

# Making sense of an ECHO report

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# The Basic Structure of an Echo Report

- Procedural details
  - Image quality, habitus, arrhythmias, patient cooperation
- Left chambers
  - Size, volume, EF, RWMA, hypertrophy, diastolic function
- Left sided valves
  - Regurgitation, stenosis, calcification
- Right chambers
  - Size, TAPSE/FAC, RWMA, evidence of pulmonary hypertension
- Right sided valves
  - Regurgitation, stenosis, evidence of pulmonary hypertension
- Miscellanea
  - Aortic root and ascending aorta
  - ASD/VSD
  - Descending aorta for coarctation/PDA
  - Pericardial/pleural effusions...

# And finally...

- The CONCLUSION
  - Most important part!
  - Must contain enough information to be sufficient on its own to most readers
  - Must be understood by a non-specialist
  - Highlight the main finding in the light of the referral reason (*like “Section 1” on death certificate*)
  - Mention findings which may have impact on main finding/referral reason (*“Section 2a” on death certificate*)
  - Mention findings which have no direct impact on main finding/referral but may be clinically relevant now or in the future (*“Section 2b” on death certificate*)
  - Recommend clinical course of action (if done by a cardiologist)

# Agenda – how to interpret common findings

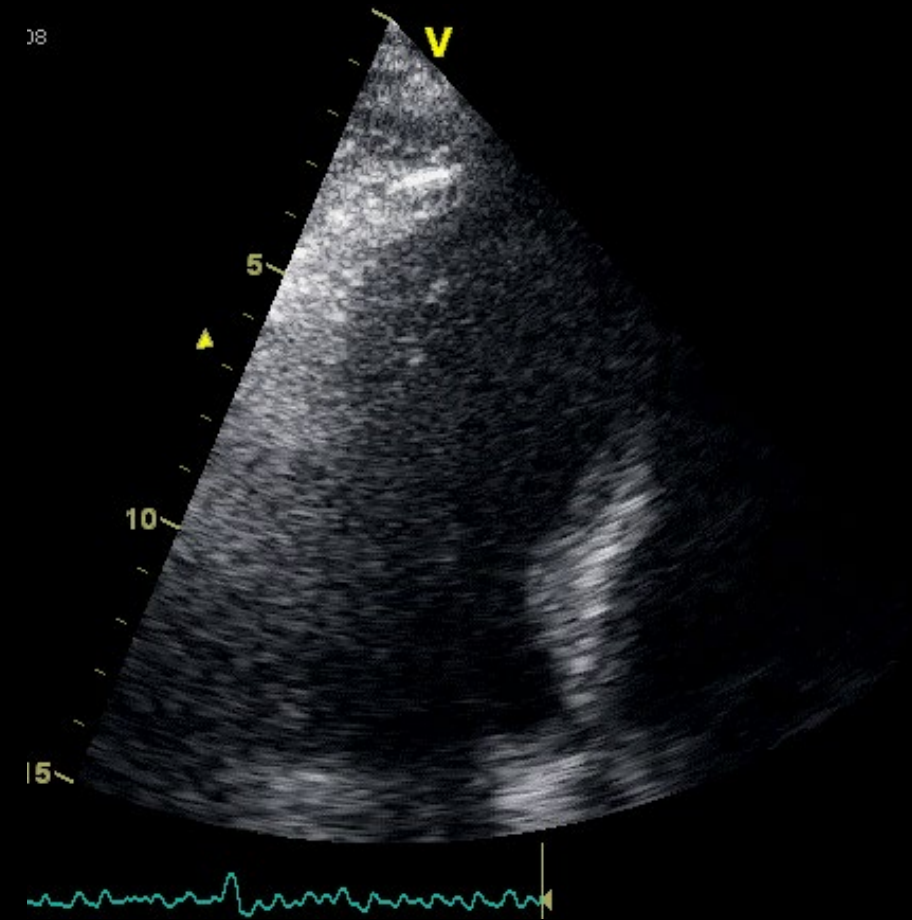
- Mildly reduced LVEF/LVEF at lower limits of normal
- Mild LV Hypertrophy
- Diastolic dysfunction
- Mild valve lesions and aortic sclerosis
- Dilated left atrium
- Mildly dilated aortic root

