

Potpourri:

Low Flow Low Gradient Aortic Stenosis
Applying the Guidelines to Every Day Cases

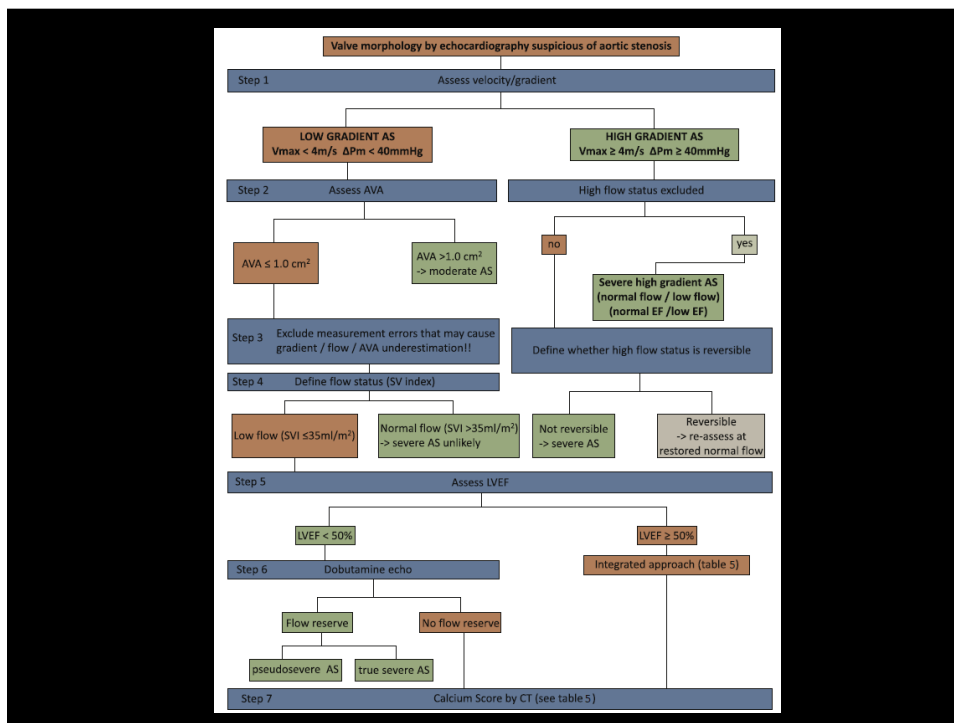
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1

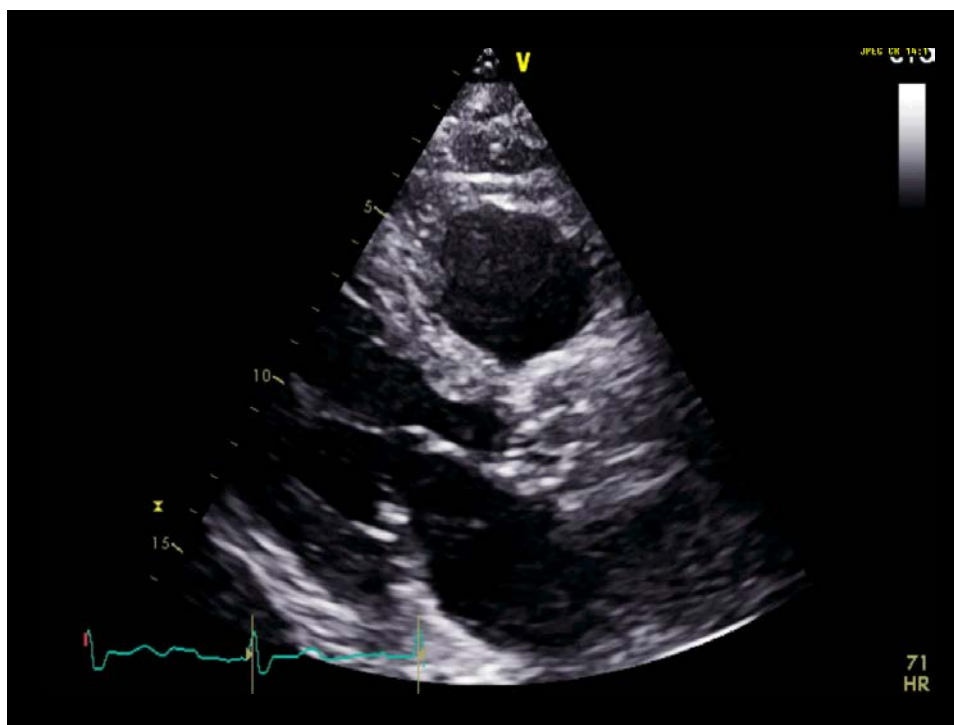
Case #1

- 77 year old female admitted with heart failure. Known history of AS.
- **Clinical exam suggestive of severe AS.**
- TTE:
 - AV max velocity 389 cm/s (gradient 61 mmHg)
 - AV **mean gradient 32 mmHg**
 - AV DVI 0.27
 - Calculated **AVA (VTI) = 0.6 cm²**
 - SVI = 33 ml/m², LVDVi 50 ml/m², LVSVi 20 ml/m²
 - LV EF = 59%, mod MR/TR, mild AI

