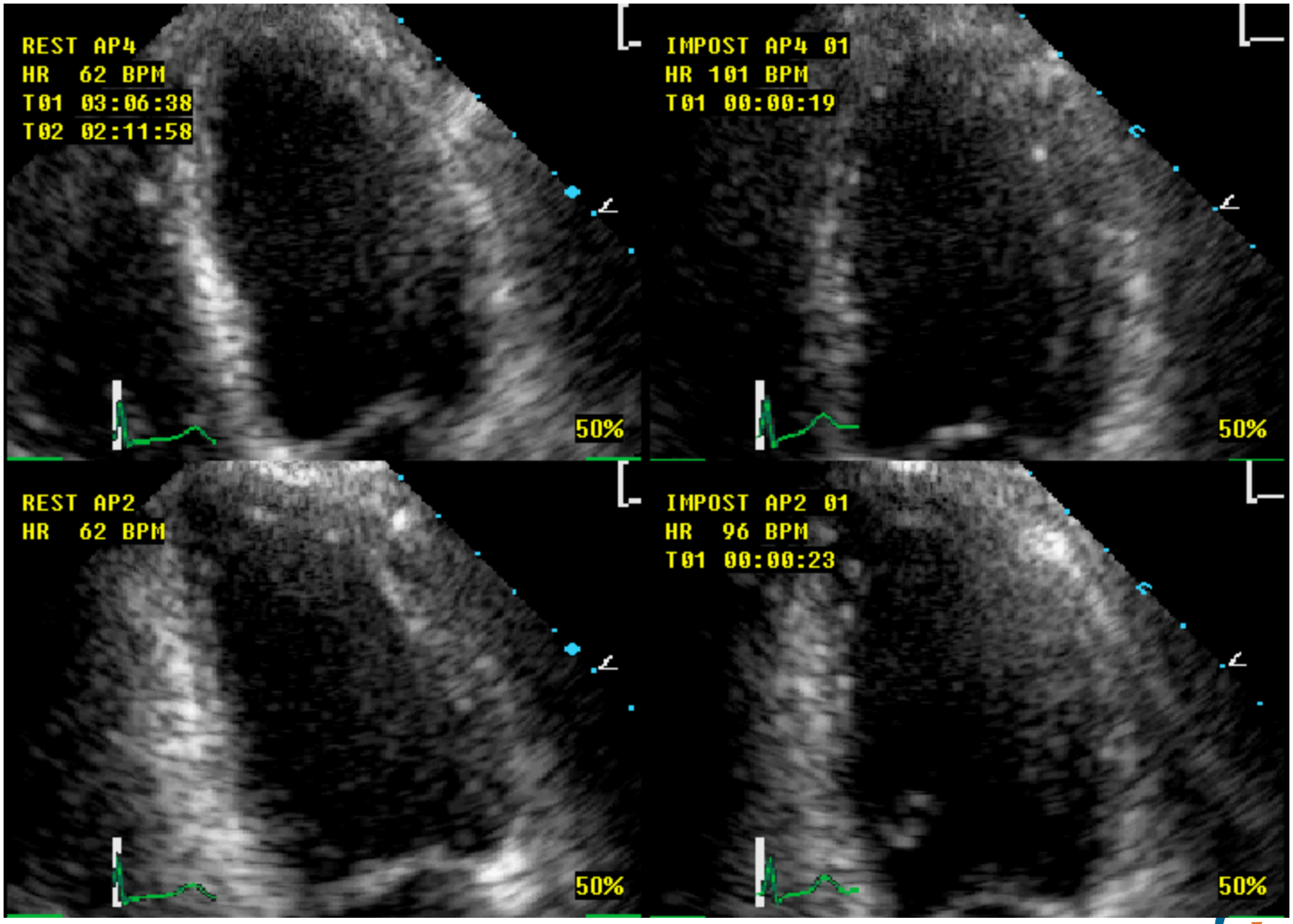
T02 00:40:49
50%
IMPOST LAX 01
HR 92 BPM
T01 00:00:45
50%
REST SAX
HR 62 BPM
T01 04:39:37
T02 04:22:39
50%
IMPOST SAX
HR 83 BPM
T01 00:00:51
50%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