# Agenda – how to interpret common findings

- **Mildly reduced LVEF/LVEF at lower limits of normal**
- Mild LV Hypertrophy
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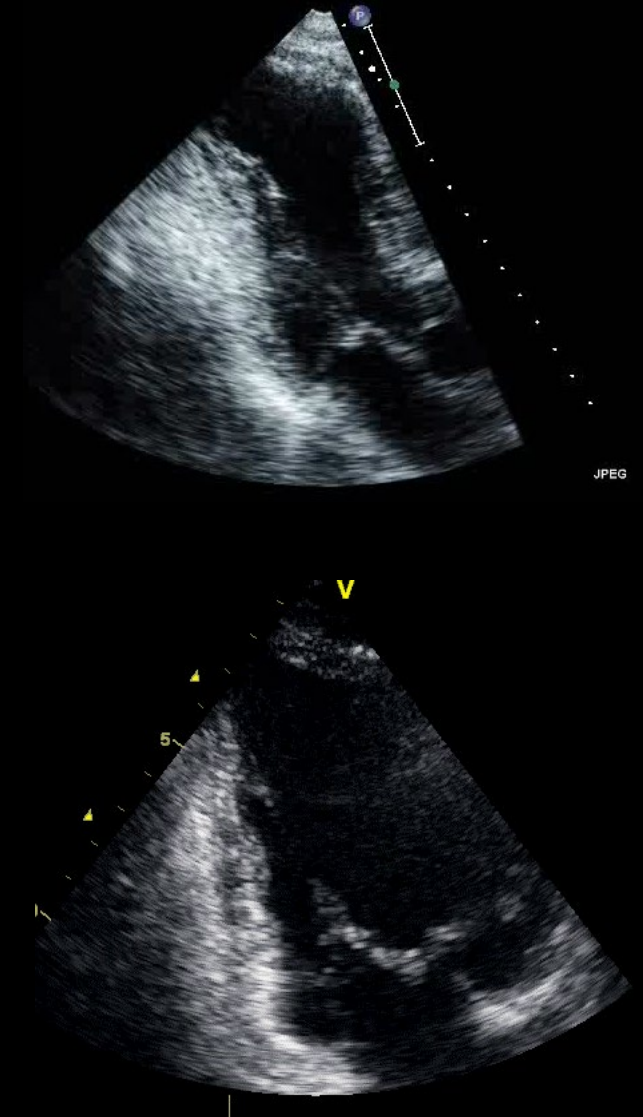
# LVEF 45-50%/lower limits of normal/mildly impaired – 1 (in the absence of valve disease)

- May be normal finding in athletes
- May be an expected finding in LBBB and paced patients
- Could be a consequence of:
  - previous MI/myocarditis
  - h/o chemotherapy and/or radiotherapy
  - Alcohol
- Can be an early cardiomyopathy in
  - Hypertension
  - Diabetes
  - Obesity



# LVEF 45-50%/lower limits of normal/mildly impaired - 2

- Clues:
  - RWMA with thinned myocardium: h/o MI
  - Spherical, globally hypocontractile heart: inherited cardiomyopathy, previous myocarditis, alcohol toxicity, chemotherapy
  - Increased wall thickness
    - Hypertensive cardiomyopathy
    - Hypertrophic cardiomyopathy
    - Amyloid heart disease
    - Valve disease
- Dilated LA, pulmonary hypertension and advanced diastolic dysfunction imply significant LV systolic dysfunction



