Weill Cornell Medicine

# Right Heart Strain

Monthly POCUS Conference

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PGY3

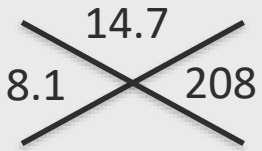
9.20.18
Medicine Library

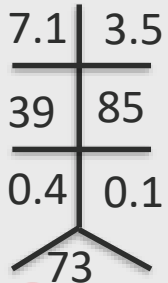
# Case Presentation—History

- Healthy 61 y/o female with no significant pmh who presents to NYPQ with DOE, lightheadedness and blurry vision x 4 weeks
- Two days PTA she had multiple episodes of syncope, prompting visit to PCP
- Referred to cardiologist next day→ in-office TTE done concerning for HF→ sent to NYPQ ER for further evaluation
- No infectious symptoms, LE edema or pain, cough, chest pain, GI symptoms, B symptoms
- Cancer screening up to date
- PMH/PSH: None
- Meds: OTC Herbal Supplements
- NKDA
- FHx: No hx of HF, CAD, cancer, blood clots
- Shx: No illicits. Lives in Queens with husband. Retired

# Case presentation—Physical and Labs

- HR 70s-80s, BP 120s-140s/60s-80s, SpO2 95-100 on RA, RR 15-22
- Gen: Well appearing middle aged woman, resting comfortably, NAD
- Neck: No JVD
- CV: RRR. Normal S1/S2. No m/r/g
- Pulm: Speaking in full sentences, not tachypneic. Normal respiratory effort. CTAB. No accessory muscle use
- Abd: Soft, NT/ND. No rebound or guarding
- Ext: WWP. In tact distal pulses. No LE edema or tenderness
- Neuro: AA&Ox3. No focal deficits, interacting appropriately.