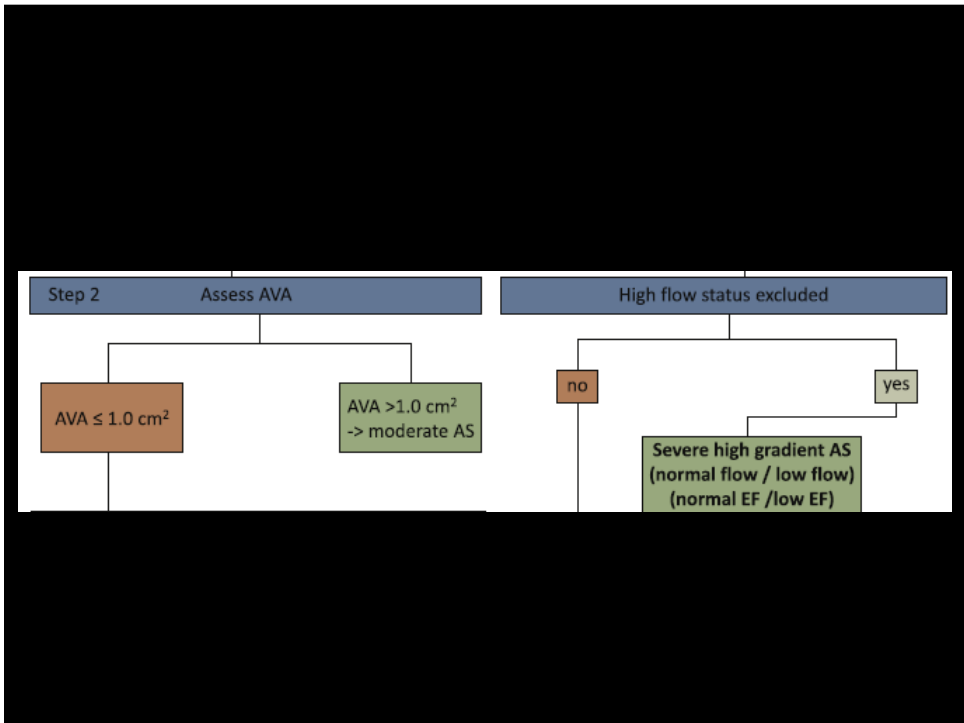
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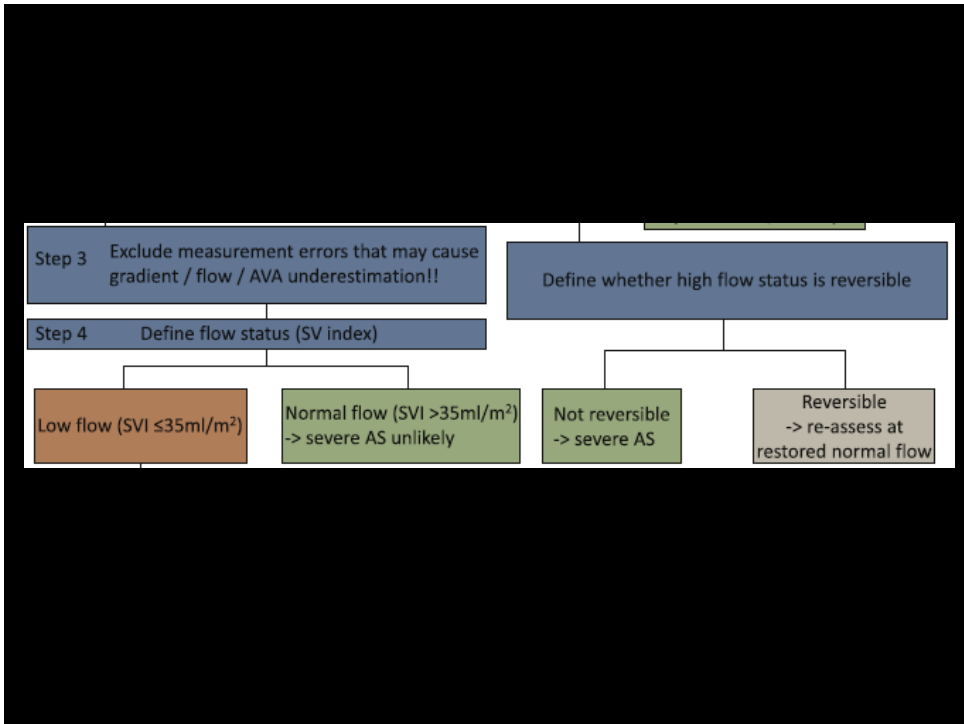
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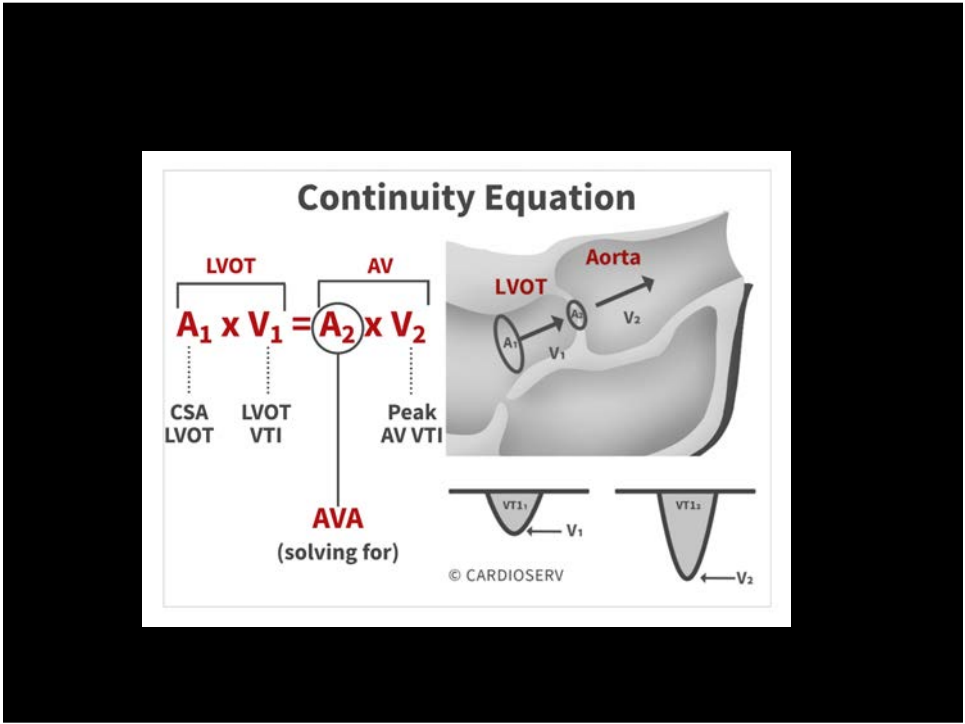
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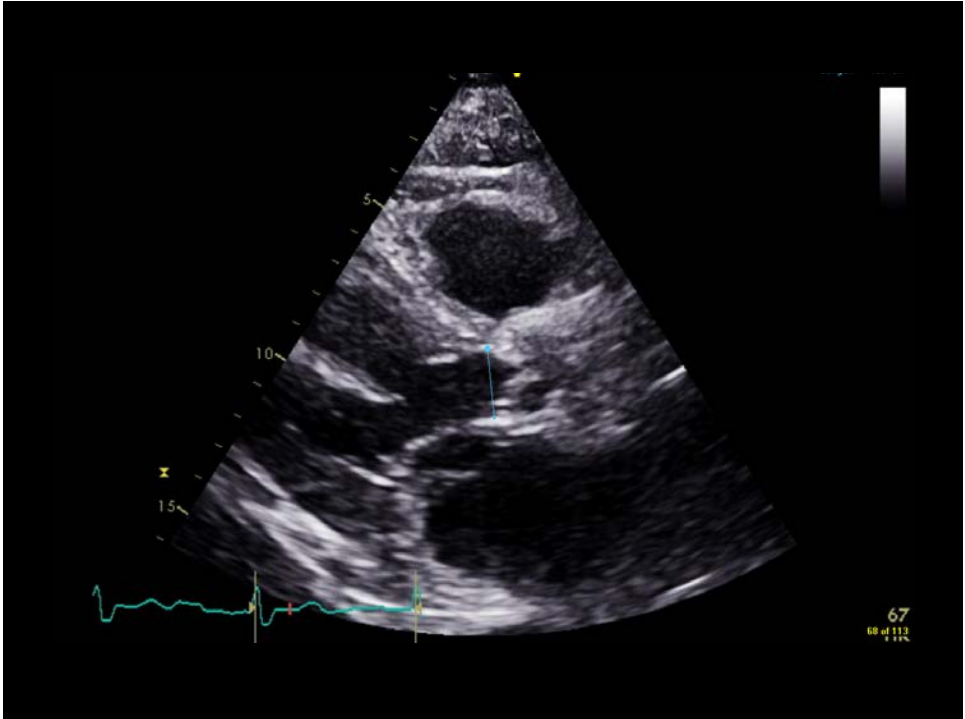
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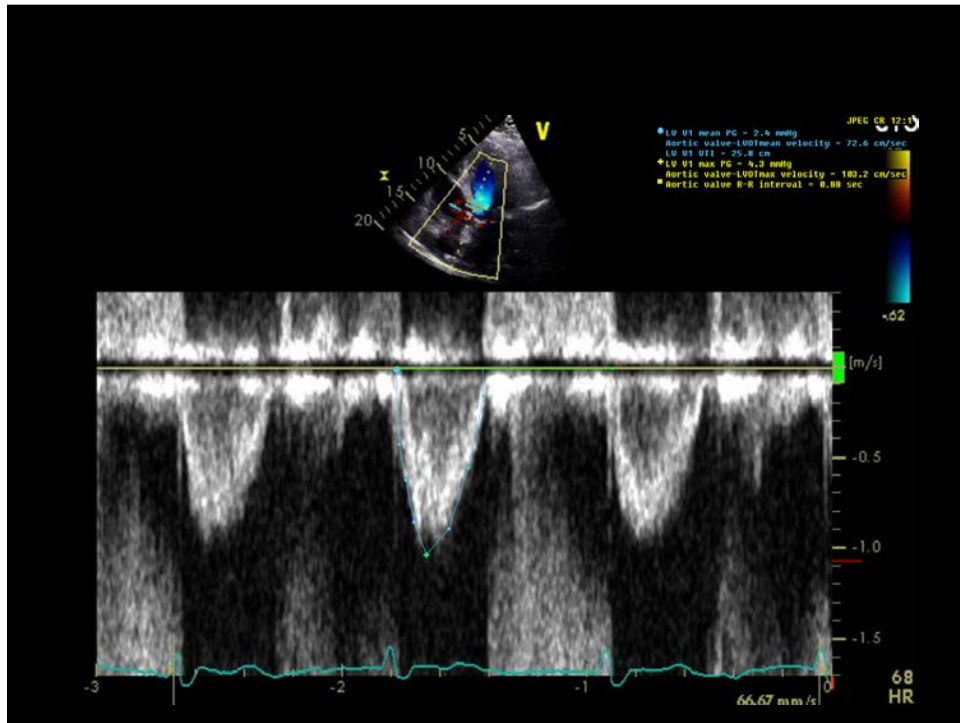
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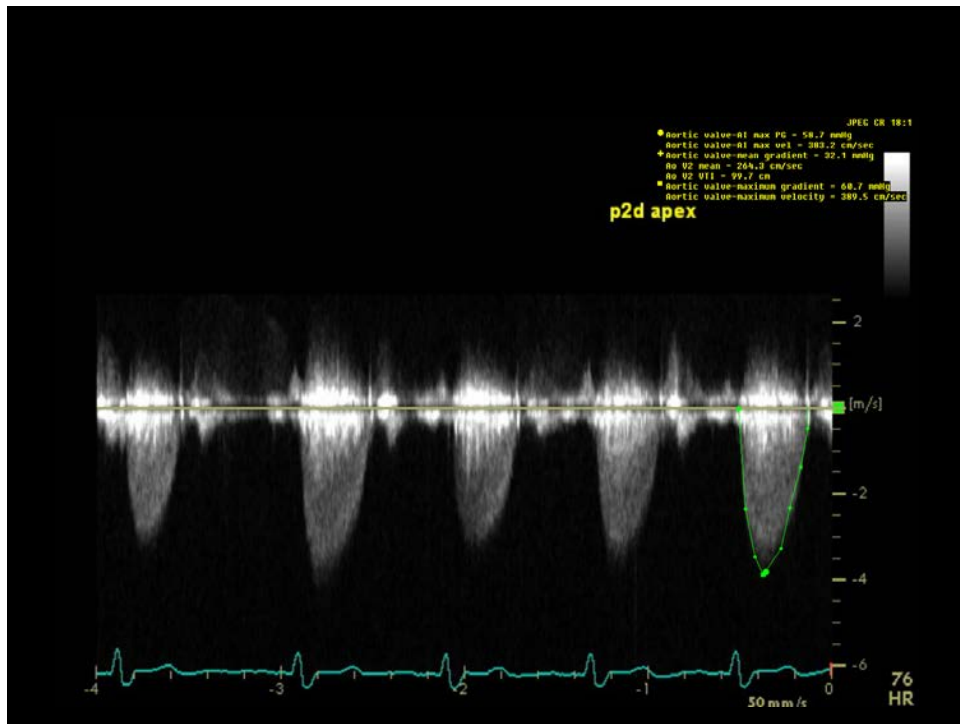
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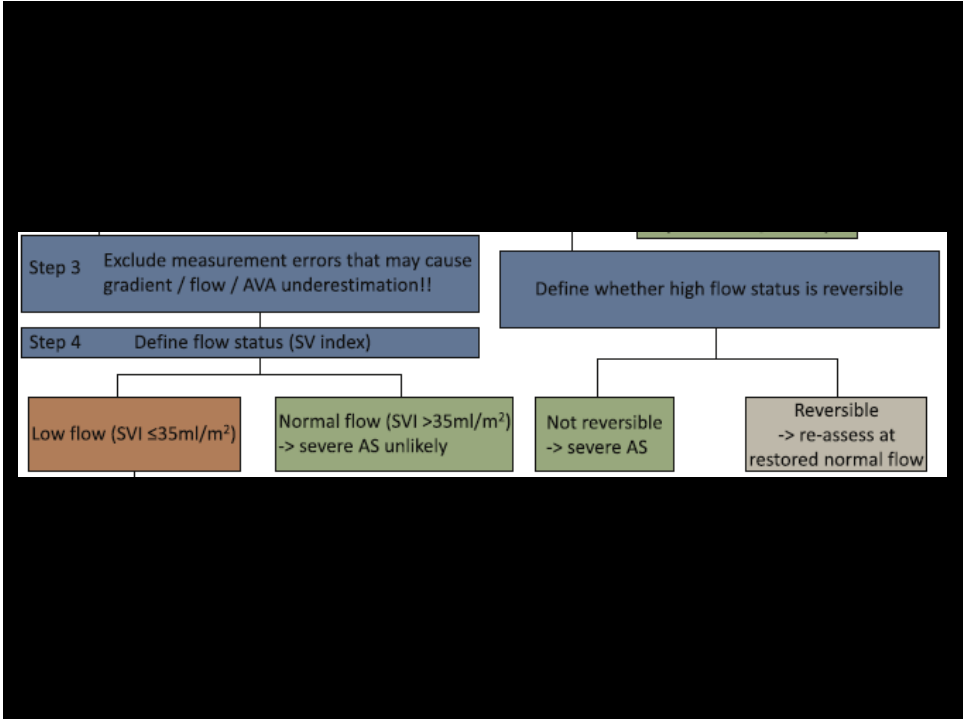
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AVA = LVOT area * VTI1/VTI2
 AVA = 2.5 * 26/96
 AVA = 0.7 cm²