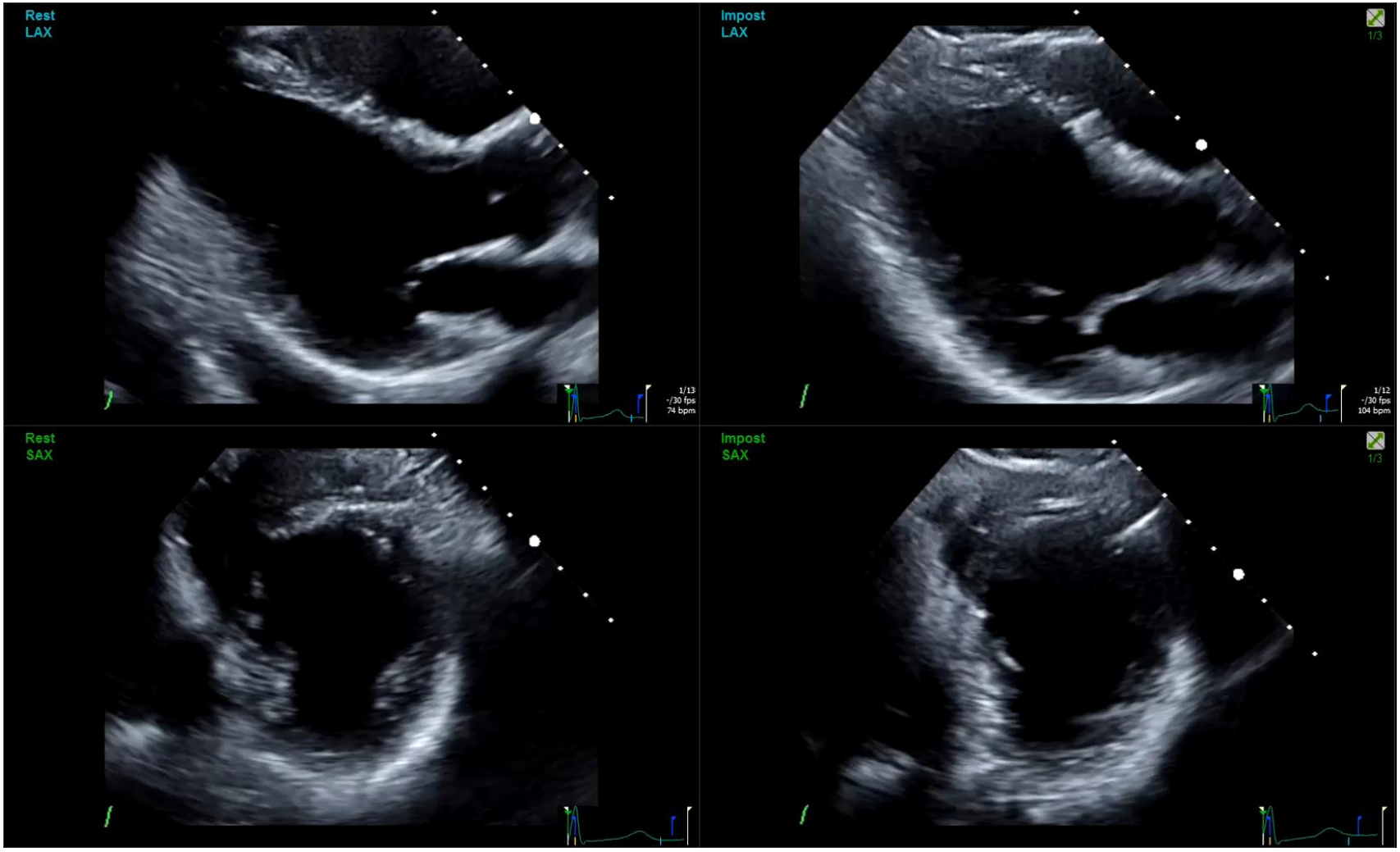
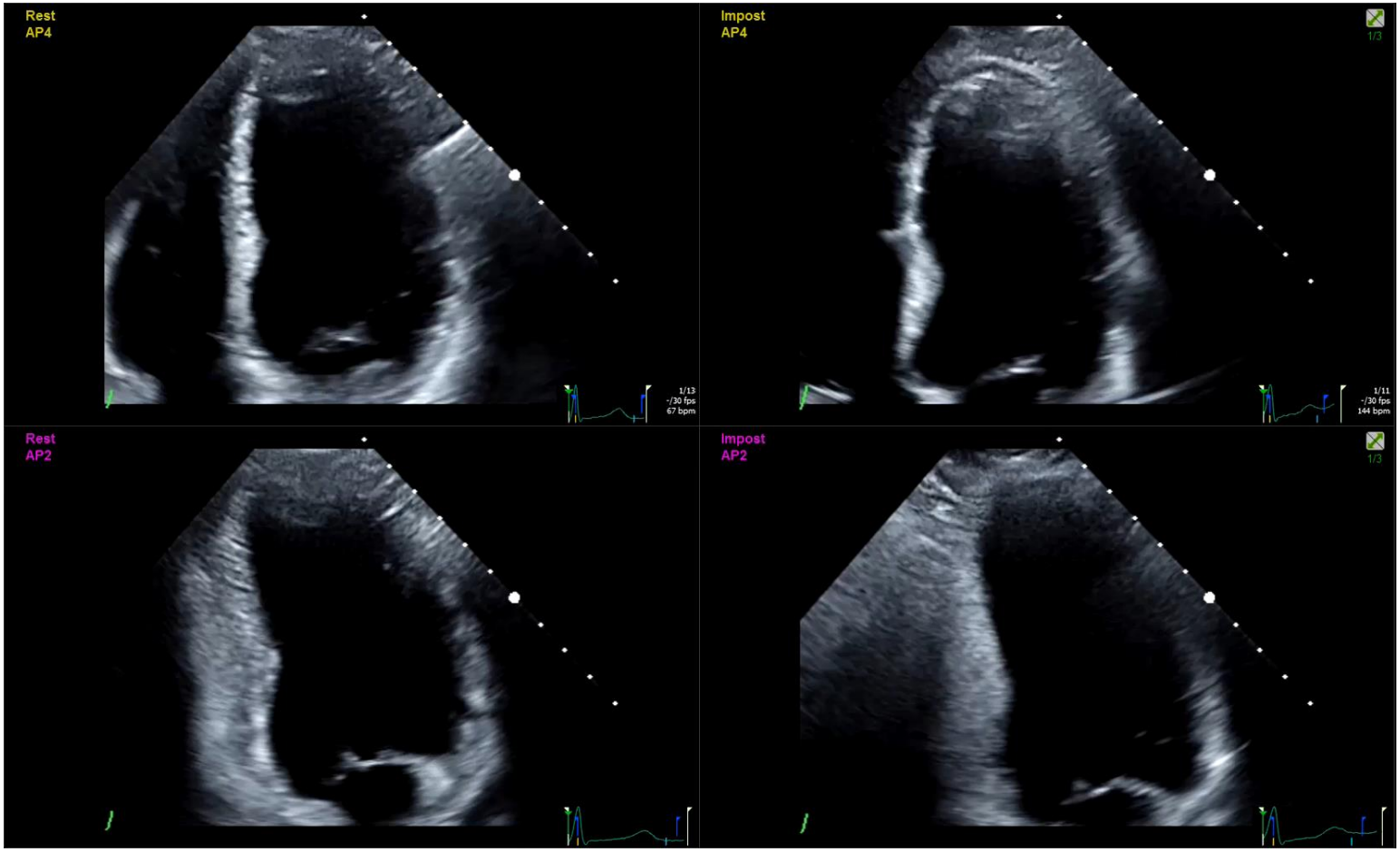
T02 02:11:58
50%
IMPOST AP4 01
HR 101 BPM
T01 00:00:19
50%
REST AP2
HR 62 BPM
50%
IMPOST AP2 01
HR 96 BPM
T01 00:00:23
50%