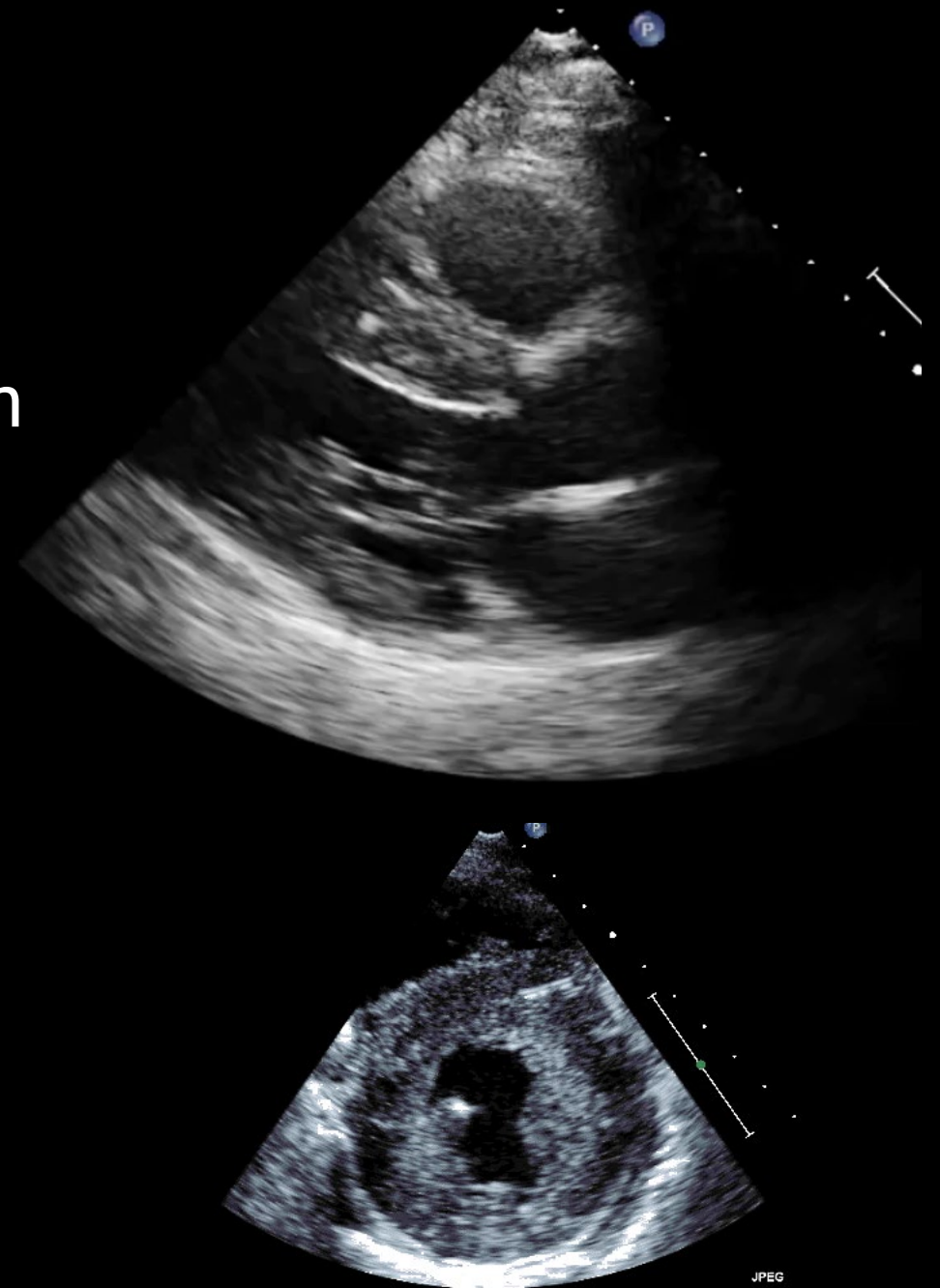
# Agenda – how to interpret common findings

- Mildly reduced LVEF/LVEF at lower limits of normal
- **Mild LV Hypertrophy**
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# Mild LV hypertrophy (in absence of valve disease) 1