DVI = 72/350
 DVI = 0.3

** Just a side note:
 DVI < .25 is not a reliable cutoff for severe AS when LVOT area is out of proportion to BSA*

11

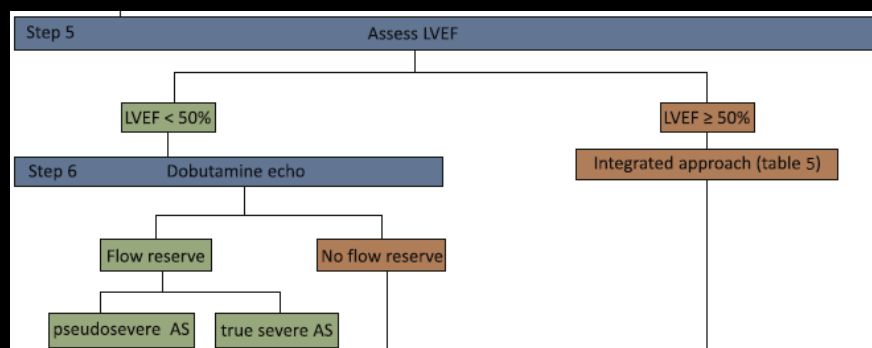


12

Is this a low flow state? (paradoxical low flow low gradient AS)

