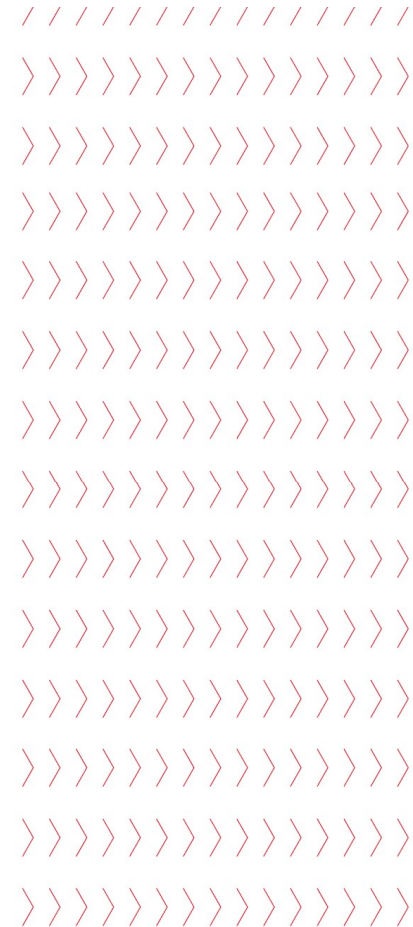


Echo Australia 2025

Beware the HFpEF
Dr Ian Goh



History

62-year-old lady

- 2 years of progressive dyspnoea, palpitations, fatigue, chest pain
- Diagnosed with HFpEF and was commenced on HF therapy
- Symptoms worsened over 5 months prior to admission, NYHA III
- B/:G Hyperlipidemia, non-smoker, 70kg

Medications pre-admission

- Rosuvastatin 10mg daily
- Empagliflozin 10mg daily
- Furosemide 40mg mane/midi
- Spironolactone 25mg daily
- Metoprolol 12.5mg BD

Investigations

CTCA - Jan 2024

- Calcium score 0
- No coronary atherosclerosis.

Stress TTE - May 2024:

- Baseline – *Septal e' 5cm/s, lateral e' 6cm/s, IVRT 60ms, E/e' avg 15*
- Stage II, 3:30 minutes, 5.2 METs, 80% MPR
- Stress – Poor systolic and mitral annular velocities augmentation

CTPA - June 2024

- No pulmonary embolism
- Moderate bilateral pleural effusions

HR 79 . Sinus rhythm. normal P axis, V-rate 50- 99
RR 760 . Inferior infarct, old Q >35mS, II III aVF
PR 148 . Anteroseptal infarct, old Q >40mS, V1-V2
QRSD 100 . Lateral leads are also involved lat Q or ST-T abnormalities
QT 474 . Prolonged QT interval QTc >500mS
QTc 544