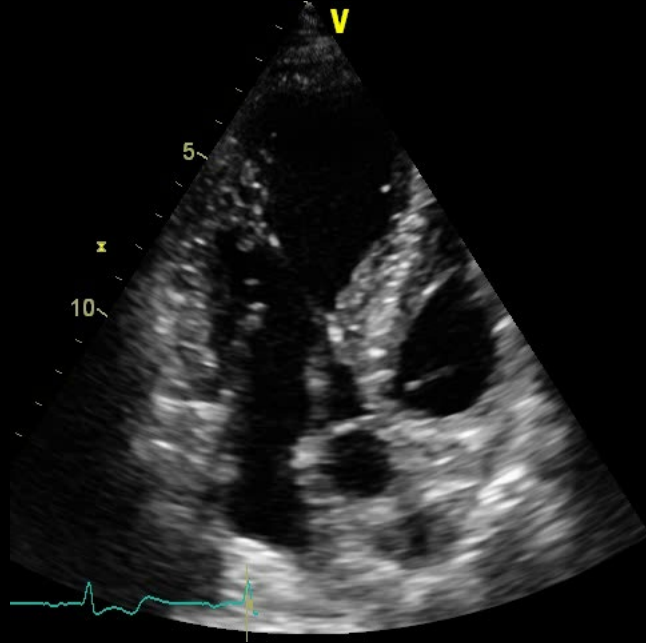
- “Grey” zone between 11 and 15 mm
  - Hypertension
  - Athletes
  - Diabetics
  - Amyloid
  - Sarcomeric HCM
- May need Cardiac MRI to confirm



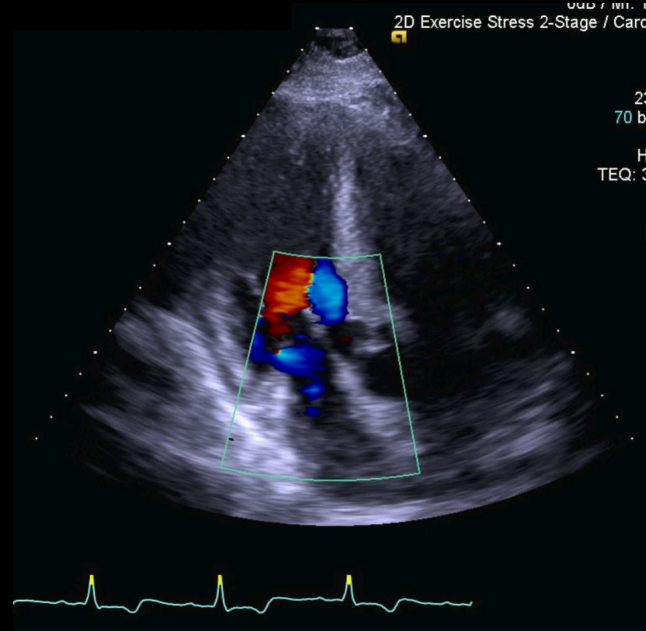
# Mild LV hypertrophy (in absence of valve disease) 2

- Clues suggesting serious disease
  - Advanced diastolic dysfunction
  - Dilated LA
  - Involvement of RV
  - Small cavity (especially in females)
  - Asymmetric septal hypertrophy (IVS:LVPW thickness  $> 1.3$  (or  $> 1.5$  in presence of hypertension) or any form of asymmetric hypertrophy suggests HCM
  - Systolic anterior motion of MV apparatus and LVOT obstruction suggests HCM
  - Abnormal ECG
  - Family history of SCD