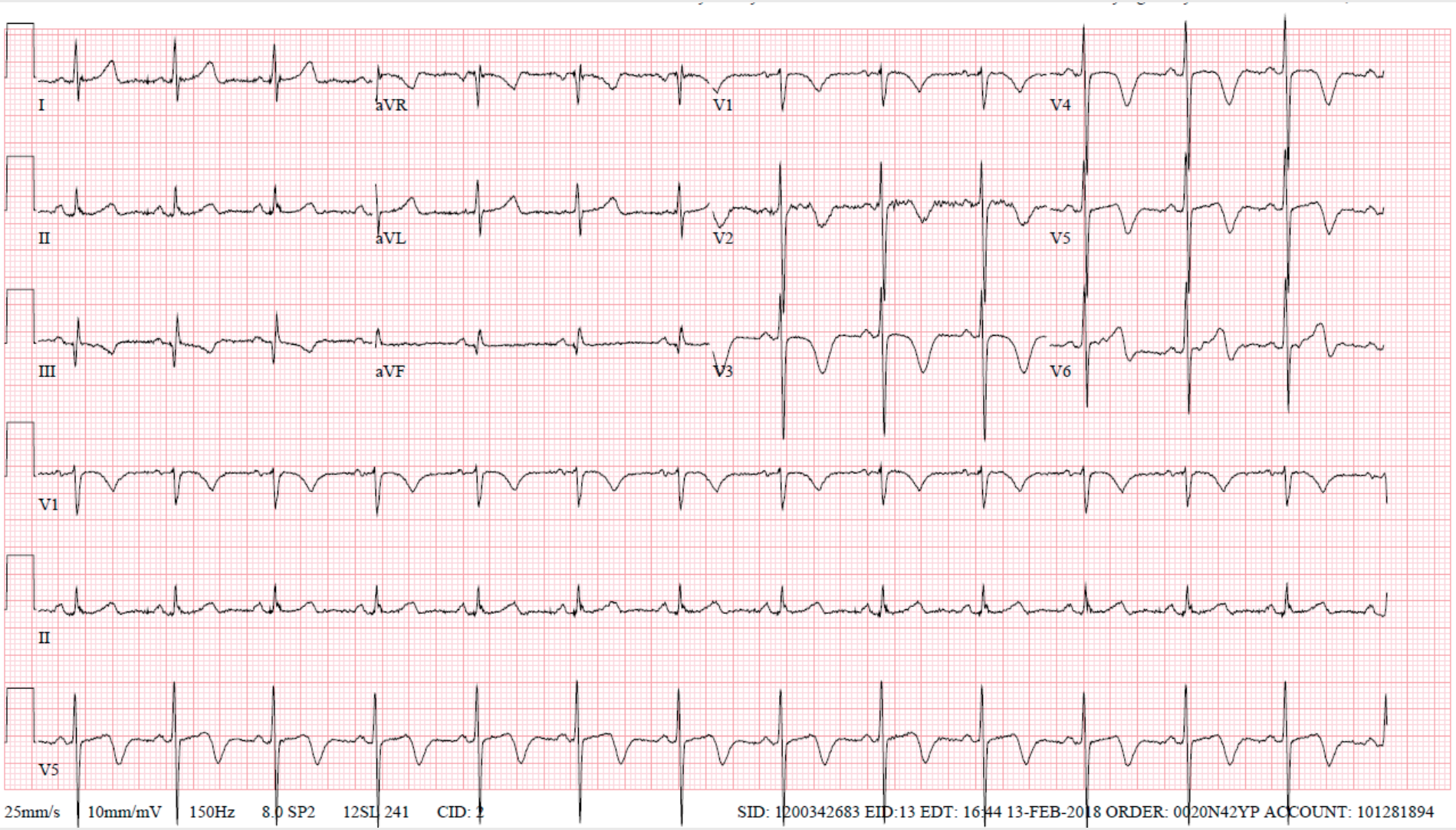



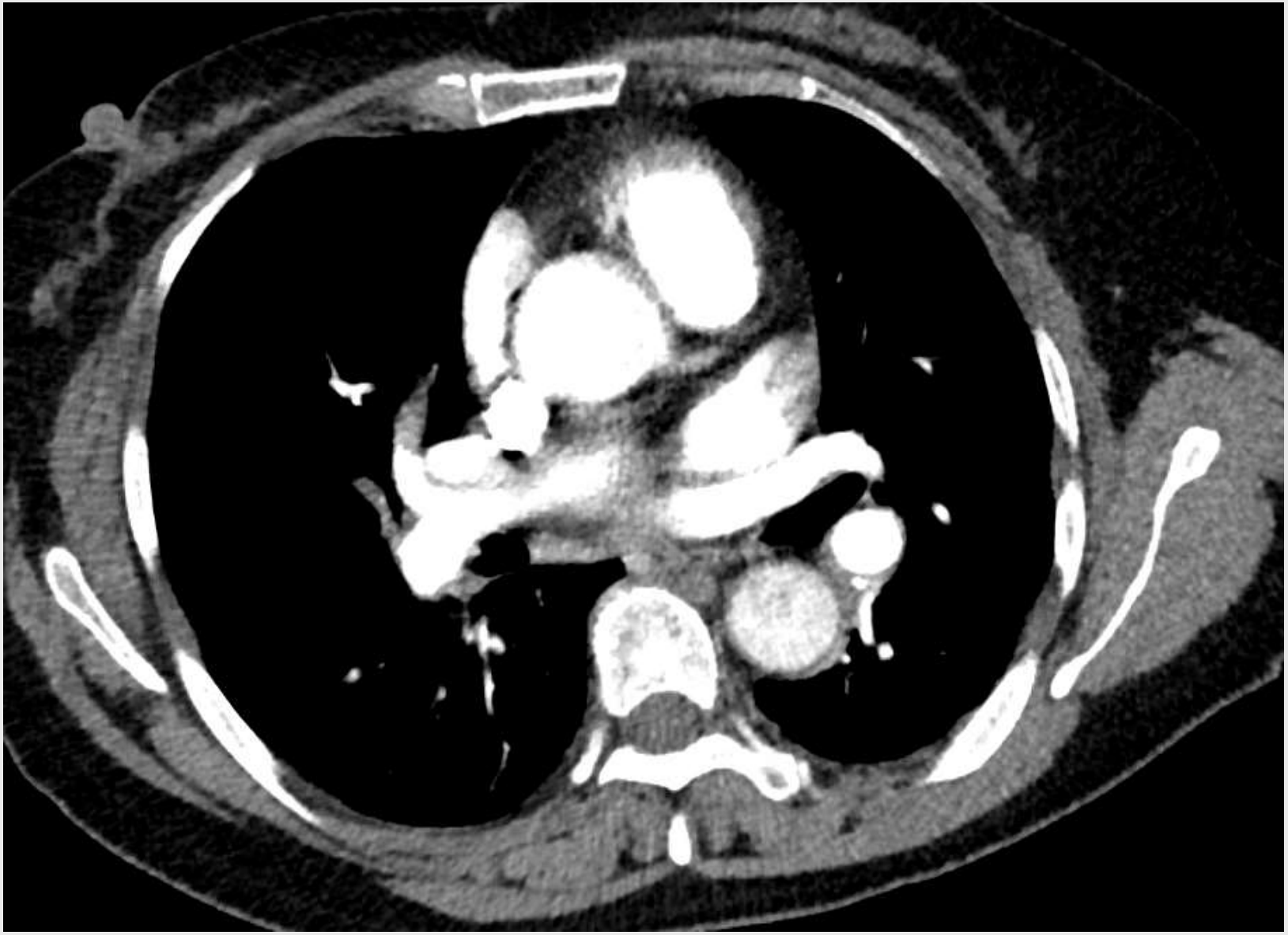

CK: 224
d-dimer: 3182

Trop neg x 1
CKMB 2.3

# ECG


I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
V1
II
V5
25mm/s 10mm/mV 150Hz 8.0 SP2 12SL 241 CID: 2
SID: 1200342683 EID:13 EDT: 16:44 13-FEB-2018 ORDER: 0020N42YP ACCOUNT: 101281894

# CTPE



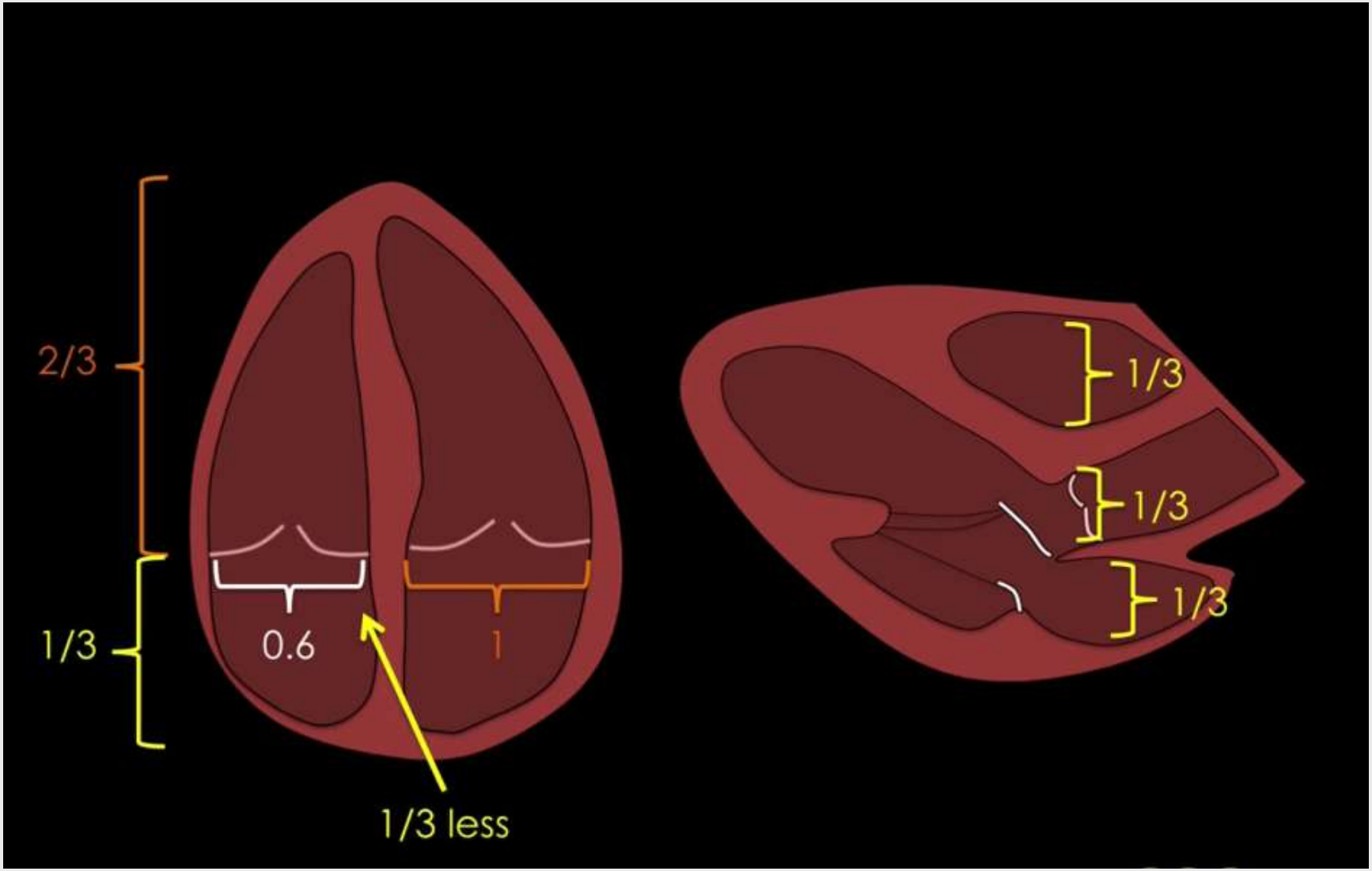
# Transferred to NYP/WCMC

- Reported to have “Wellens-type” ECG concerning for cardiac ischemia
- Per report, bedside TTE revealed flattening of RV septum with severe TR
- Started on Lovenox, hemodynamically stable
- Transferred to NYP/WCMC MICU given lack of ICU bed at NYPQ and for consideration of thrombolysis
- Arrived hemodynamically stable, without respiratory distress.