Room: 2B 25

--AXIS--

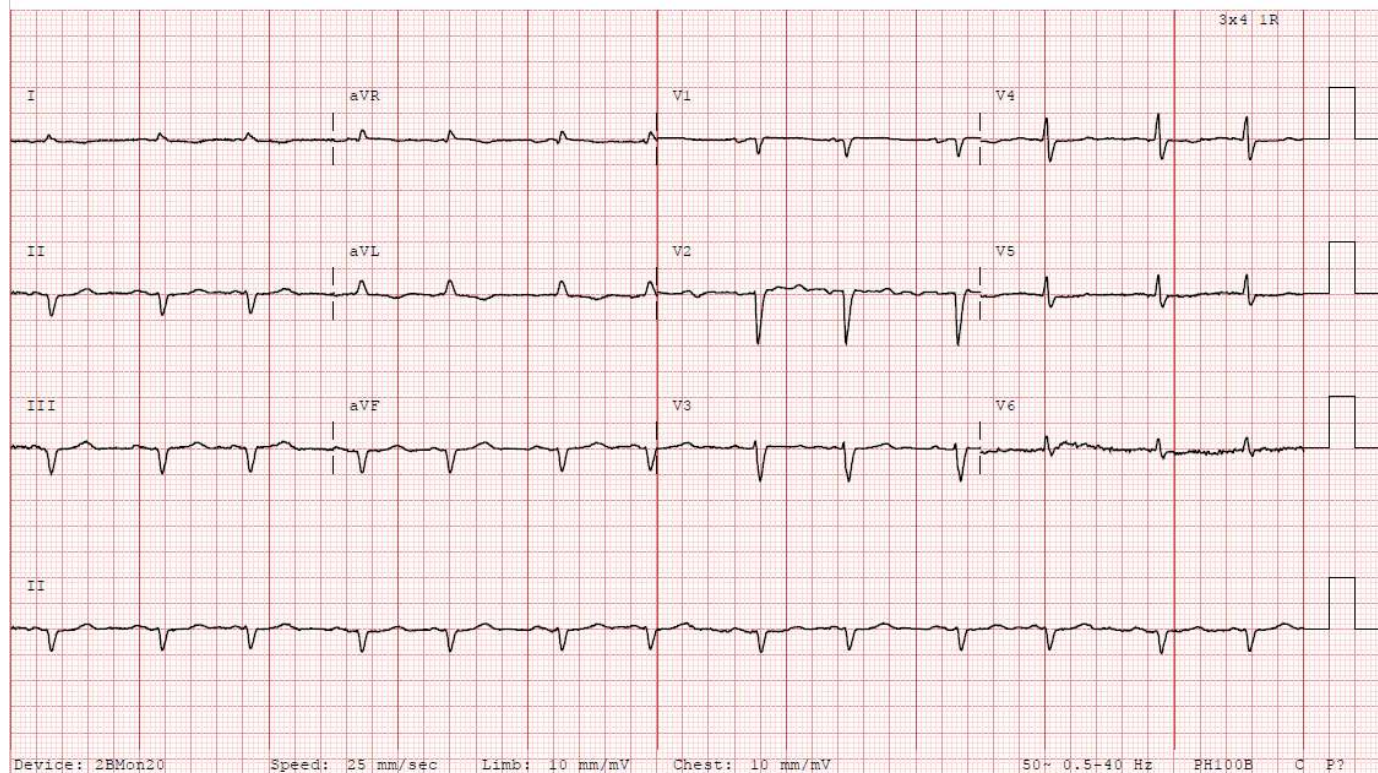
P 61
QRS -81
T 106

Encounter #: 7869165