# Some images of hypertrophy



HCM with SAM



HCM with LVOT obstruction;  
turbulence in LVOT on colour  
Doppler



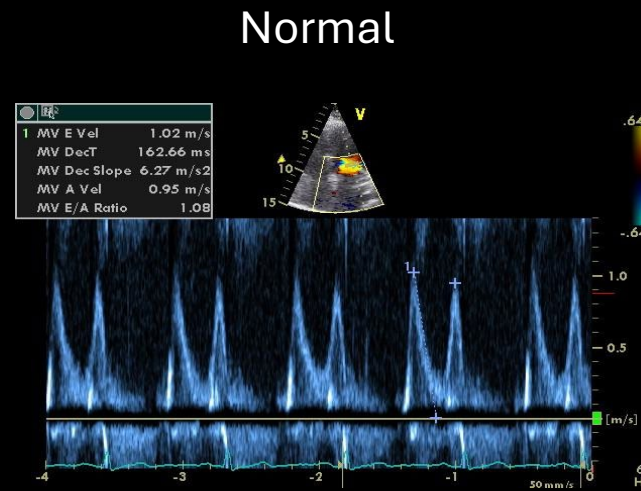
Amyloid Heart Disease

# Agenda – how to interpret common findings

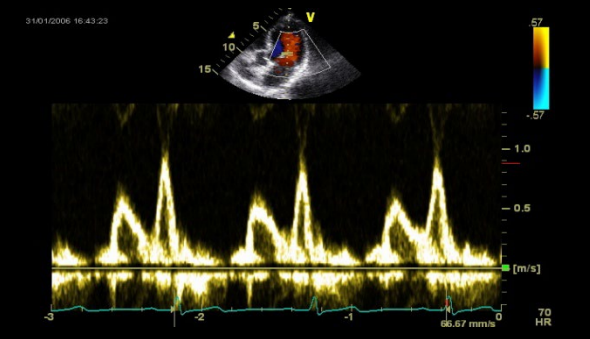
- Mildly reduced LVEF/LVEF at lower limits of normal
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# Diastolic dysfunction (in presence of normal LVEF) 1

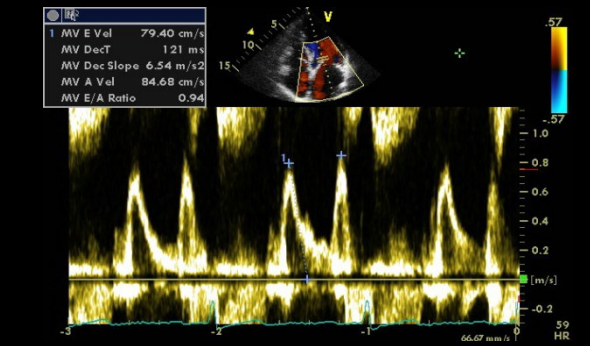
- Measured routinely on echo using transmitral Doppler and tissue Doppler of longitudinal mitral valve annulus velocities
- Classified as
  - Grade 1 (impaired relaxation)
  - Grade 2 (pseudonormalisation)
  - Grade 3 (high filling pressures) (decreased compliance)



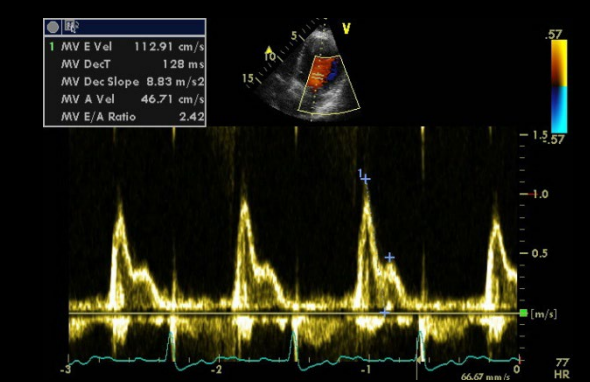
Grade 1



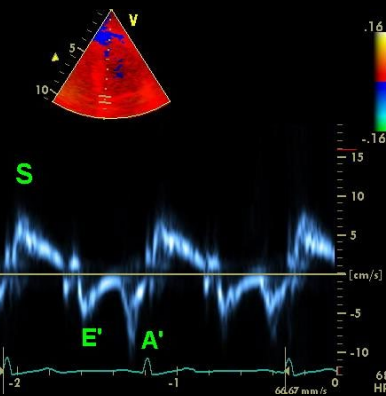
Grade 2



Grade 3



Tissue Doppler



# Diastolic dysfunction 2

- Common in “healthy” general population and frequency increases with age (27%)<sup>1</sup>
  - E/A ratio is commonly  $< 1.0$  after age 60 years (50% of pts  $> 60$  years)
- Clues to presence of underlying significant disease
  - Dilated LA
  - Diabetes
  - Hypertension
  - Sedentary obese females
- Watch out for increased E/E' – a marker of high LV filling pressures
  - Be wary if E/E'  $> 8.5$  and especially if  $> 15$ ...there is a problem with LV function