Rest
LAX
1/13
-/30 fps
74 bpm
Impost
LAX
1/3
1/12
-/30 fps
104 bpm
Rest
SAX
Impost
SAX
1/3



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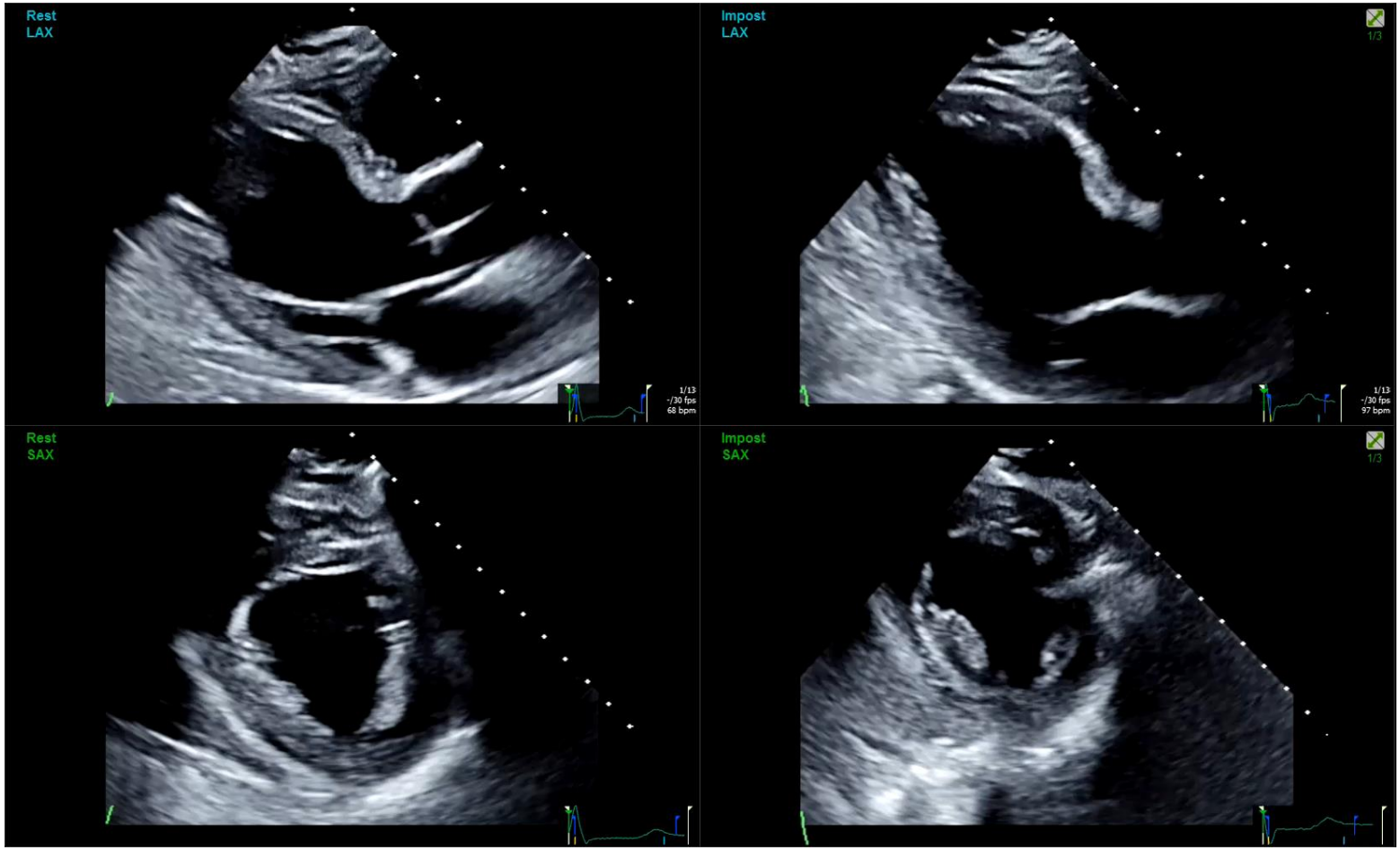
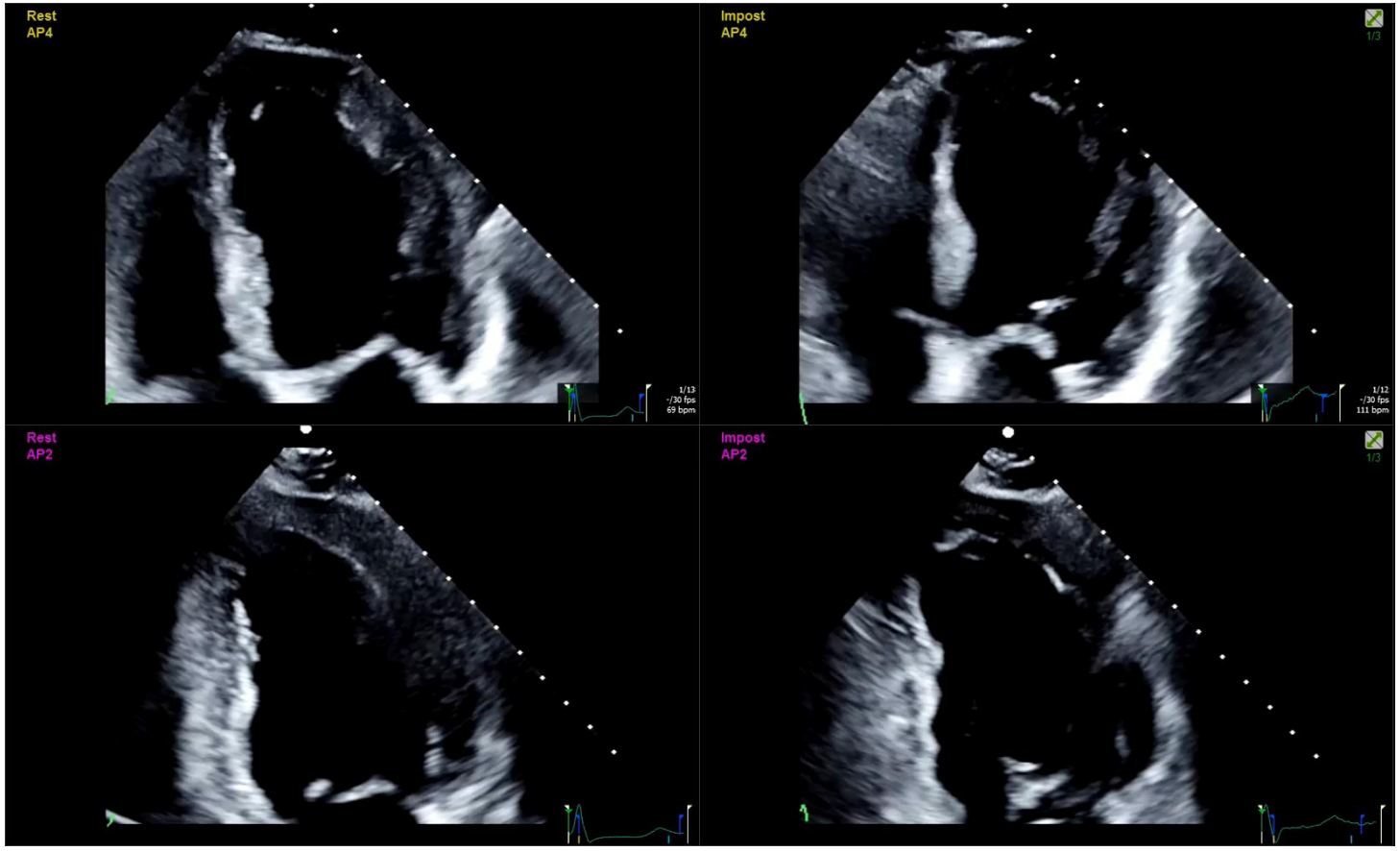