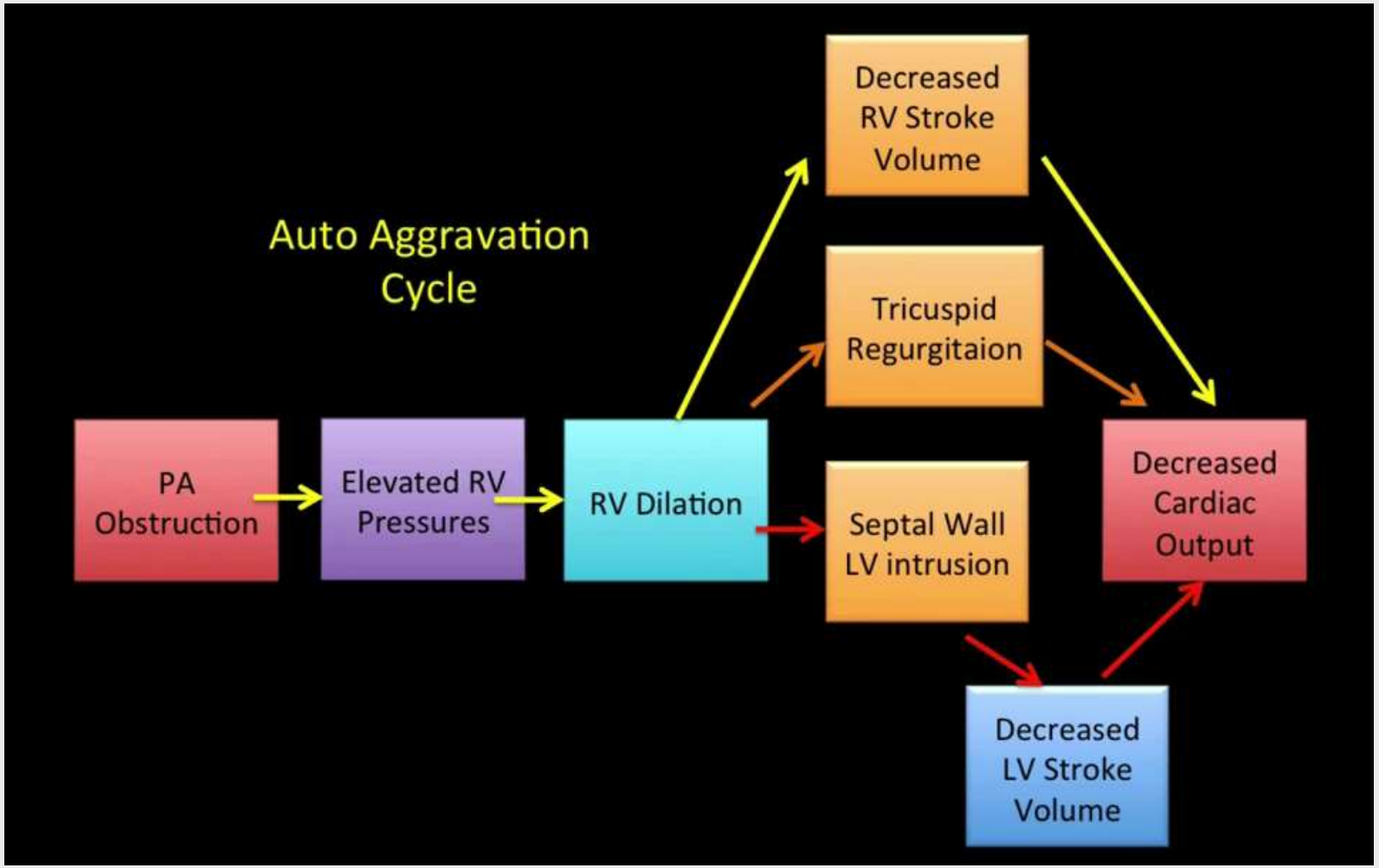
# What's the next step?

- Obviously… POCUS
- But first, lets review what's normal and how we can utilize bedside ultrasound to evaluate for right heart strain

# Rule of Thirds – normal cardiac chamber size

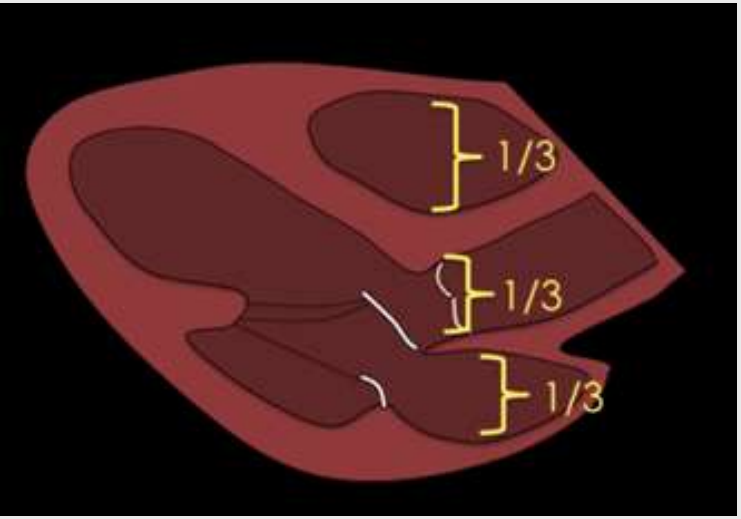


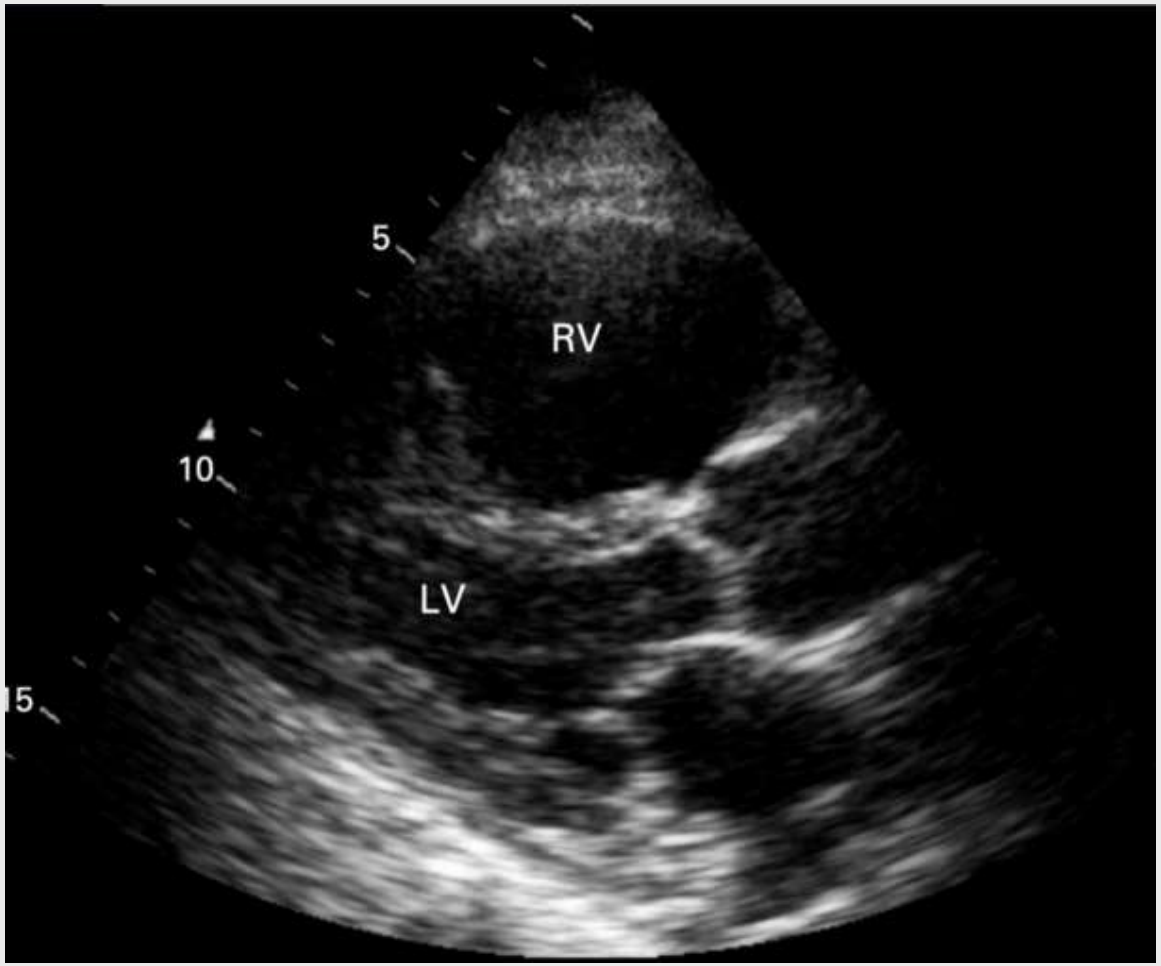
# Pathophysiology of Hemodynamically Significant PE