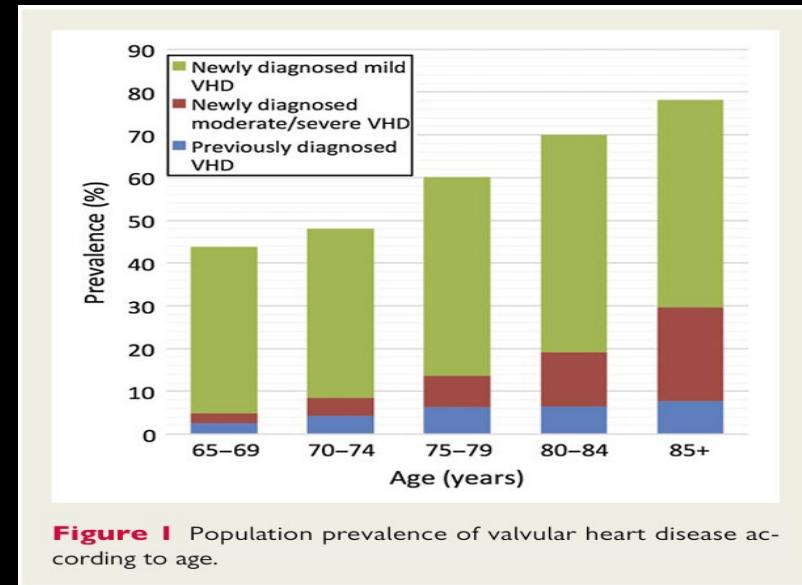
<sup>1</sup>Kuznetsova et al. Circ Heart Failure 2009;2:105

# Agenda – how to interpret common findings

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- **Mild valve lesions and aortic sclerosis**
- Dilated left atrium
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# Mild valve lesions and aortic sclerosis 1

- Mild valvular heart disease is found in 50% of asymptomatic people > 65 years<sup>1</sup>
- The most common is aortic sclerosis
- Aortic valve sclerosis is thickening and calcification of aortic valve without haemodynamic problems
- Is a marker of higher risk of cardiovascular events and mortality
- May progress to aortic stenosis (< 2% per year)<sup>2</sup>



Sclerosis



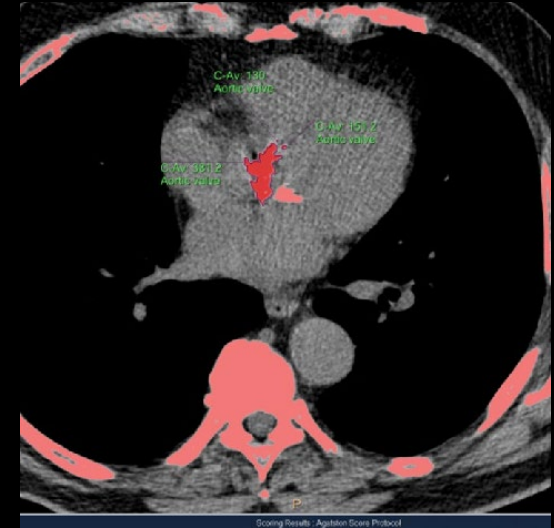
Stenosis

<sup>1</sup>D'Arcy et al. EHJ 2016;37:3515-3522. <sup>2</sup>Coffey et al. JACC 2014;63:2852