- Should find typical features of this
 - Concentric remodeling or hypertrophy, small LV size, elderly (“classic” PLFLGAS)
- Identify other potential causes of low flow
 - HTN, MR, TR, Afib,
- LVOT stroke volume should be corroborated by other means
 - e.g. LV volumes

13



14

Table 5 Criteria that increase the likelihood of severe AS in patients with AVA <1.0 cm² and mean gradient <40 mmHg in the presence of preserved EF

(1) Clinical criteria:		
Physical examination consistent with severe aortic stenosis		
Typical symptoms without other explanation		
Elderly patient (>70 years)		
(2) Qualitative imaging data:		
LVH (additional history of hypertension to be considered)		
Reduced LV longitudinal function without other explanation		
(3) Quantitative imaging data:		
Mean gradient 30–40 mmHg ^a		
AVA ≤0.8 cm ²		
Low flow (SVi <35 mL/m ²) confirmed by other techniques than standard		
Doppler technique (LVOT measurement by 3D TEE or MSCT; CMR, invasive data)		
Calcium score by MSCT ^b		
Severe AS likely:	men ≥2000	women ≥1200
Severe AS very likely:	men ≥3000	women ≥1600
Severe AS unlikely:	men <1600	women <800

Case Conclusion:

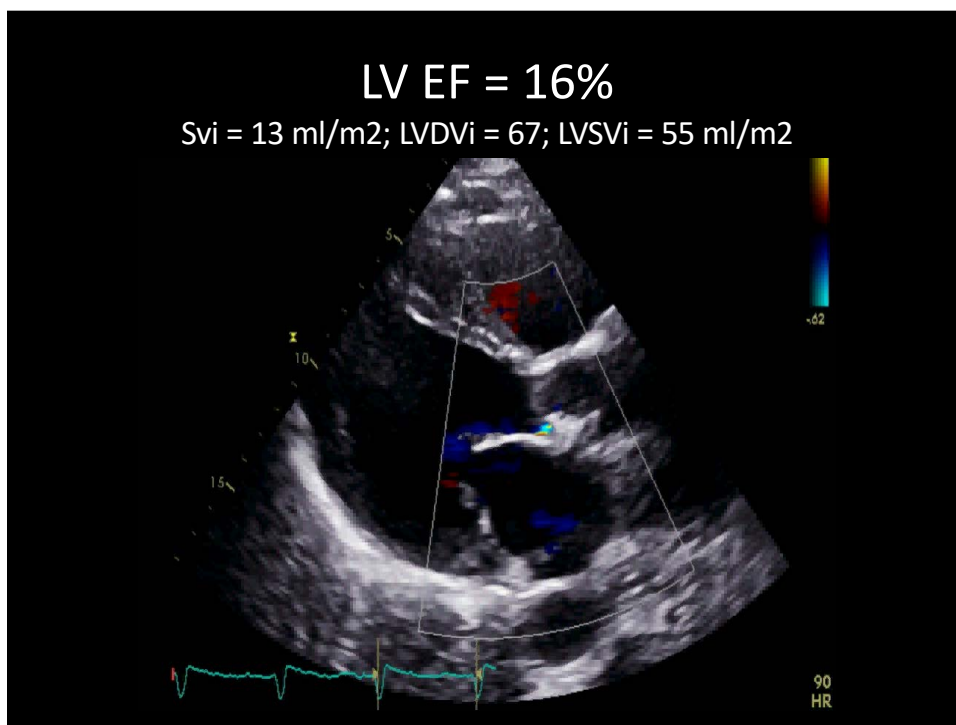
Using an integrative approach, given clinical exam, age, Some LVH, low SVi, calcified valve, we decided this was severe AS

15

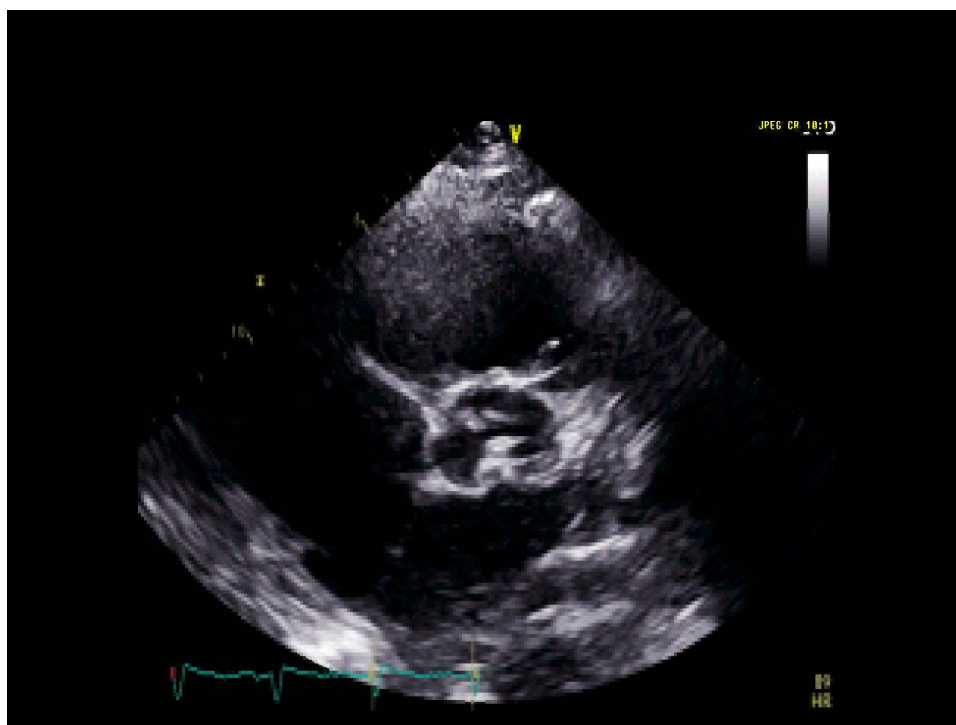
Case #2

- 65 yr old male with bicuspid aortic valve admitted with heart failure
- TTE on admission:
 - AV peak velocity = 183 cm/s
 - AV mean gradient = 7 mmHg
 - AVA (VTI) = 1.1 cm²
 - DVI = 0.41