# Echo Evidence of Right Heart Strain

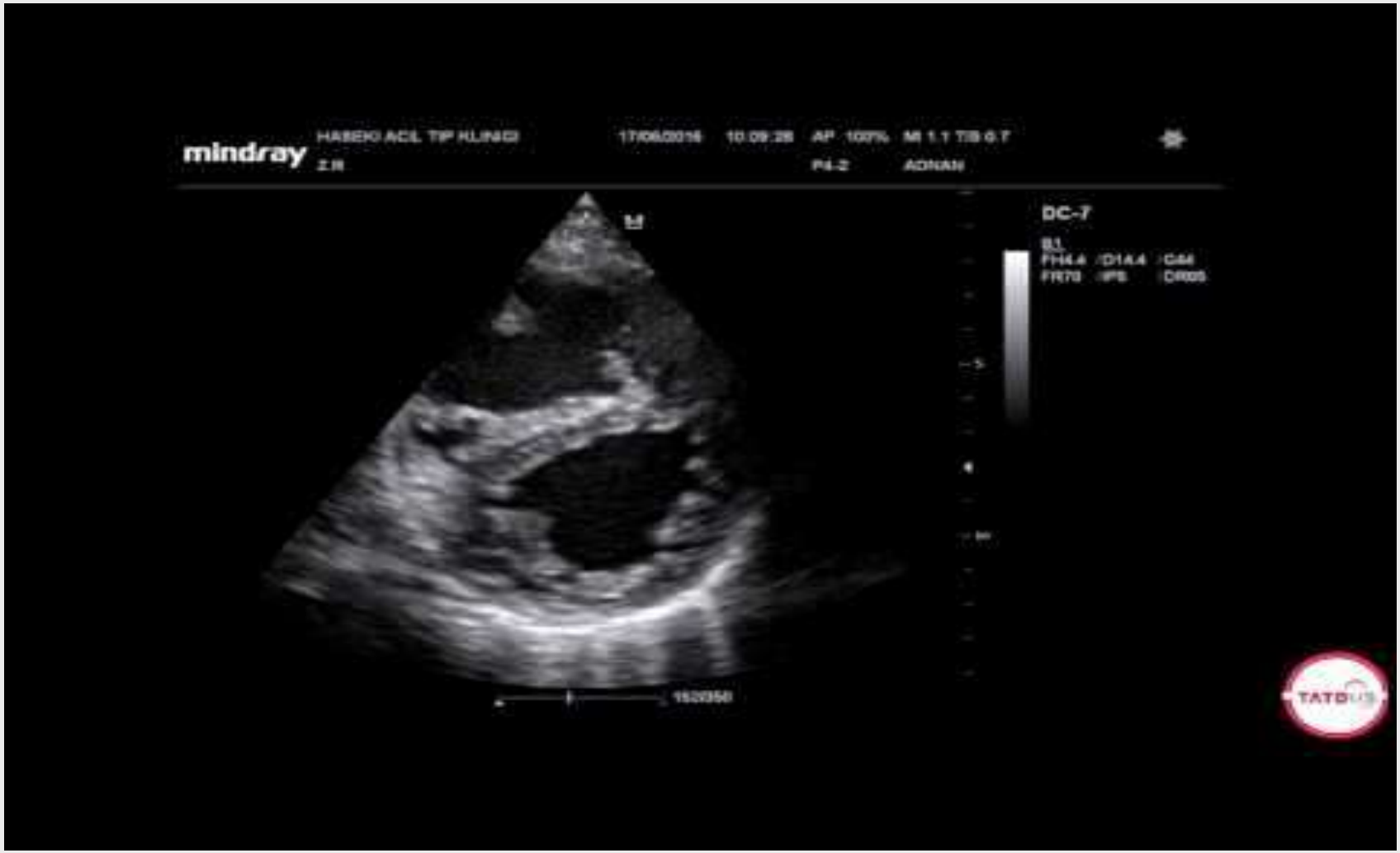
1. Enlarged RV
2. Underfilled LV



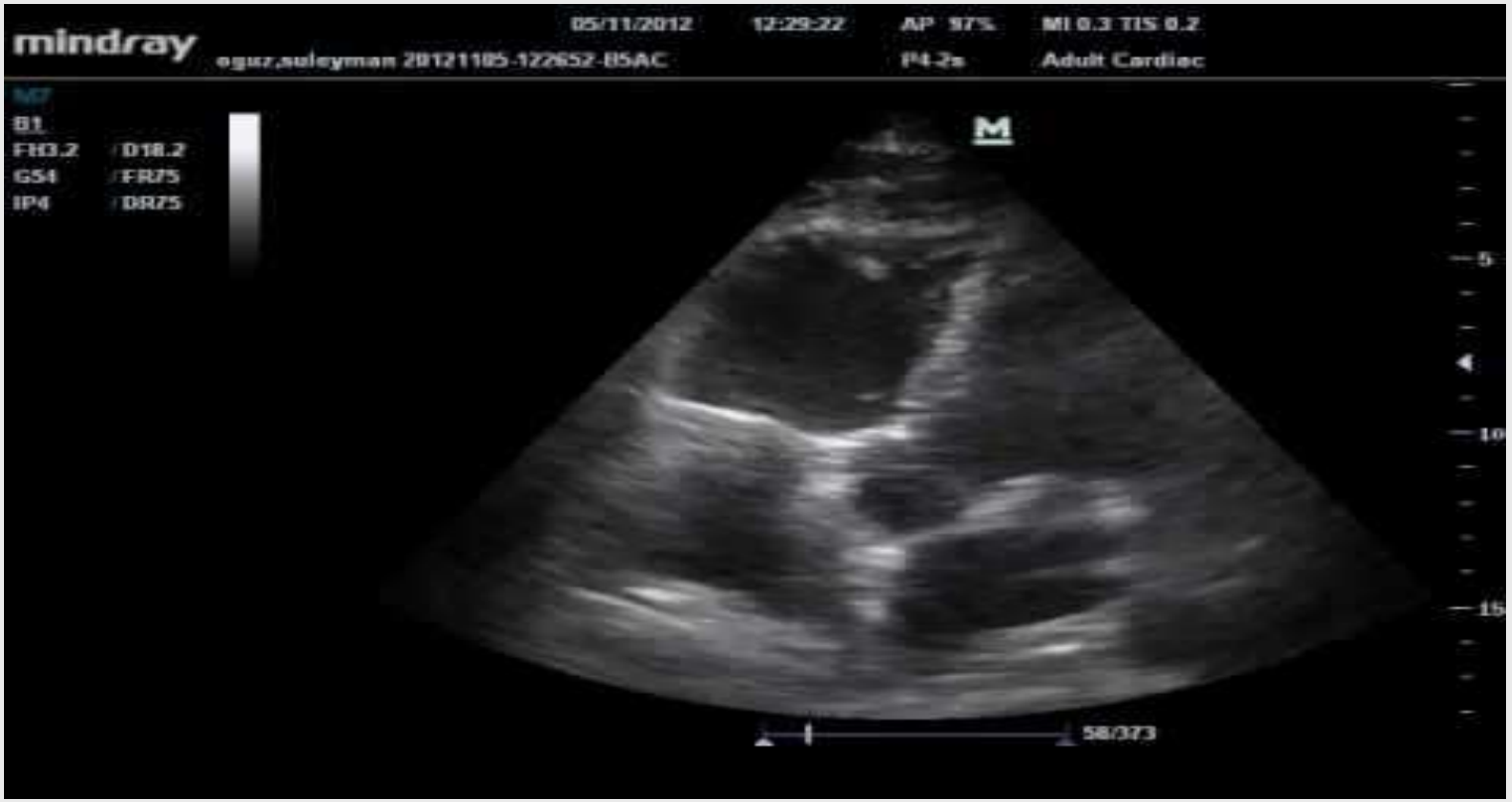
# Echo Evidence of Right Heart Strain

3. Paradoxical Septal Wall Motion



# Echo Evidence of Right Heart Strain

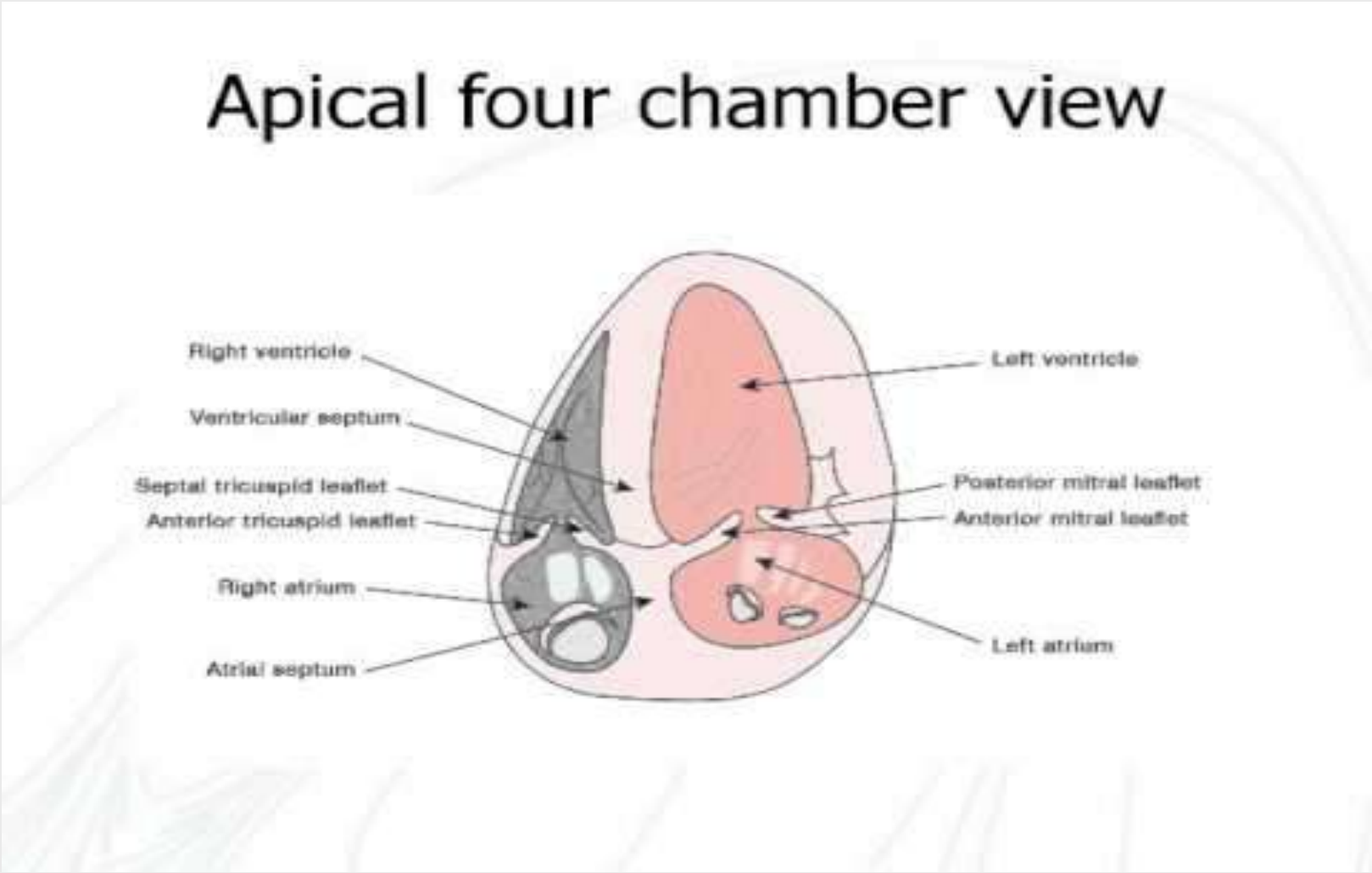
4. McConnell's Sign = Preserved RV apical contraction + RV free wall hypokinesis