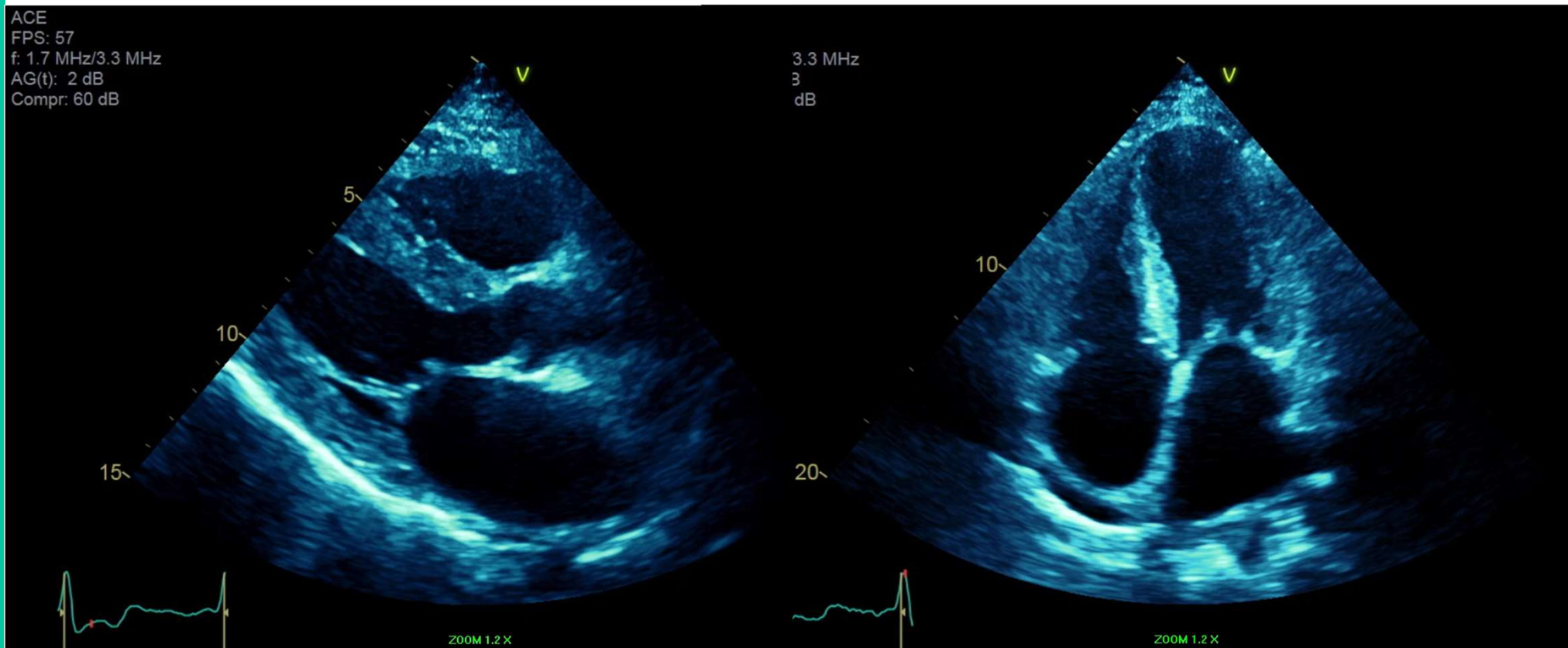
- ABNORMAL ECG -

12 Lead ECG Report (Standard)