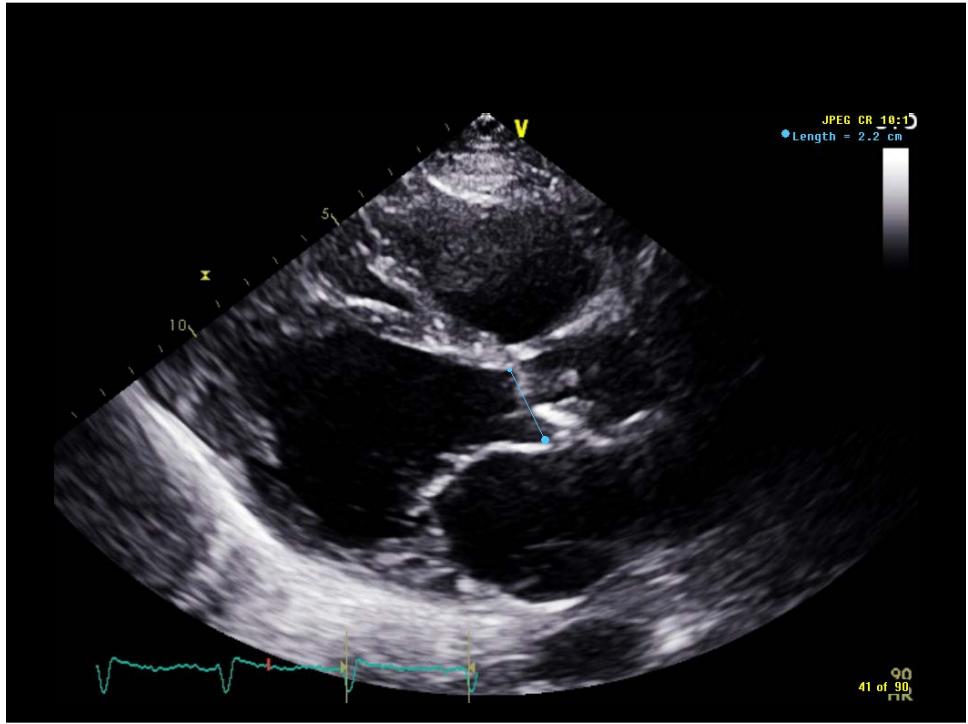
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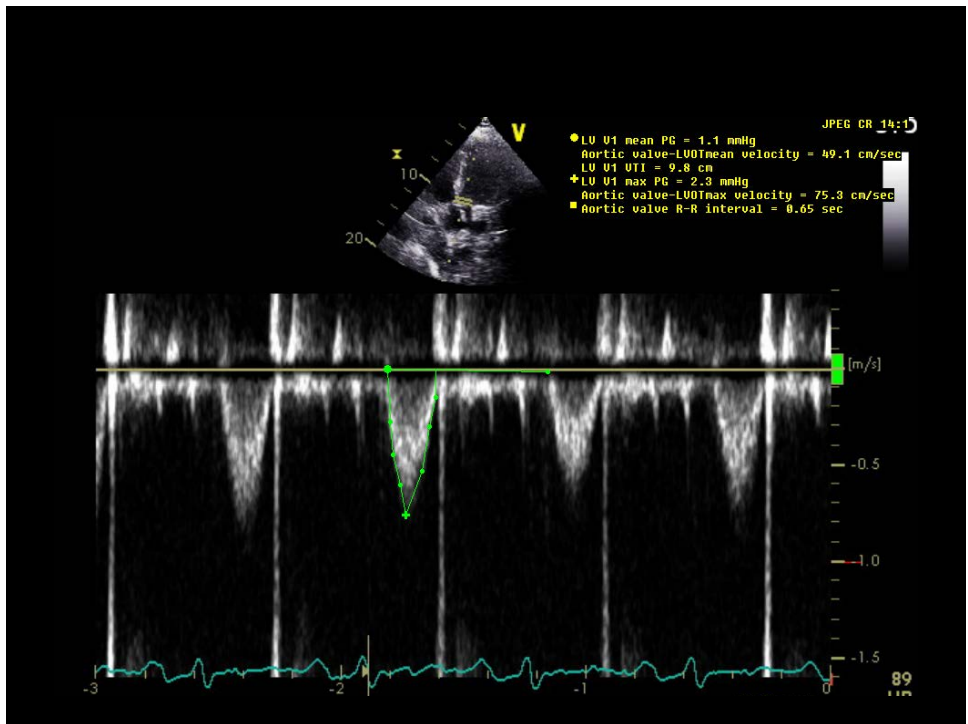
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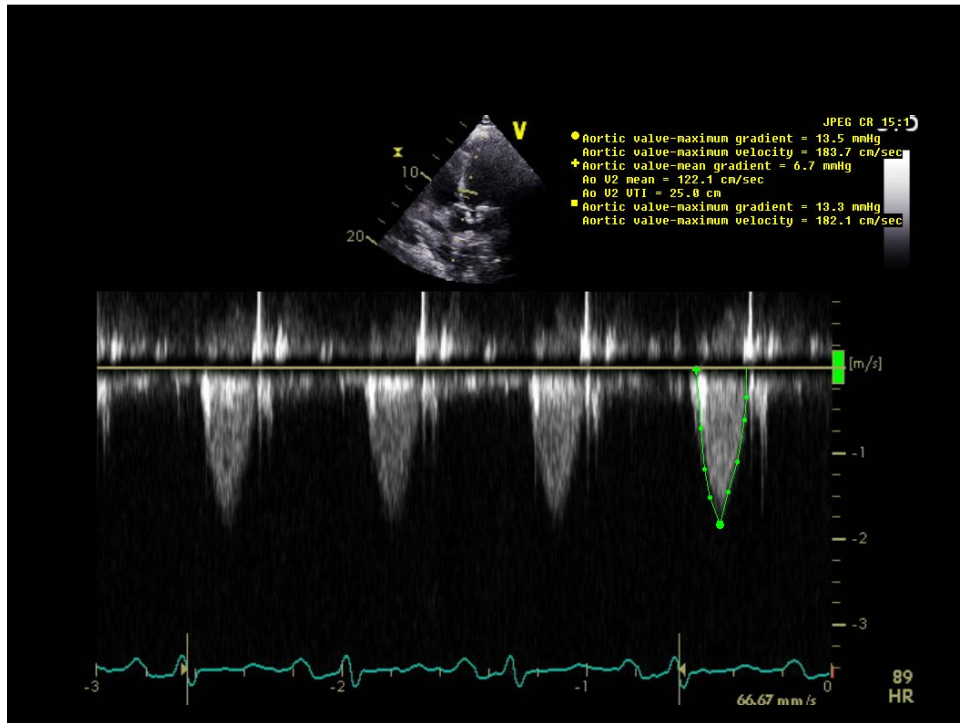
18