5. RV Dominant Apex



# RV Function - TAPSE

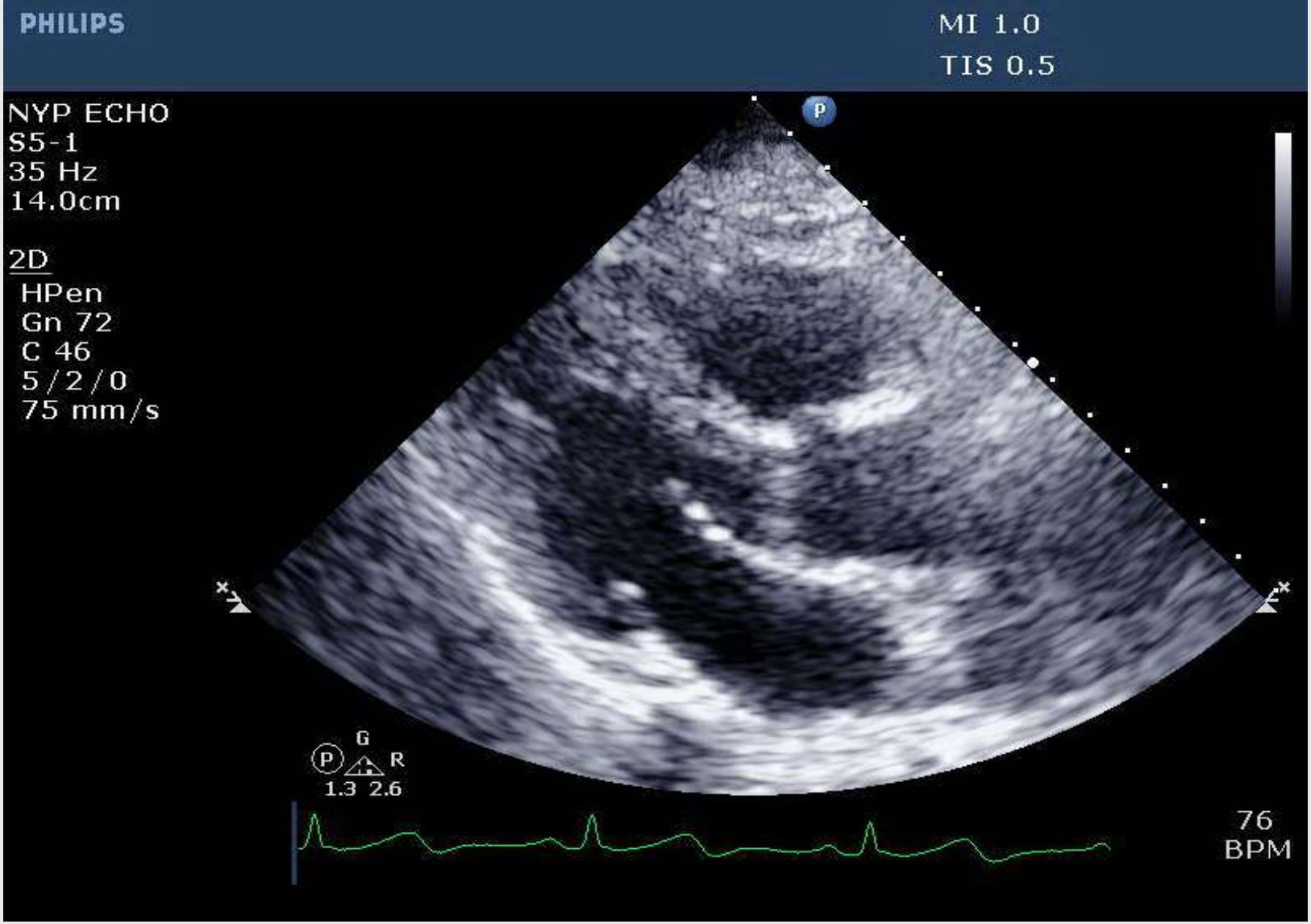
- In systole, the base of RV rises, in diastole, it descends
- Apical 4→M mode at tricuspid annular leaflet at lateral wall of RV→bottom of M mode is RV movement at tricuspid annular plane
- TAPSE = tricuspid annular plane systolic excursion
- TAPSE > 16mm is normal