# Mild AS

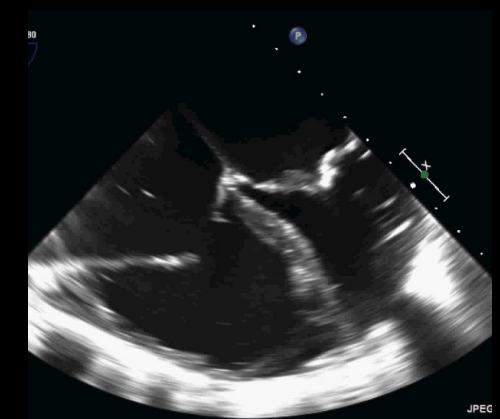
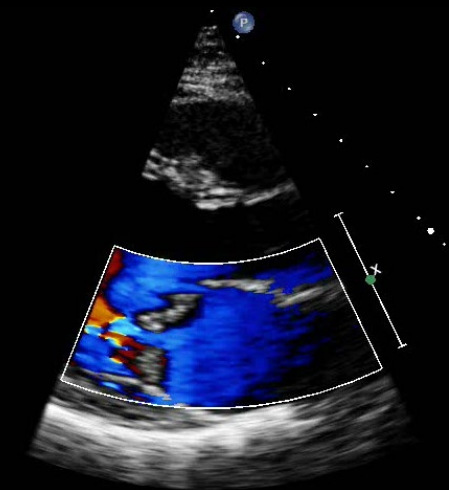
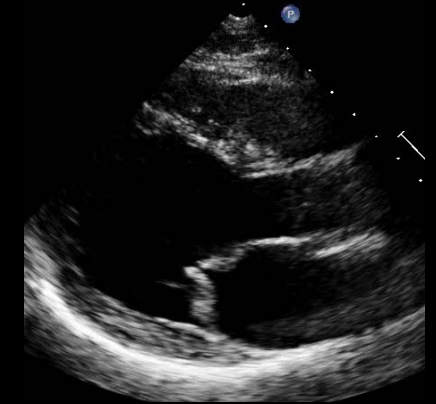
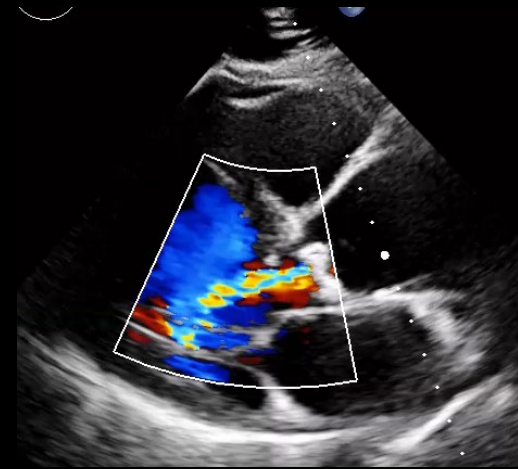
- Mild AS progresses at variable rates
  - On average, AVA decreases by 0.08 cm<sup>2</sup> per year<sup>1</sup>
  - Faster progression in older age, CKD, LVH, AF<sup>2</sup>
- Guidelines advocate surveillance echo every 2 or 3 years in young patients with no or mild calcification
- What about other mild valve lesions?
  - It depends...



<sup>1</sup>Willner et al. JACC:CI 2023;16:314. <sup>2</sup>Venema et al. JACC: Advances 2024; in print

# Other mild valve lesions

- Mild AR: ignore unless
  - Co-existent AS
  - Aortic root dilatation
  - Effacement of ST junction
  - Known aortic dilatation and Marfan's syndrome
  - Autoimmune connective tissue disease
- Mild MR: ignore unless
  - Prolapse or known Marfan's syndrome
  - Severe LA dilatation
  - Severe heart failure or LV systolic dysfunction or dilated LV
  - Rheumatic changes