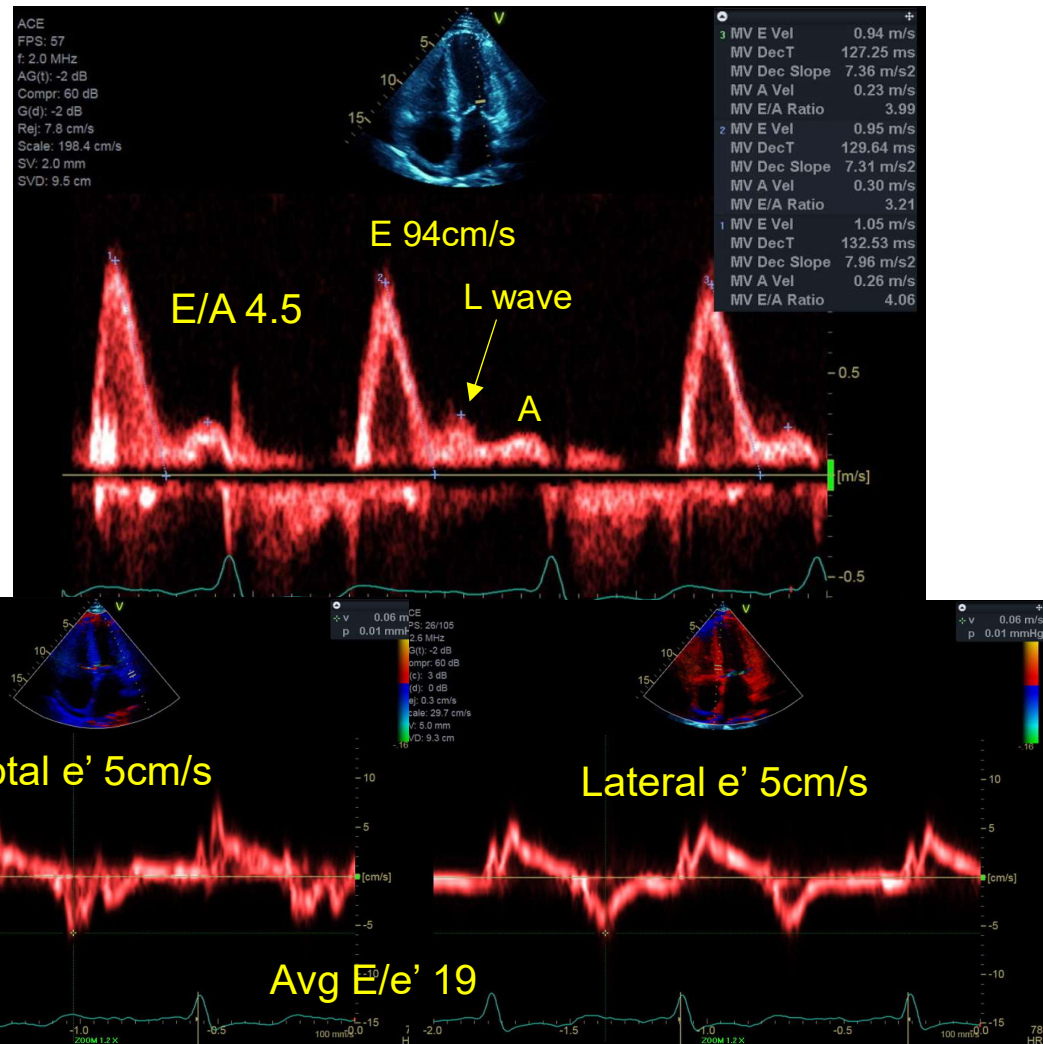
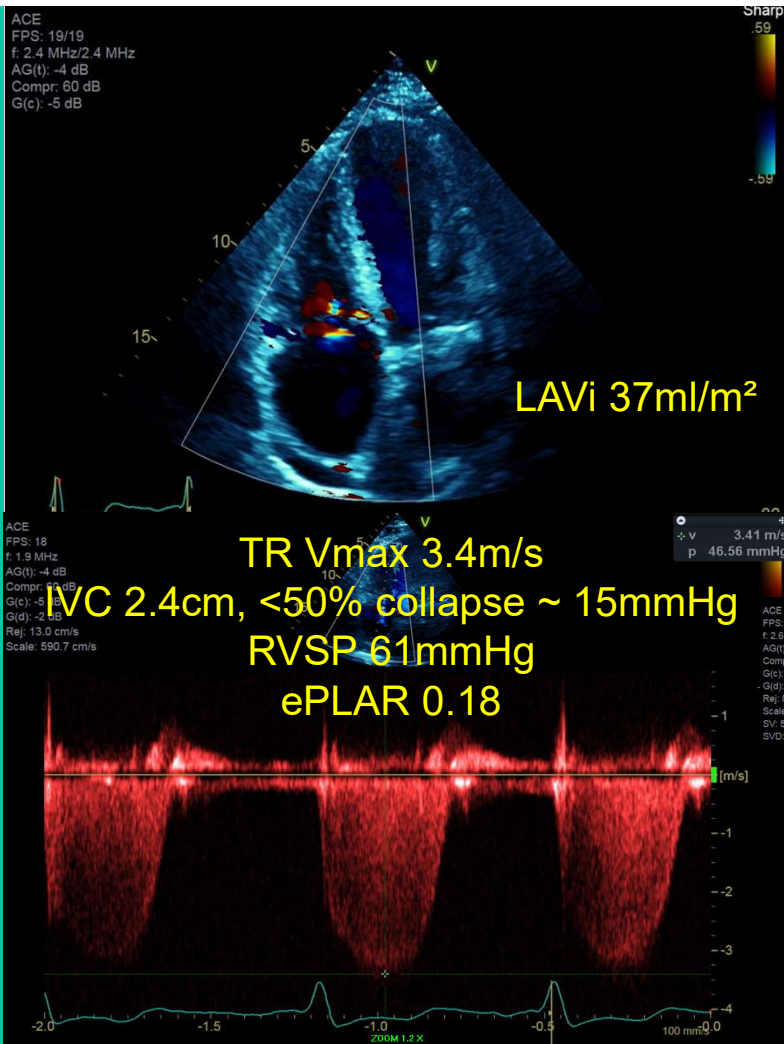
Unconfirmed Diagnosis