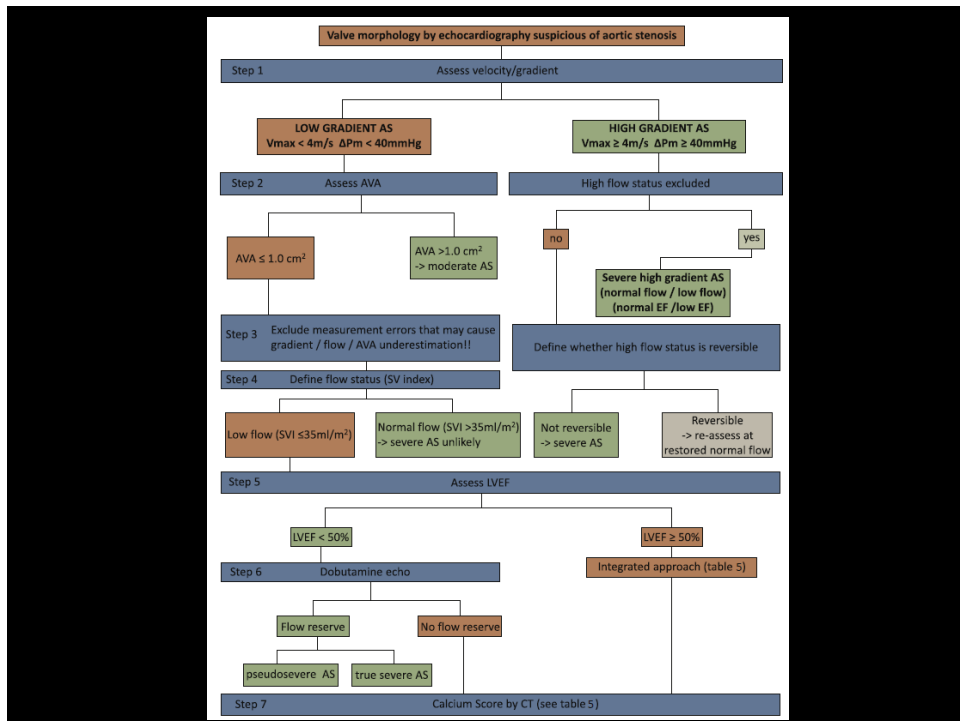
19



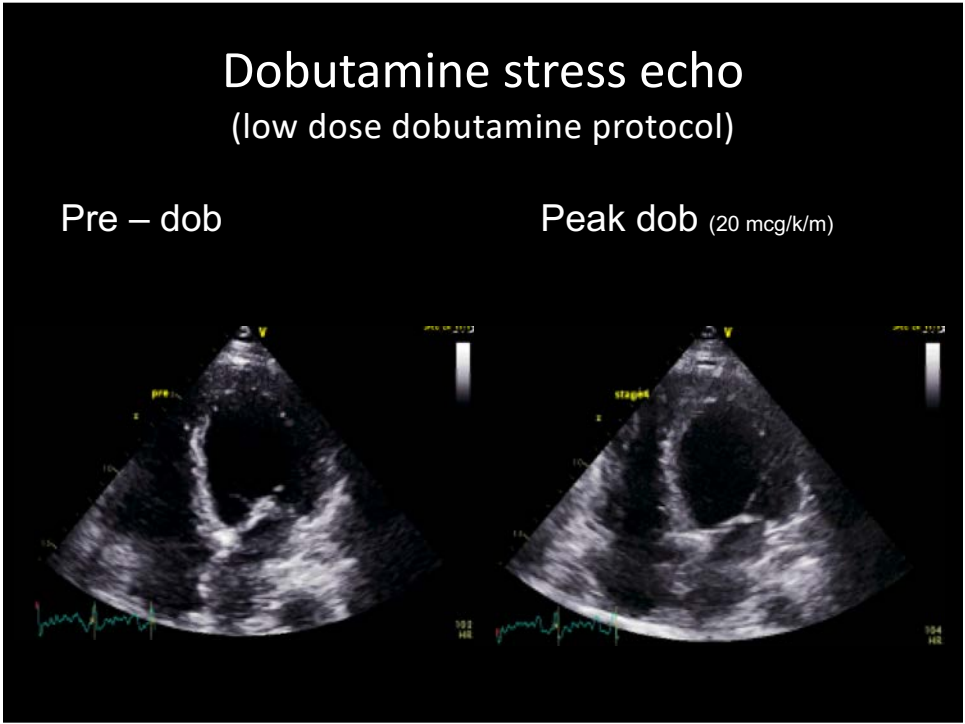
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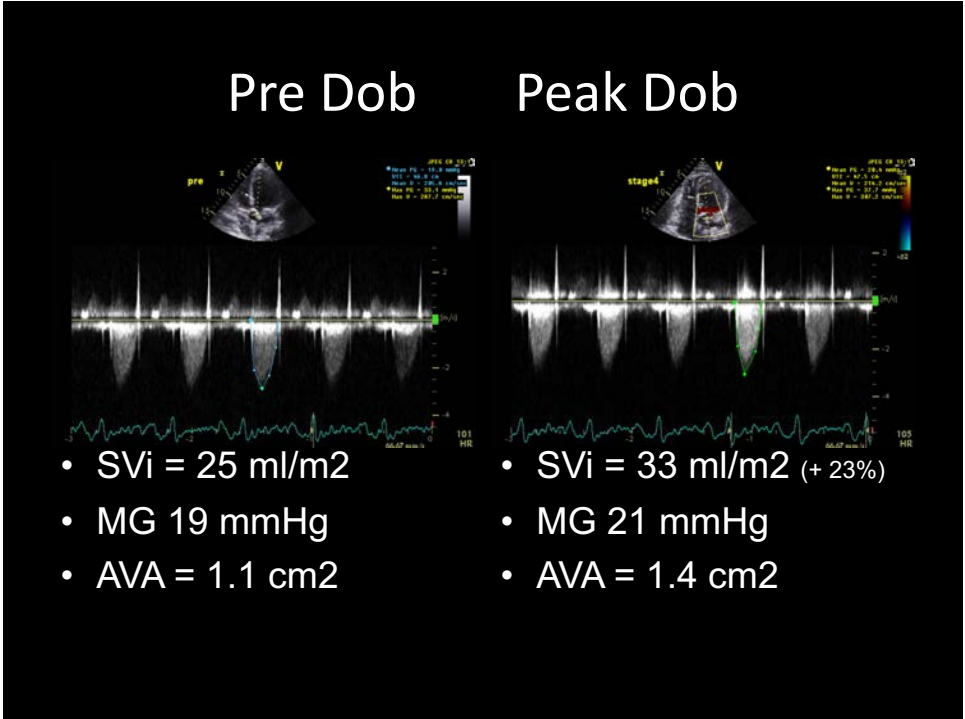
21



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Diagnosis?

- Pseudo-severe (moderate) aortic stenosis
- Another cause of LV dysfunction (e.g. IHD or primary cardiomyopathy)
- Valve replacement is of no benefit
- Heart failure treatment recommended