Rest
LAX
1/13
-/30 fps
68 bpm
Impost
LAX
1/3
1/13
-/30 fps
97 bpm
Rest
SAX
Impost
SAX
1/3


Rest
AP4
1/13
-/30 fps
69 bpm
Impost
AP4
1/3
1/12
-/30 fps
111 bpm
Rest
AP2
Impost
AP2
1/3

Add Curtis cath LMCA

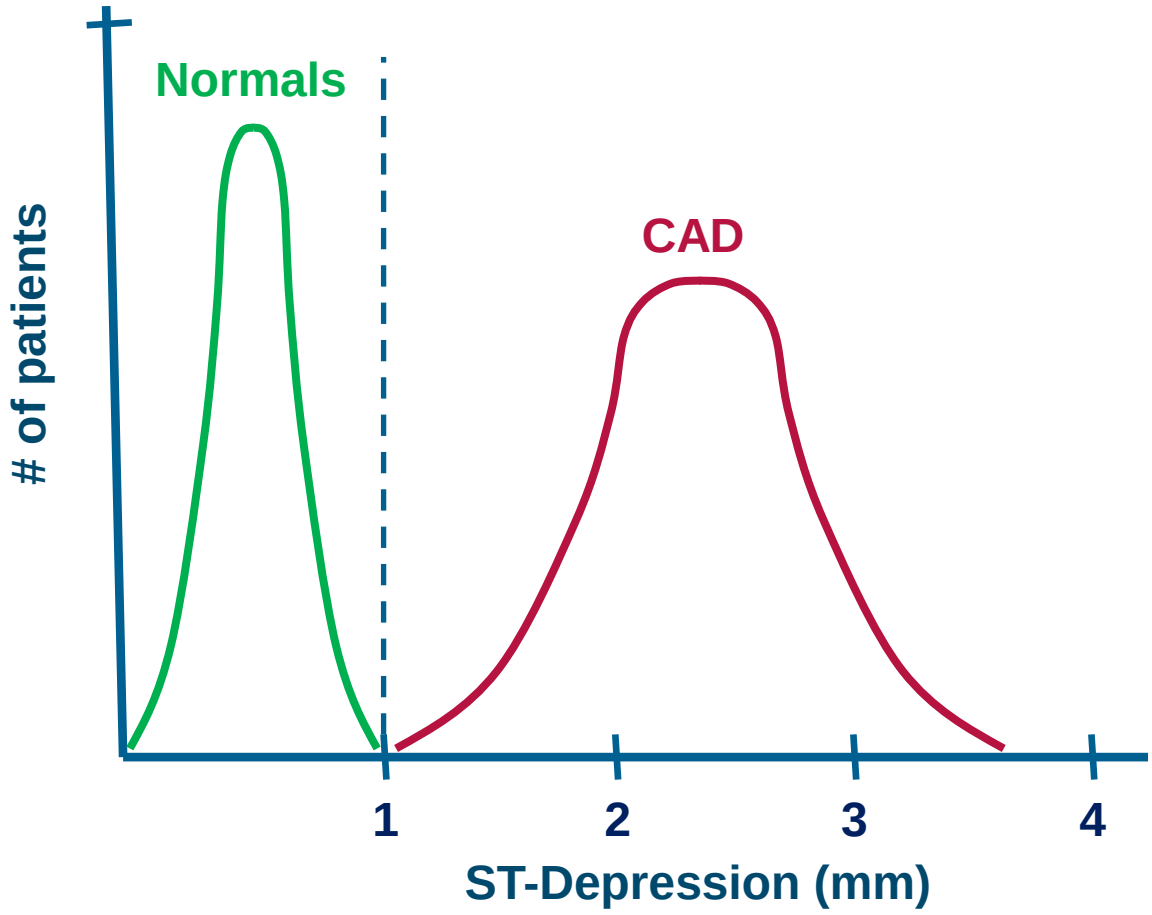
Lesson #3

ECG *vs* Wall Motion: Key Points

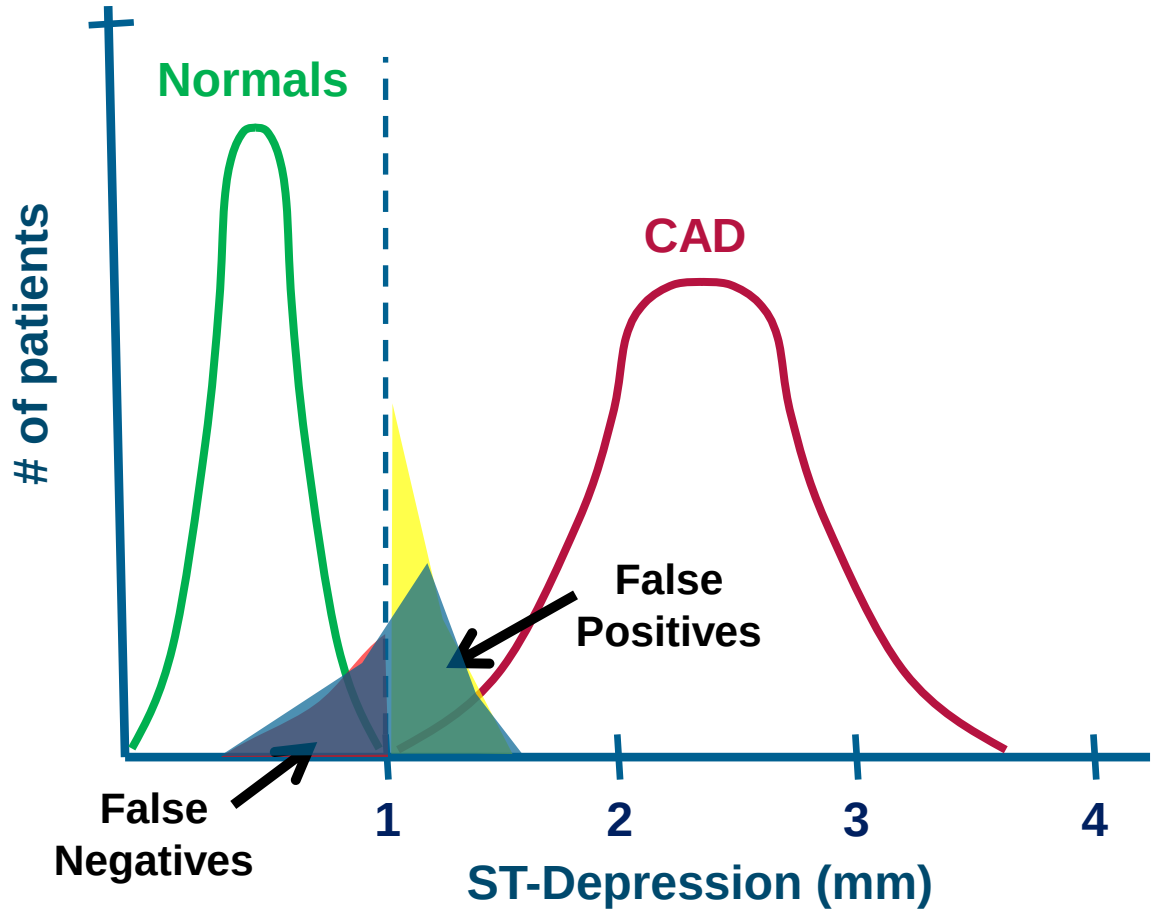
1. Wall motion is the most important parameter
2. ECG can't be ignored
3. Clinical data are important
4. It's often easier to interpret stress echo after you've looked at the angiogram