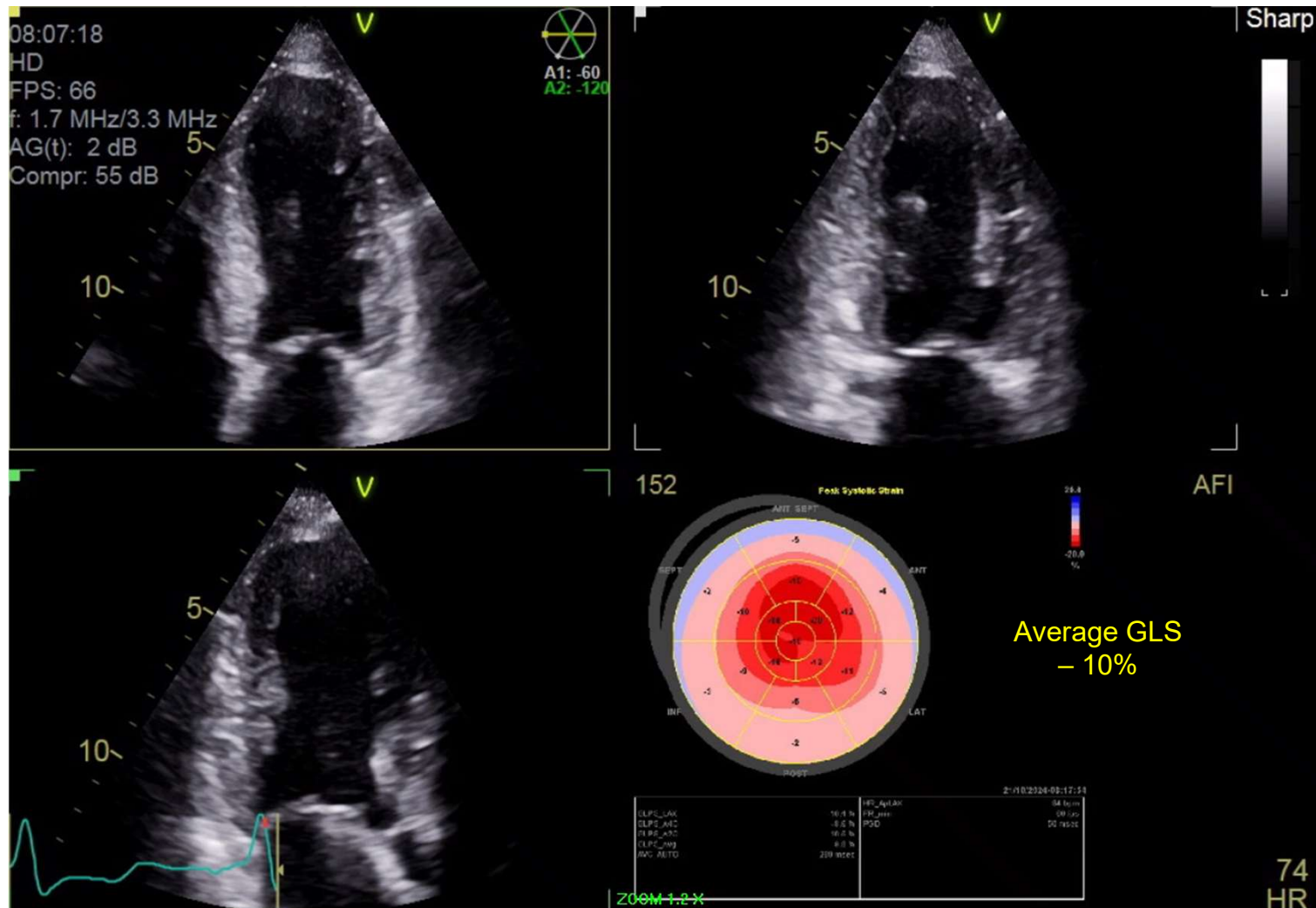


ACE
FPS: 57
f: 1.7 MHz/3.3 MHz
AG(t): 2 dB
Compr: 60 dB

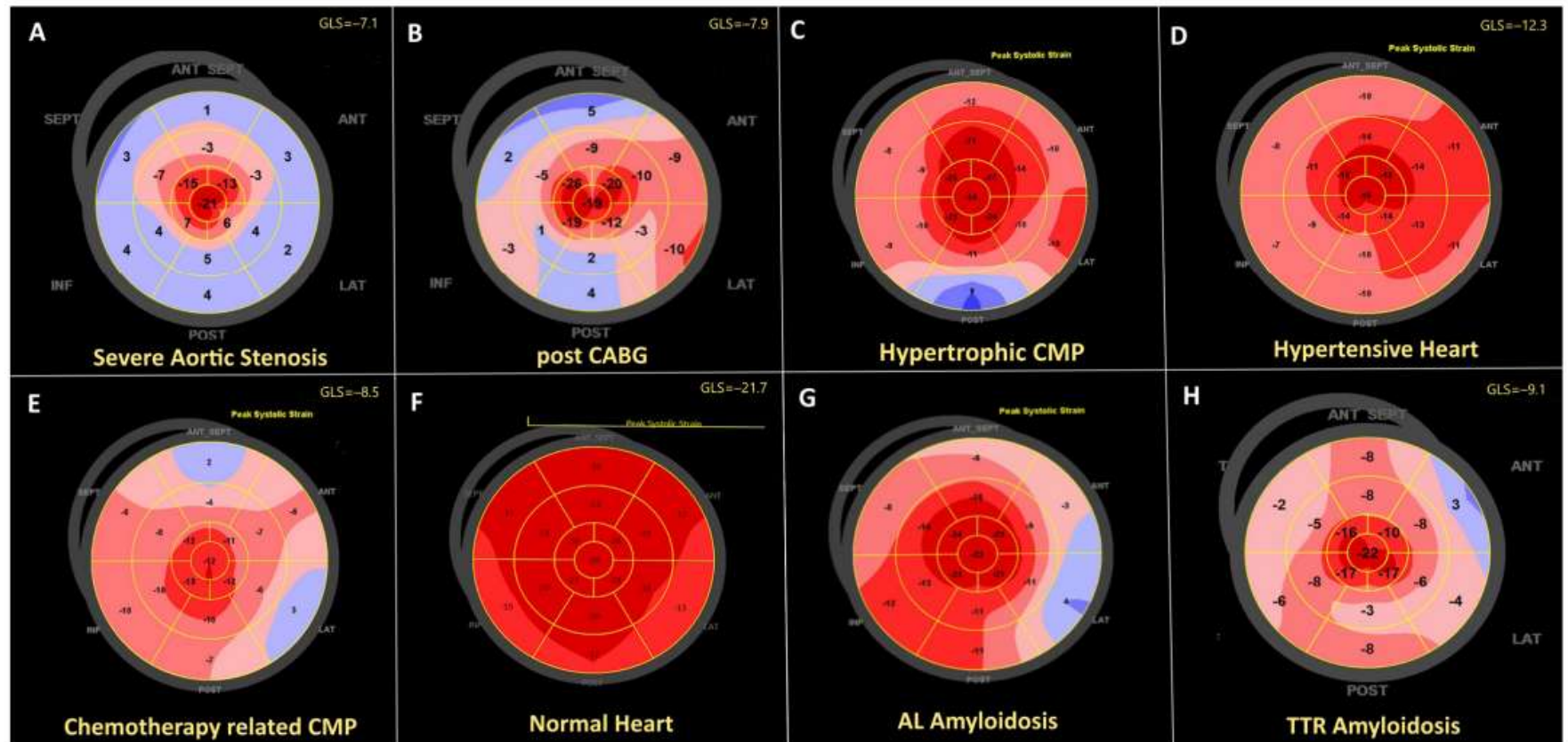