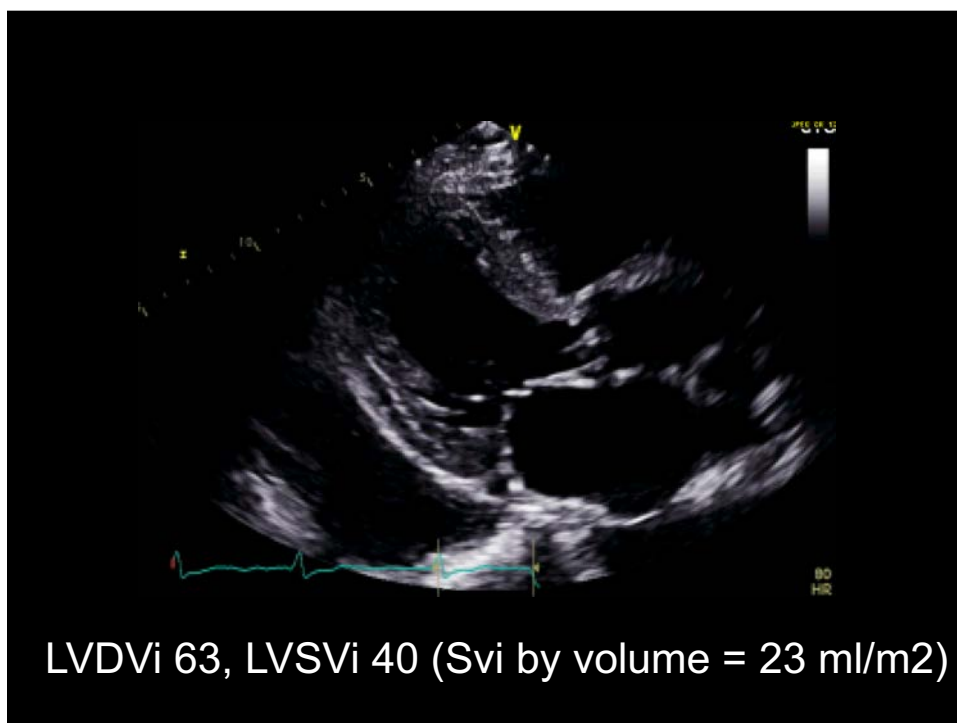
25

Mr. DP

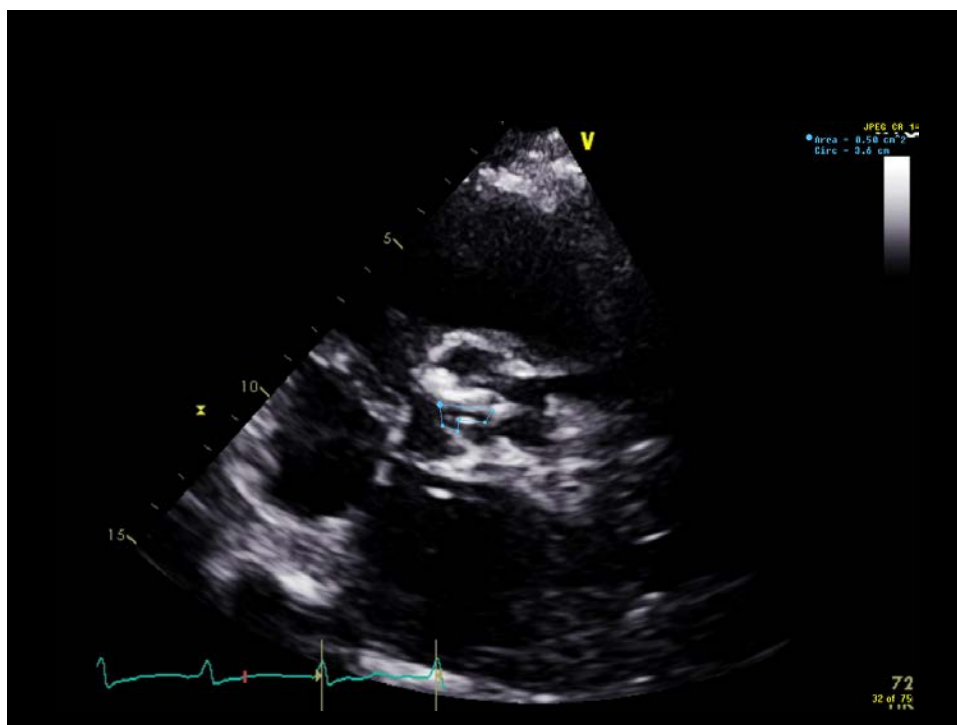
- 94 yr old male with heart failure
 - AVA = 1.1 cm² (VTI continuity)
 - AV V_{max} = 361 cm/s
 - AV mean gradient = 26 mmHg
 - LV EF 38%, S_{vi} = 40 ml/m²
 - DVI 0.25 (LVOT 2.4 cm)
 - Mild-mod MR, TR, AI
 - Mild RV hypokinesis

Moderate AS?

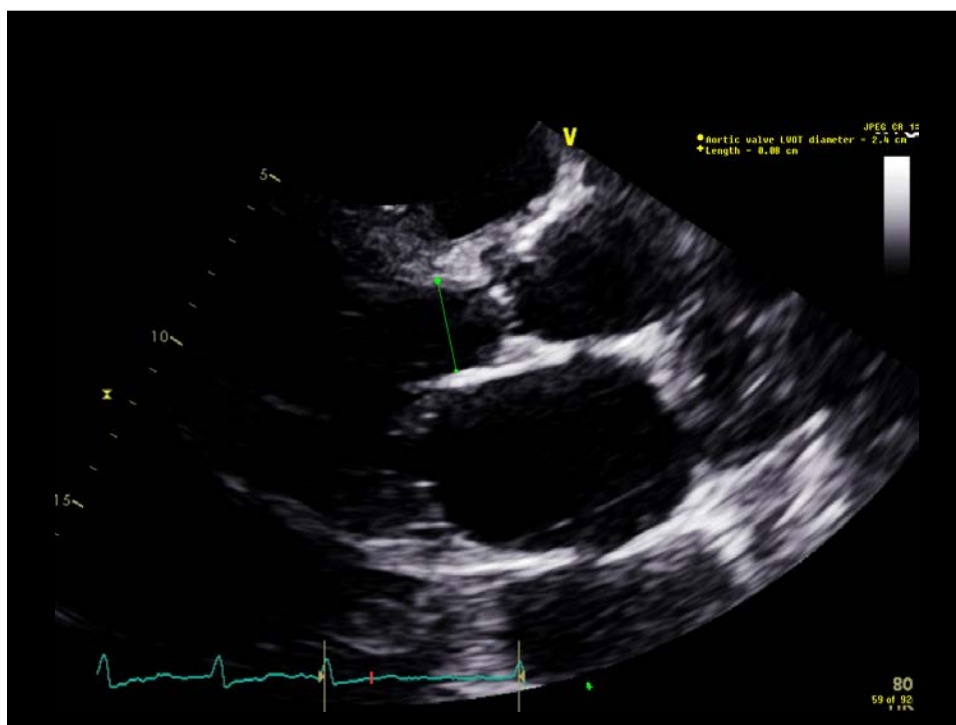
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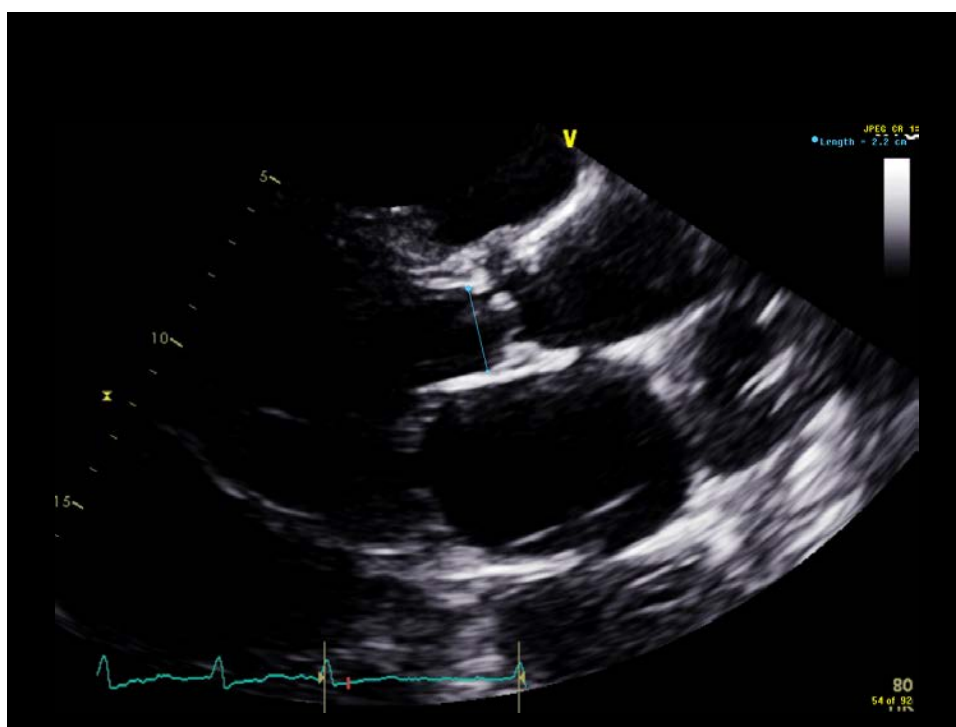
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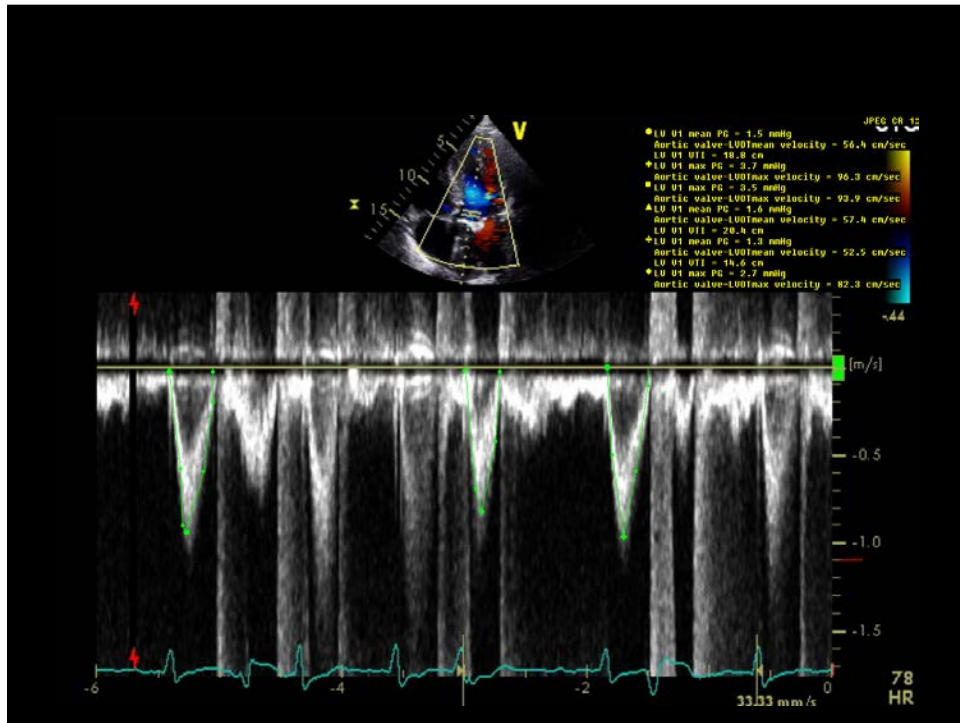
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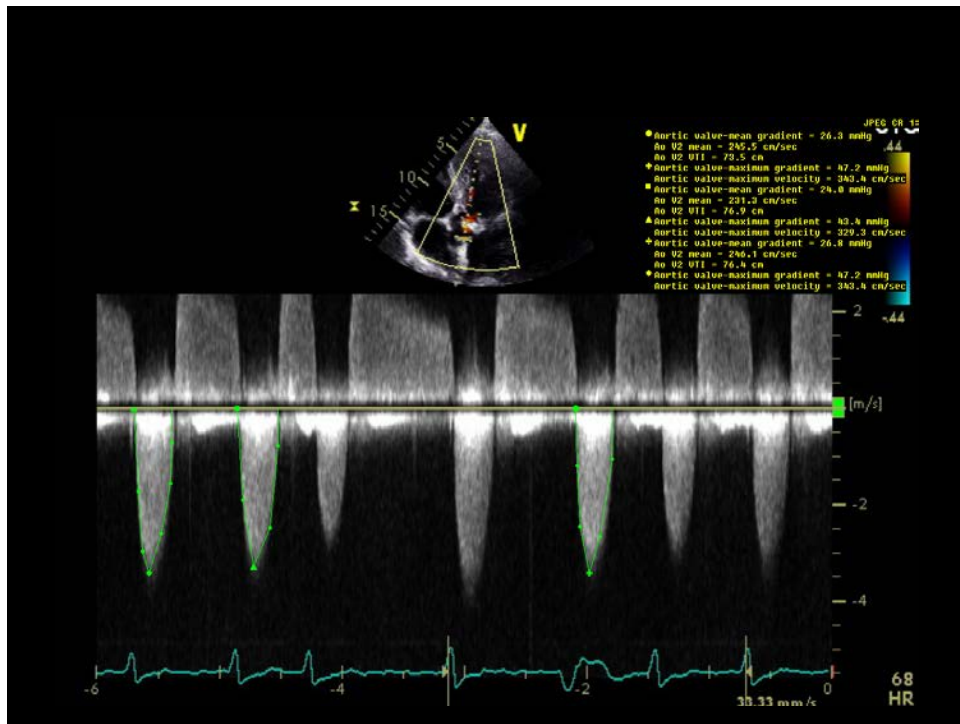
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30