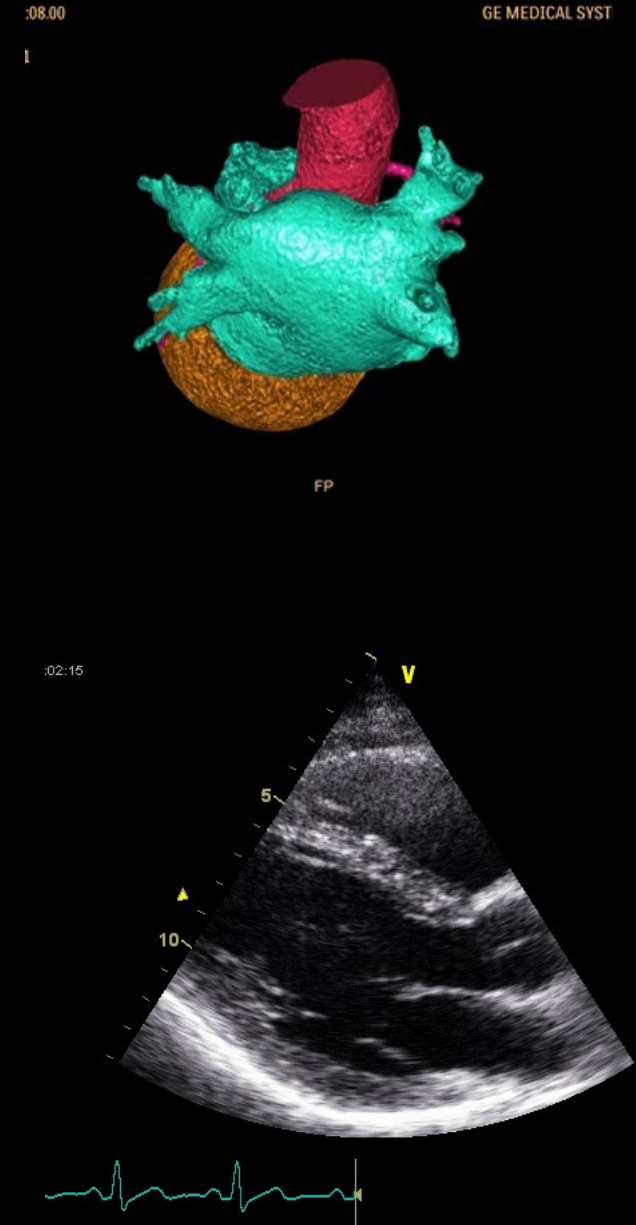
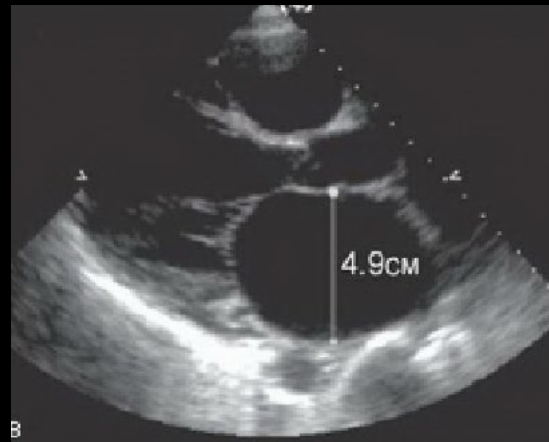


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# Dilated left atrium 1

- LA size is the “HgbA1c” of LV dysfunction
- AP diameter from parasternal long axis view is the convention (though volumes from apical views are more accurate)
- Upper limit depends on body size, general cut-off 3.7 – 3.9 cm



# Dilated left atrium 2

- Implies chronic/longstanding disease
- Causes/associations (in presence of normal LV)
  - AF
  - Hypertension
  - Mitral valve disease
  - Athletic adaptation
  - HFpEF

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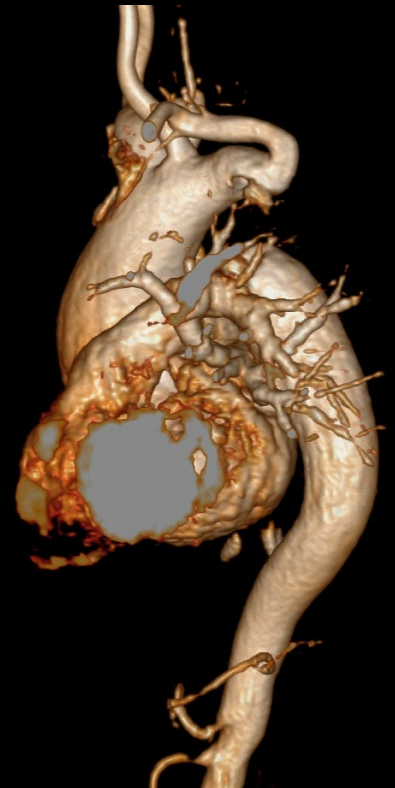
# Mildly dilated aortic root 1

- Mildly dilated means 35-40 mm in men, 34-38 mm in women
- Can be seen in
  - Elderly
  - Large patients
  - Hypertension
  - Athletes
  - Genetic syndromes such as bicuspid AoV and Marfan's
- Should be adjusted to patient size (IMP!)



# Mildly dilated aortic root 2

- Clues to the presence of significant disease
  - Abnormal AoV/presence of AR or AS
  - MV prolapse
  - Body habitus of Marfans
  - Increase in dimension over time ( $\geq 5\text{mm}$ )
  - FH of aortic dissection/aneurysm
- May need confirmation with CT/MRI





# CONCLUSIONS

- Mildly abnormal incidental findings in an otherwise normal patient are common
- They may be a manifestation of an underlying problem (known or unknown)
- ... or a consequence of the main underlying disease
- BUT...there is almost always an explanation
- Unless...