The relationship among sensitivity/specificity and pretest probability

The Problem with Diagnostic Tests

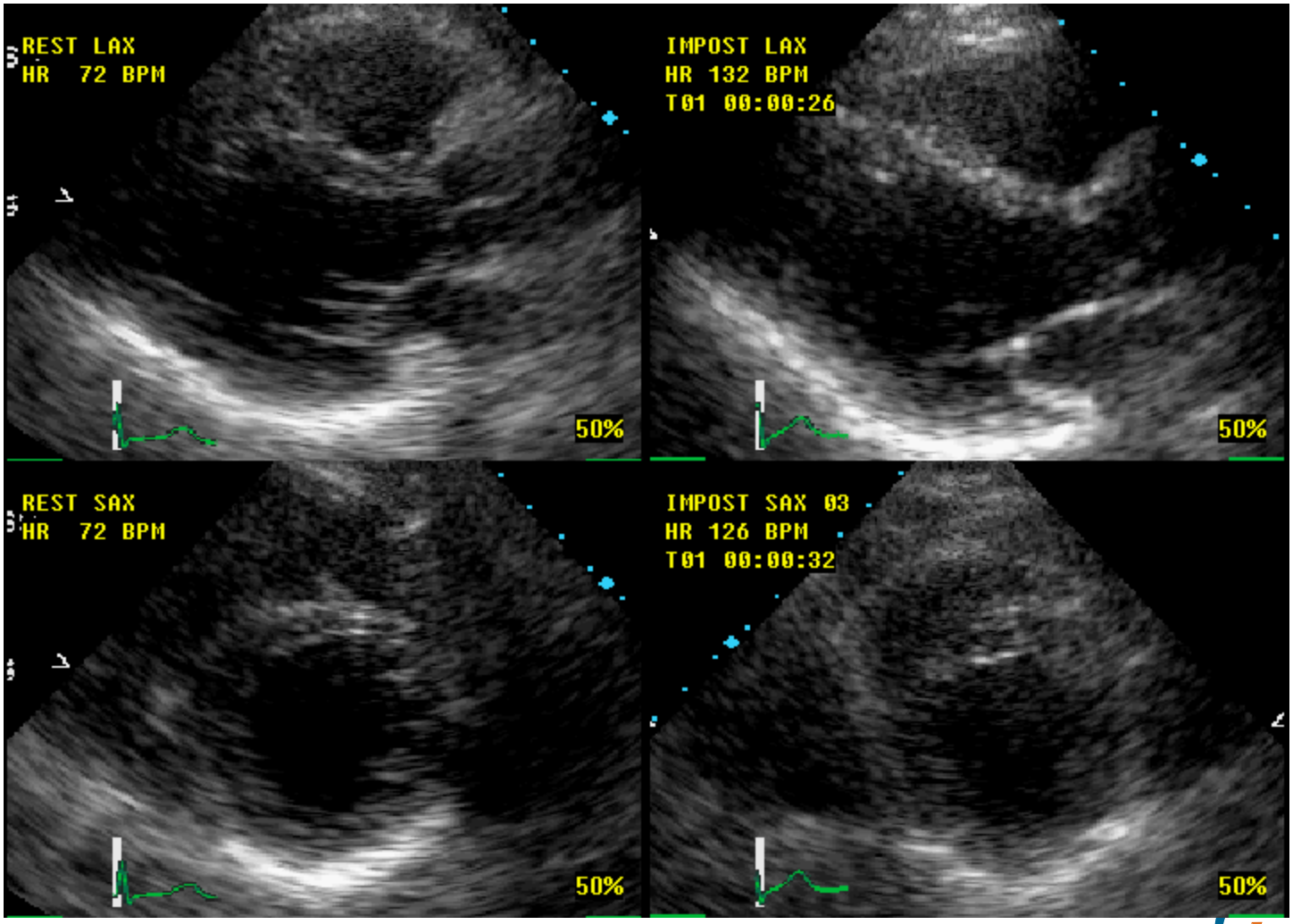


The Problem with Diagnostic Tests



Case 6

- 34 yo man with atypical chest discomfort
- Only risk factor is family history
- Long history of palpitations, ? MVP
- Referred from ED for stress echo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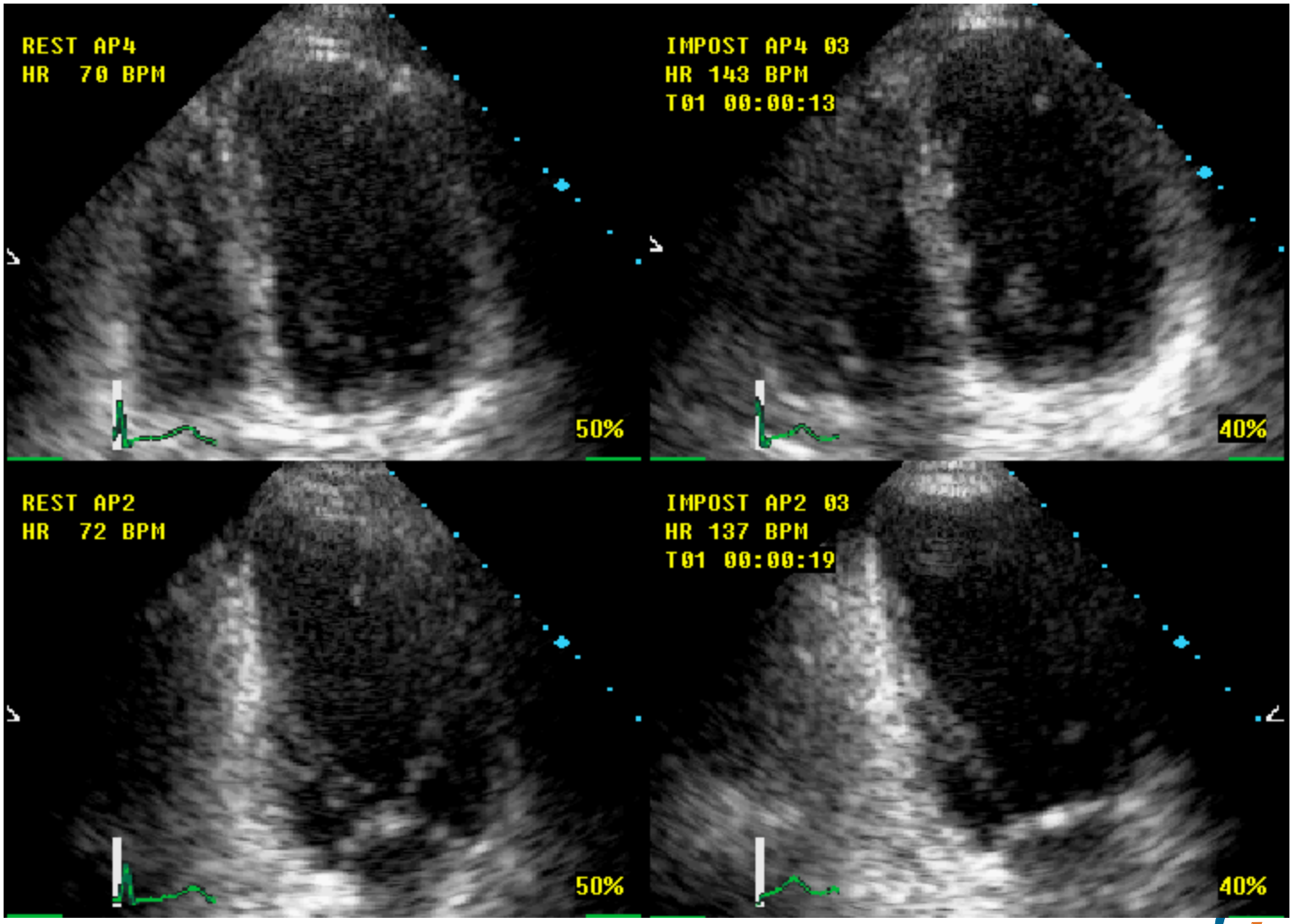
HR 72 BPM
50%
IMPOST LAX
HR 132 BPM
T01 00:00:26
50%
REST SAX
HR 72 BPM
50%
IMPOST SAX 03
HR 126 BPM
T01 00:00:32
50%


REST AP4
HR 70 BPM
50%
IMPOST AP4 03
HR 143 BPM
T01 00:00:13
40%
REST AP2
HR 72 BPM
50%
IMPOST AP2 03
HR 137 BPM
T01 00:00:19
40%

Pre Test Probability of Coronary Disease by Symptoms, Gender and Age

Age	Gender	Typical/Definite Angina Pectoris	Atypical/Probable Angina Pectoris	Non-Anginal Chest Pain	Asymptomatic
30-39	Males	Intermediate	Intermediate	low (<10%)	Very low (<5%)
30-39	Females	Intermediate	Very Low (<5%)	Very low	Very low
40-49	Males	High (>90%)	Intermediate	Intermediate	low
40-49	Females	Intermediate	Low	Very low	Very low
50-59	Males	High (>90%)	Intermediate	Intermediate	Low
50-59	Females	Intermediate	Intermediate	Low	Very low
60-69	Males	High	Intermediate	Intermediate	Low
60-69	Females	High	Intermediate	Intermediate	Low