# RV Function - TAPSE

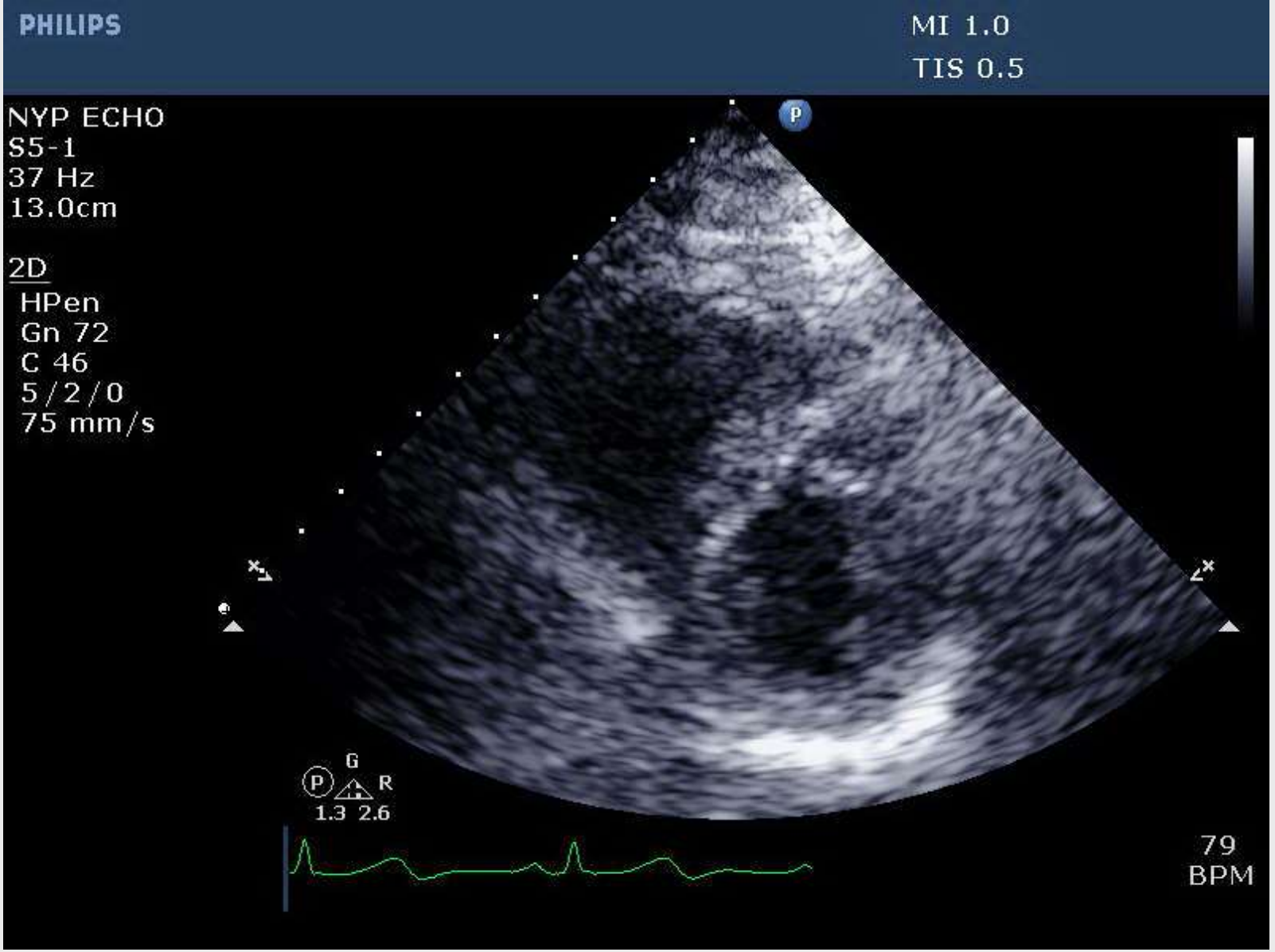


# Back to our case…

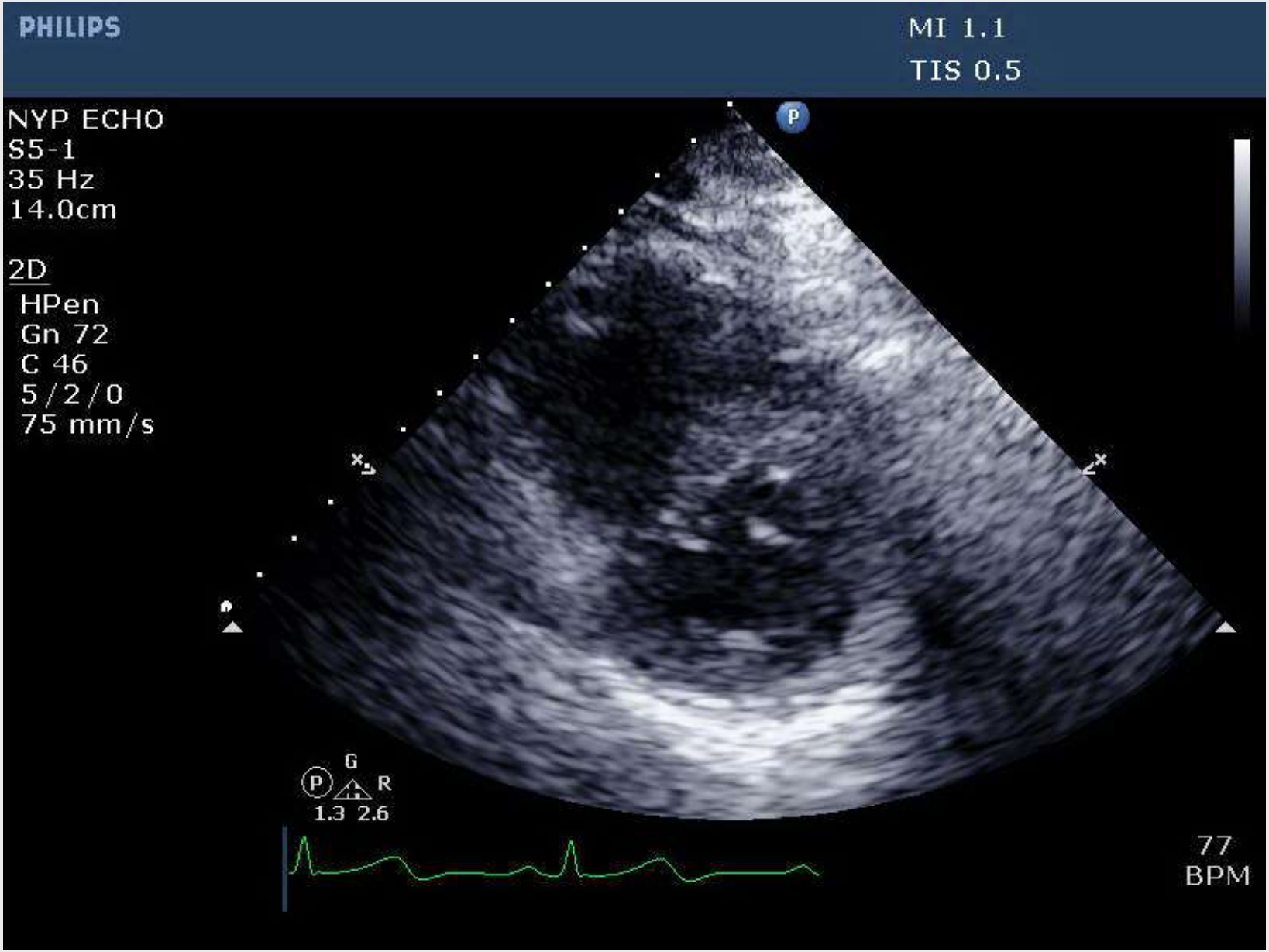
- 61 y/o F with no sig pmh who presents to NYPQ with DOE and lightheadedness, found to have b/l segmental and subsegmental PEs with reported evidence of right heart strain at OSH, transferred to MICU for further management