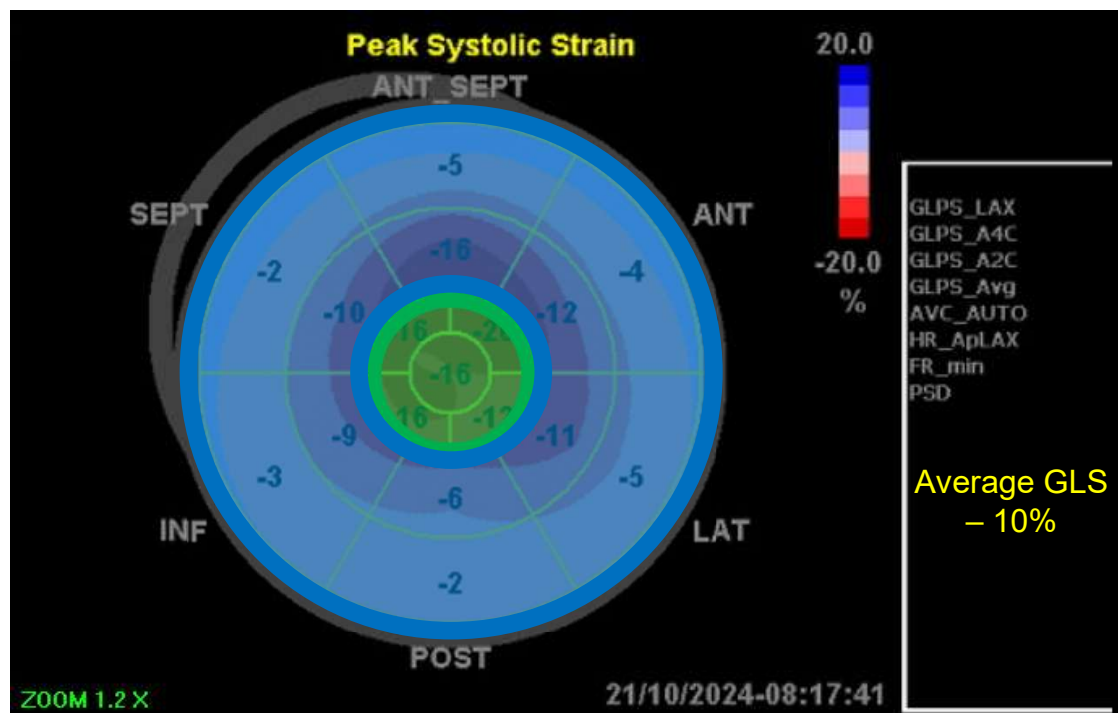
Basal anteroseptum ~ 12mm. Inferolateral wall ~ 10mm.
RWT 0.57. LVMI 71 g/m²





APICAL SPARING PATTERN IS NOT EXCLUSIVE TO AMYLOIDOSIS





Relative Apical Strain Ratio (RASR)