High = >90% Intermediate = 10-90% Low = <10%
Very Low = <5%

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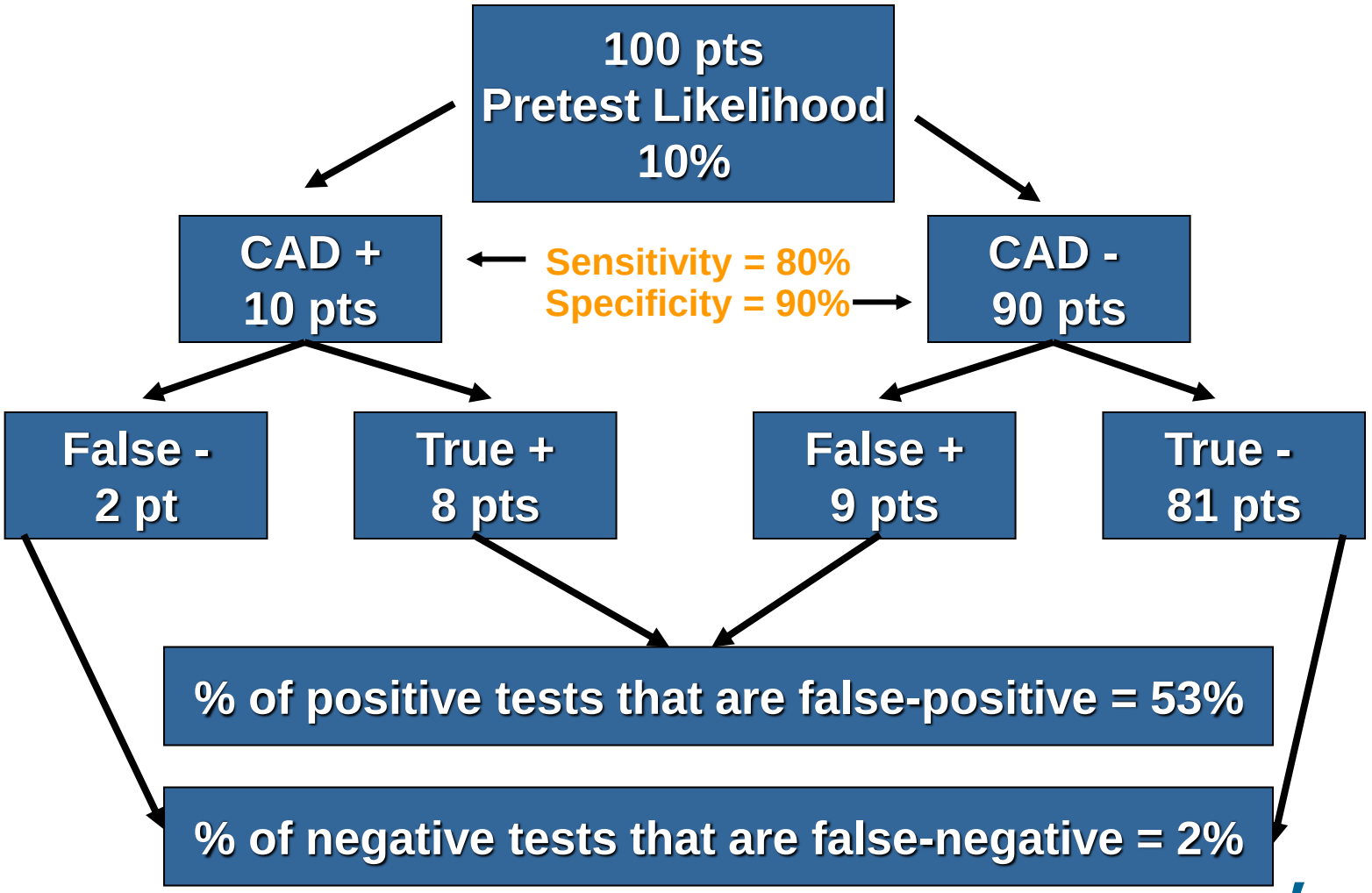
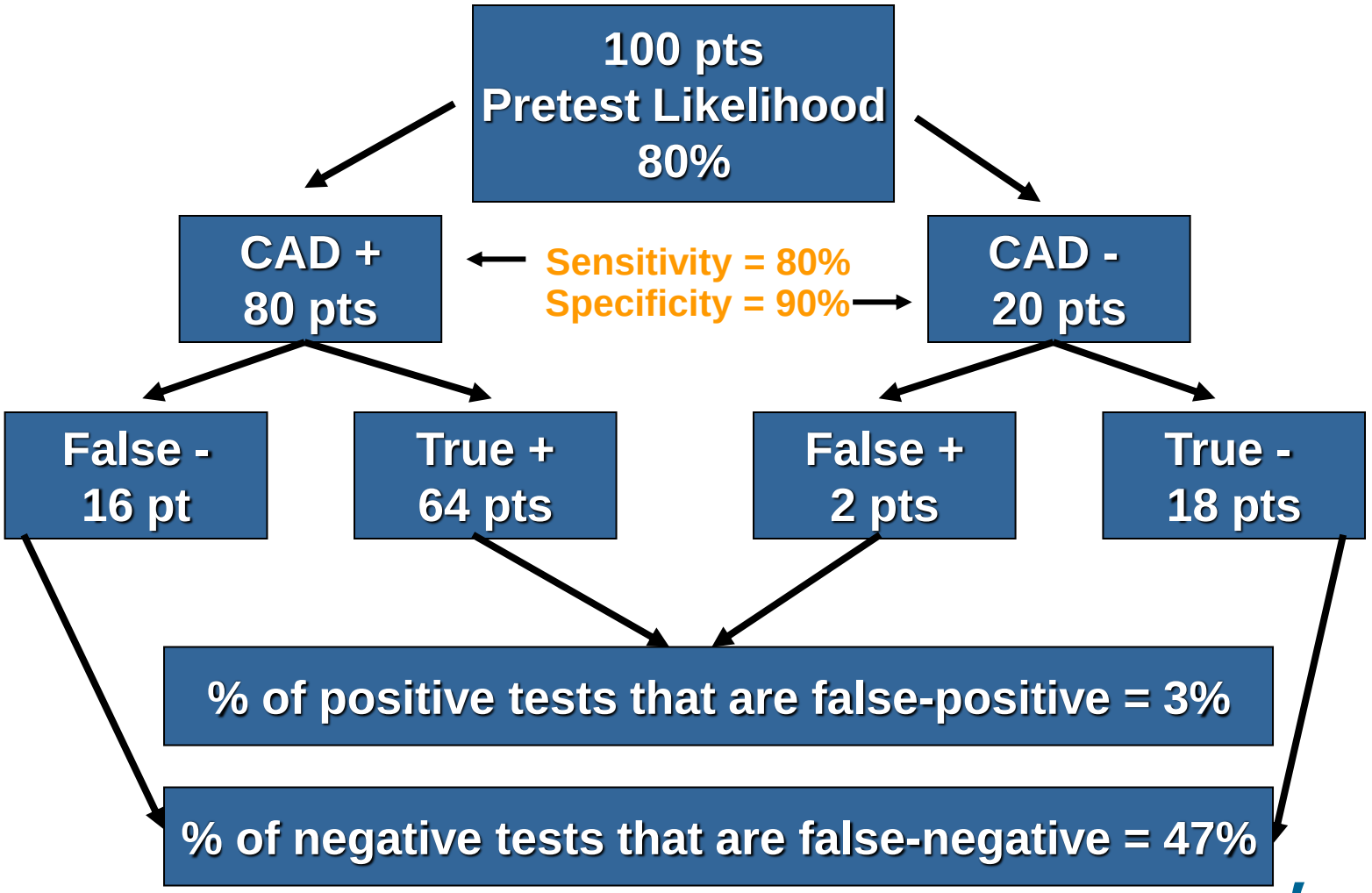
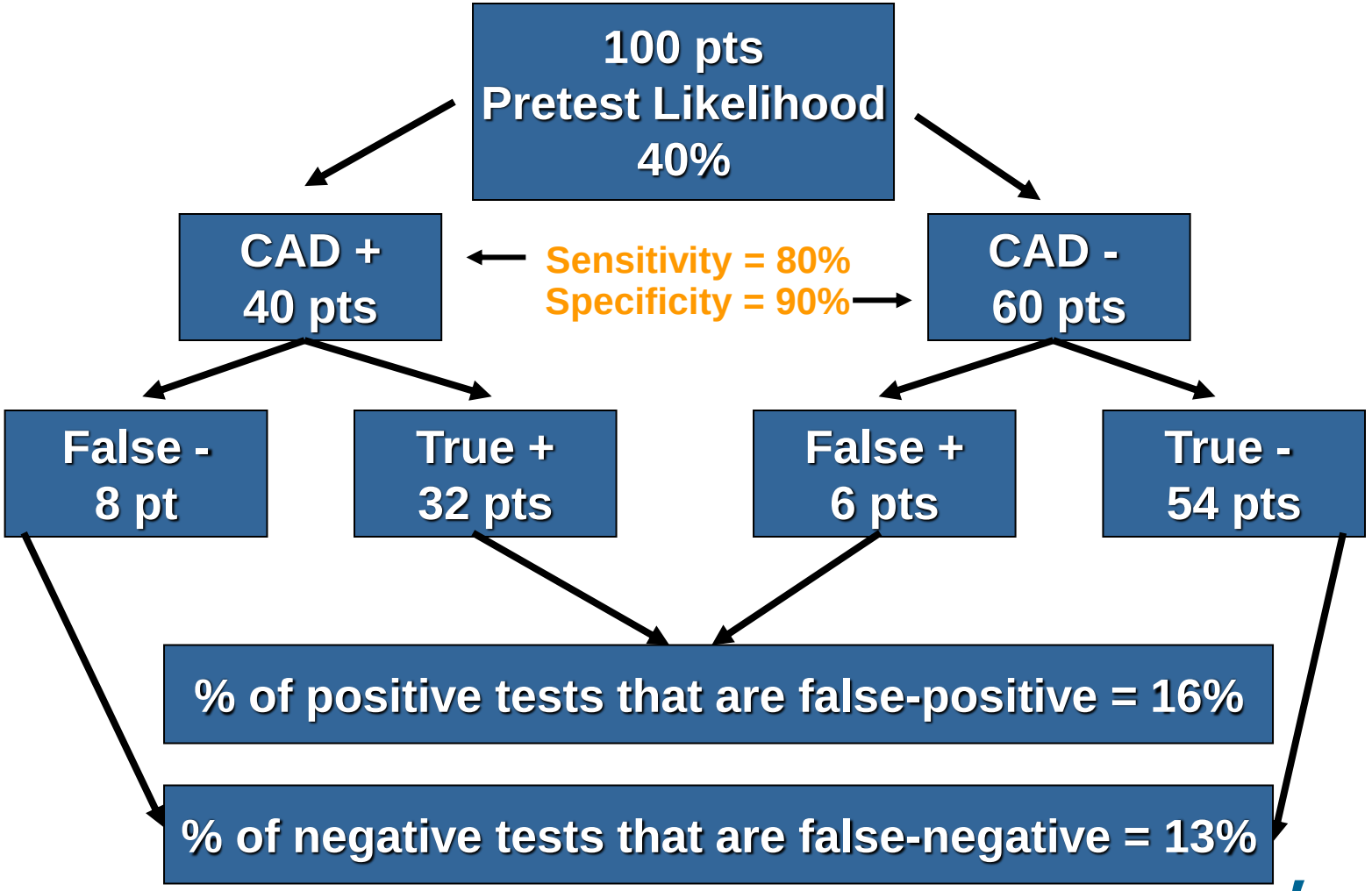
Factors Affecting Stress Testing Results



Factors Affecting Stress Testing Results



Factors Affecting Stress Testing Results



Lesson #4

Pretest probability provides the link between sensitivity/specificity and clinical utility.

How to Maximize Value

1. Be aware of all the data
2. Wall motion (thickening) is still #1
3. More objective/quantitative techniques may emerge - ? Strain
4. Use contrast when appropriate
5. Remember Bayes Theorem