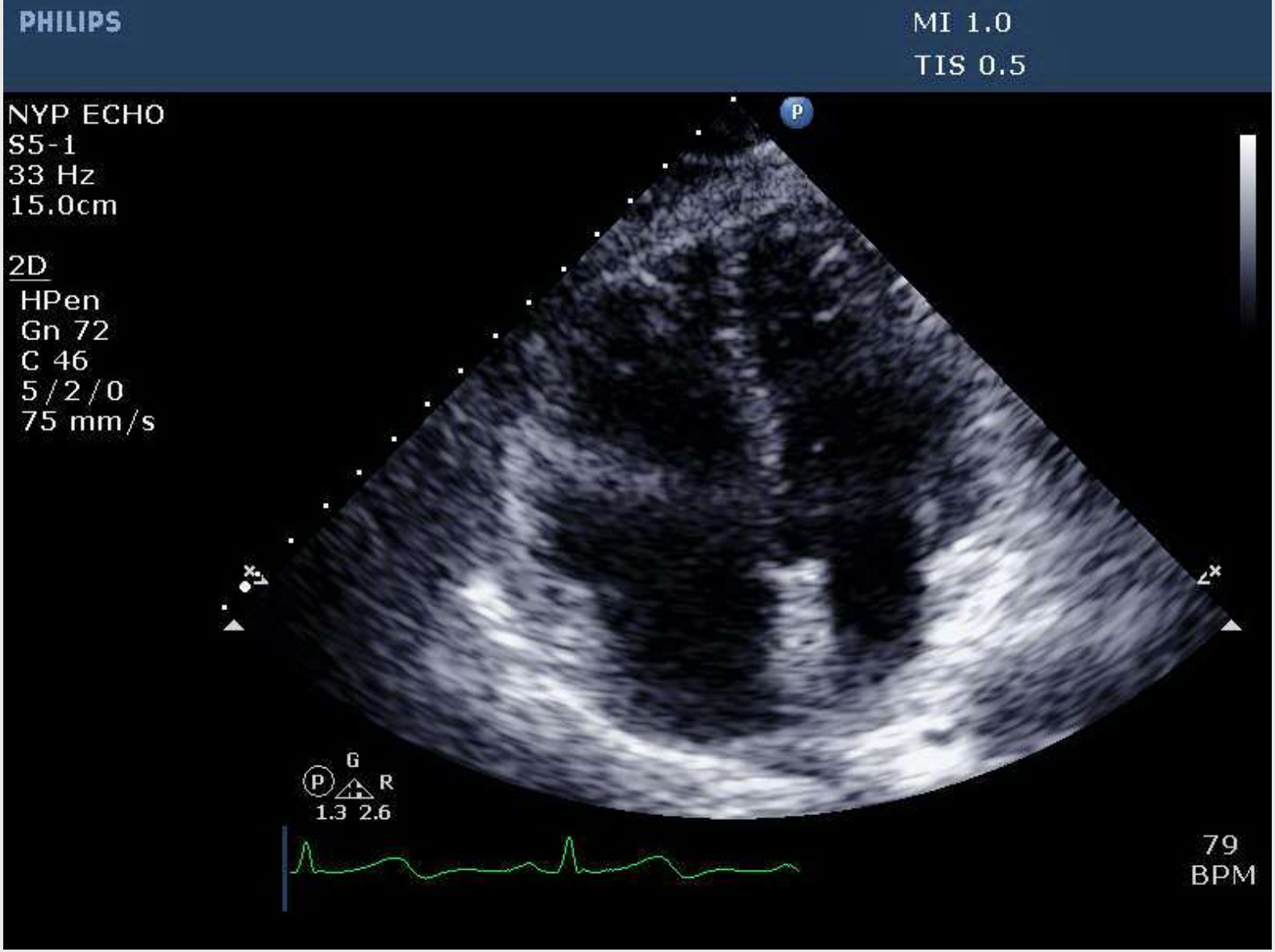

- Enlarged RV?
- Underfilled LV?



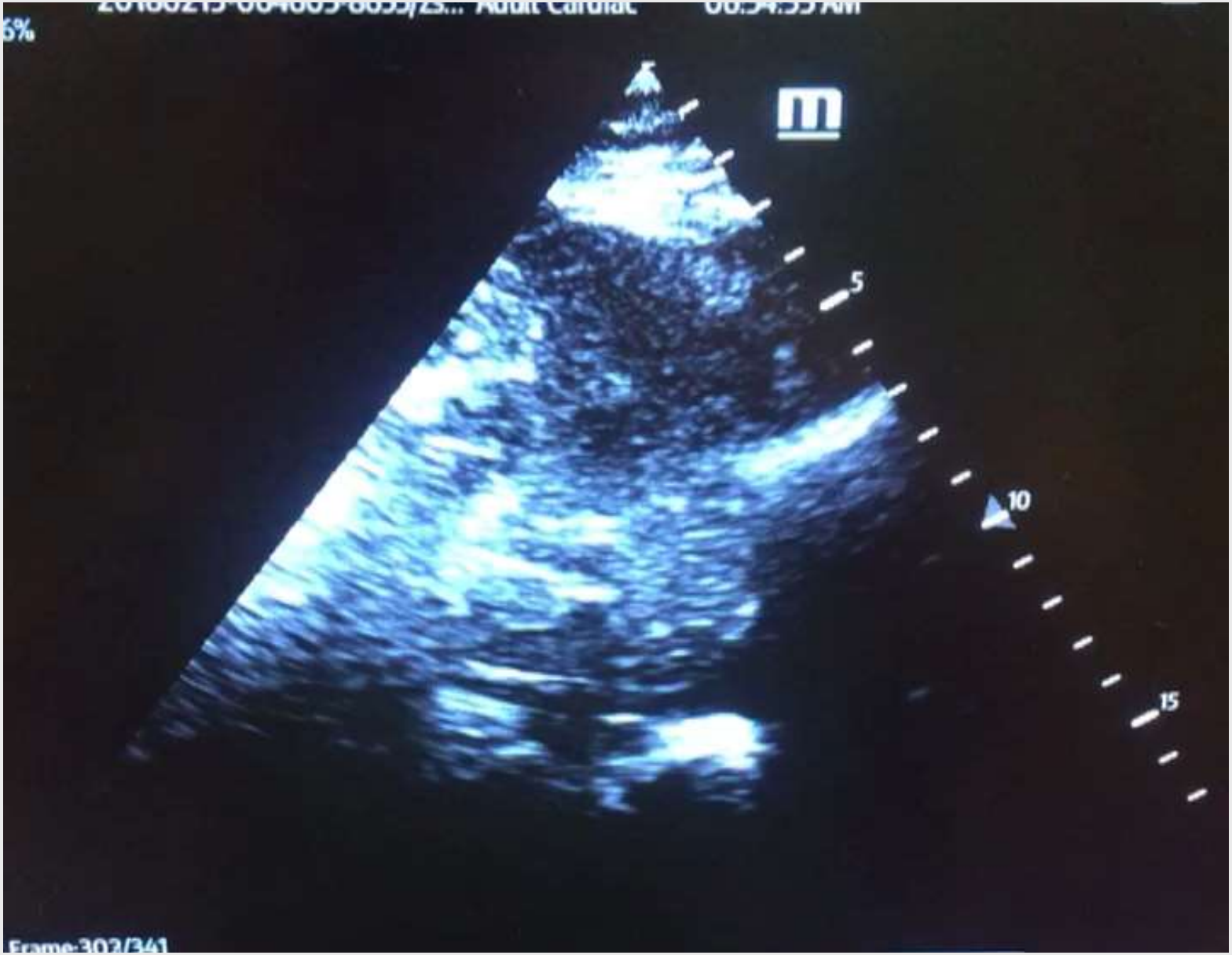

- Paradoxical Septal Wall Motion?