31



32

Calculations using re-measured LVOT diameter

- $AVA = LVOT \text{ area} * VTI1/VTI2 = 3.8 * 18/74$
- $AVA = 0.9 \text{ cm}^2$; $AVA_i = 0.45 \text{ cm}^2/\text{m}^2$

- $SV = LVOT \text{ area} * LVOT \text{ VTI} = 68 \text{ ml}$
- $SV_i = 34 \text{ ml}/\text{m}^2$

33

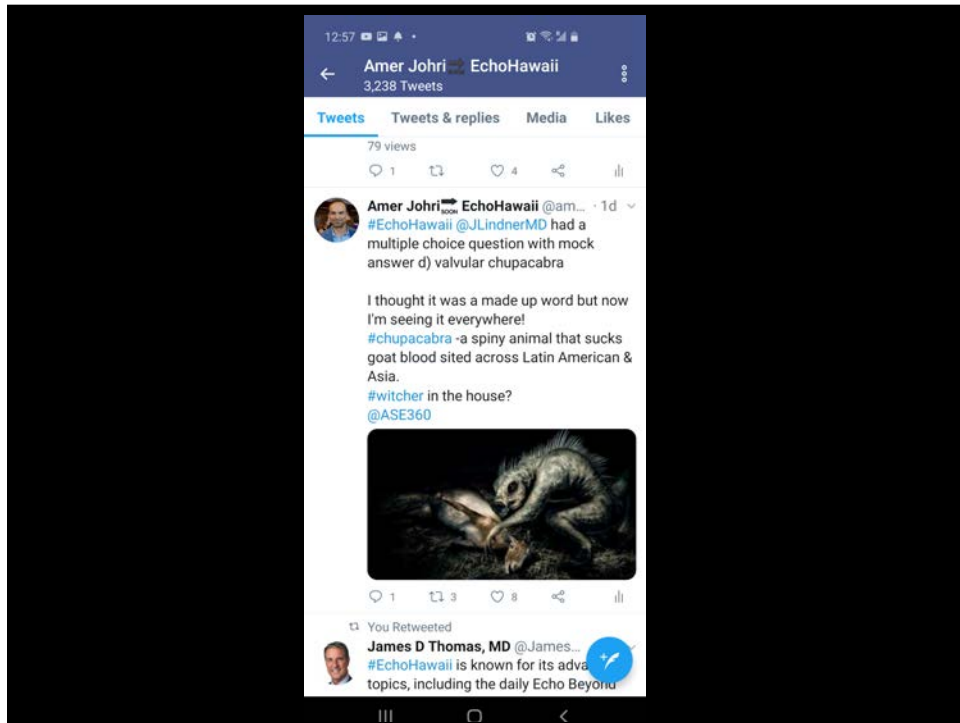
Case Conclusion

- Guidelines would suggest DSE

- But he's 92!

- Low Flow Low Gradient Aortic Stenosis
- Probably True Severe (vs pseudosevere)

34



35