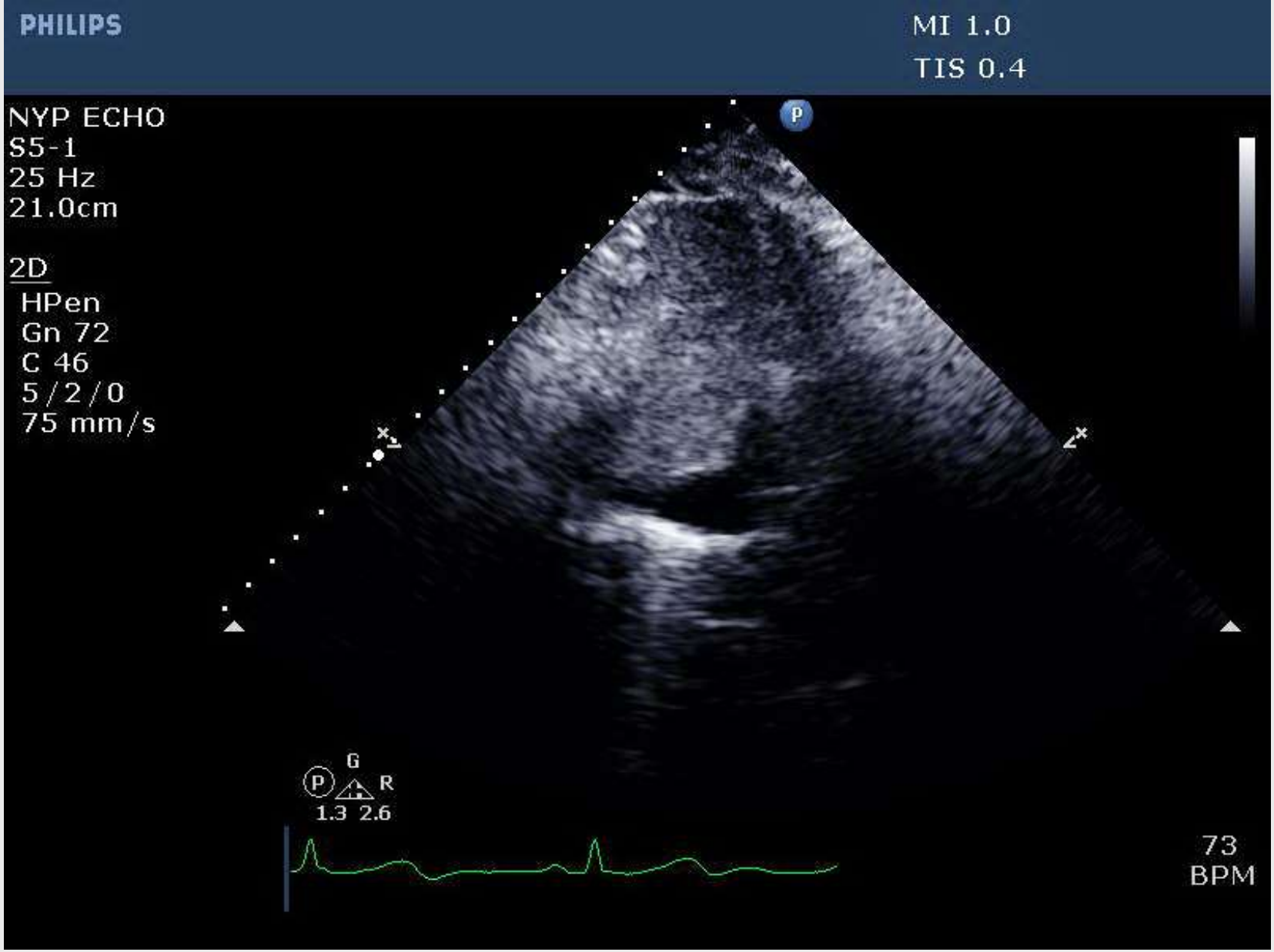

- Paradoxical Septal Wall Motion?



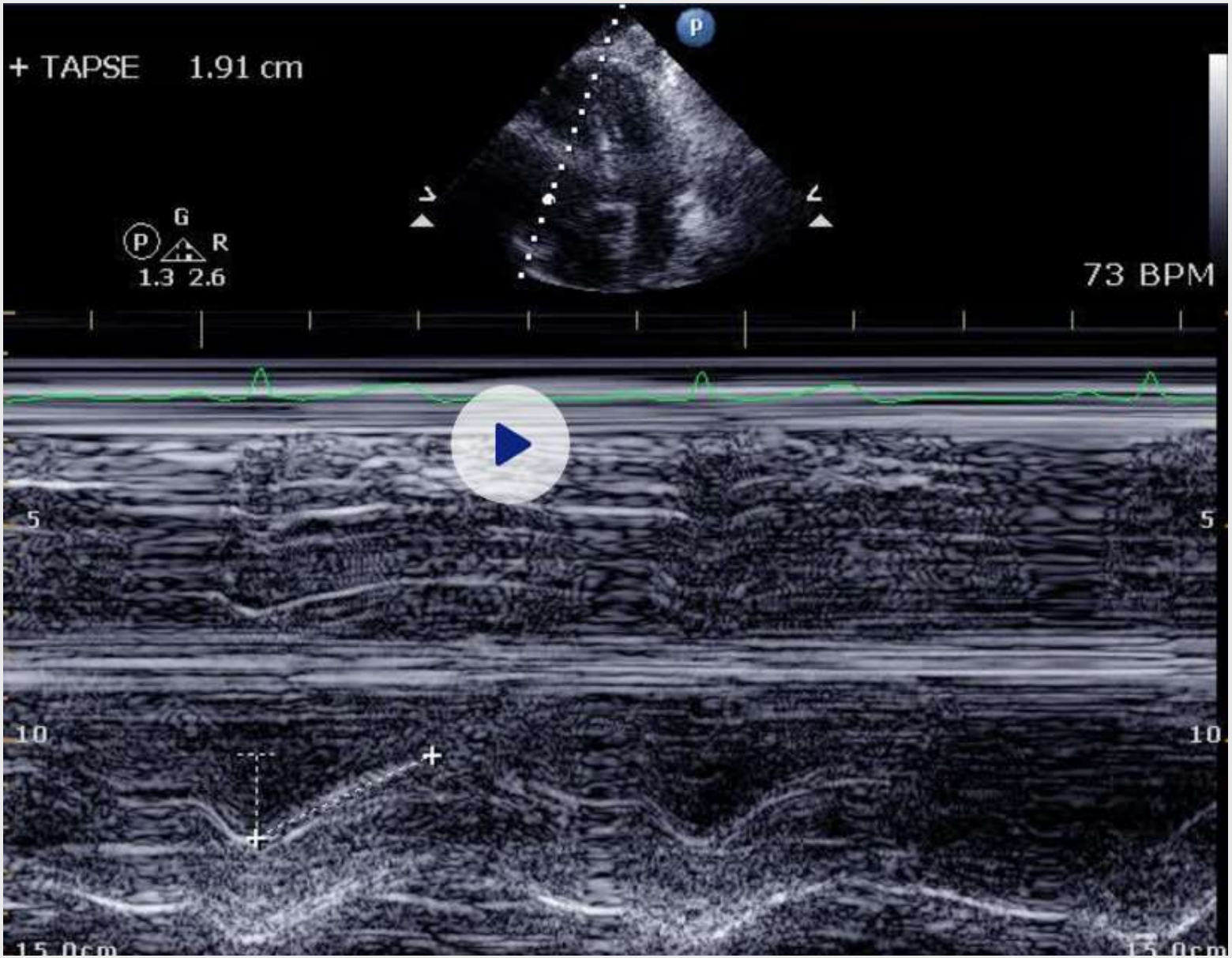

- McConnell's Sign?
- RV Dominant Apex?




- IVC Normal?


PHILIPS
MI 1.0
TIS 0.4
NYP ECHO
S5-1
25 Hz
21.0cm
2D
HPen
Gn 72
C 46
5/2/0
75 mm/s
G
R
1.3 2.6
73
BPM

- IVC Normal?




- TAPSE?

# Case Presentation

- No evidence of right heart strain on TTE
- Patient transitioned to Apixaban and discharged shortly after transfer

# Questions?

# Sources


- Ferry & Boyd, "Right Ventricular Strain", Vanderbilt Emergency Department, Video, https://vimeo.com/106214780.
- https://www.youtube.com/watch?v=H_IuM5zVPKs
- https://www.youtube.com/watch?v=aLGB9V3YDQc
- https://www.youtube.com/watch?v=X7sEPUcG1eQ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