38% sensitivity, 93% specificity¹

$$= \text{Apical} / (\text{Basal} + \text{Mid}) = 80/85 = \underline{0.94}$$

Ejection Fraction to Strain Ratio

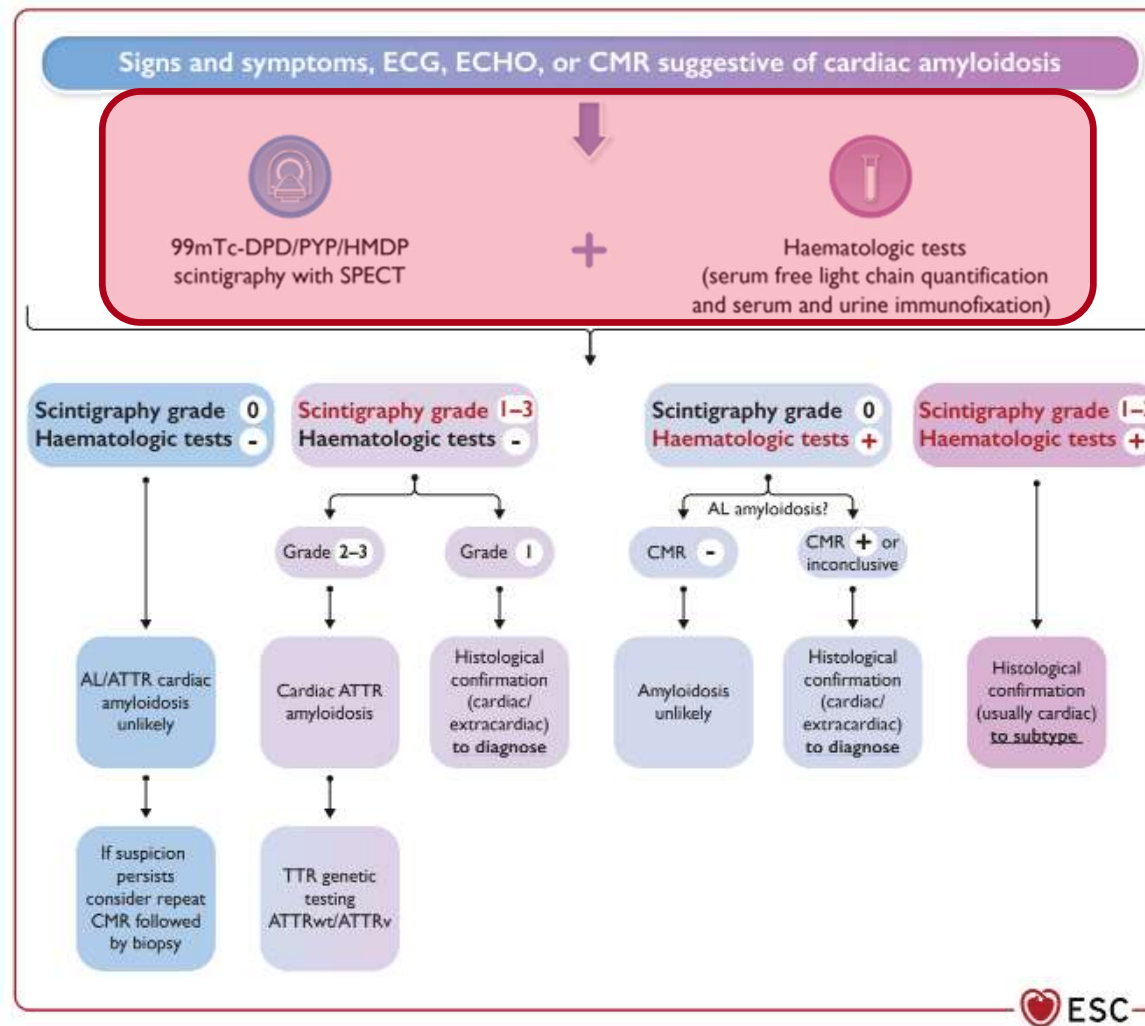
90% sensitivity, 92% specificity¹

$$= 45\% / 10\% = \underline{4.5}$$

Table 2 Longitudinal strain ratios that have been described, with the diagnostic cutoffs used in the original publications: proposed ratios incorporating LV GLS for diagnosis of CA

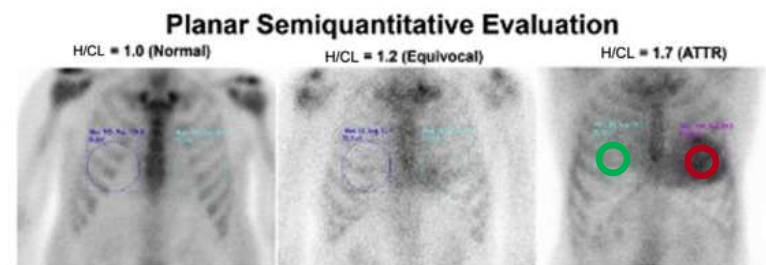
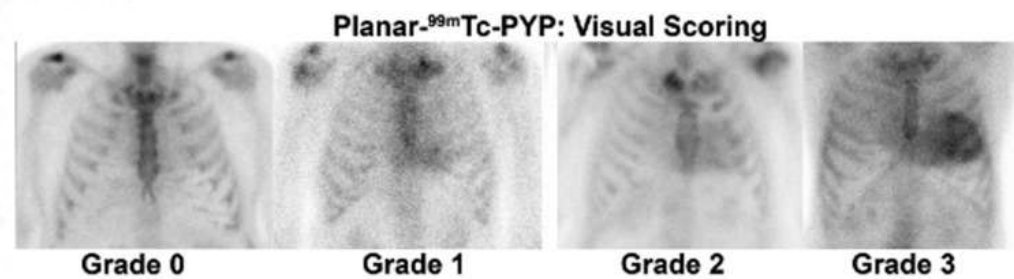
Ratio	Cutoff
RRSR ⁹	Average apical segment LS/ average combined mid + basal segment LS >1.0
Ejection fraction to strain ratio ¹³	>4.1

LS, Longitudinal strain.

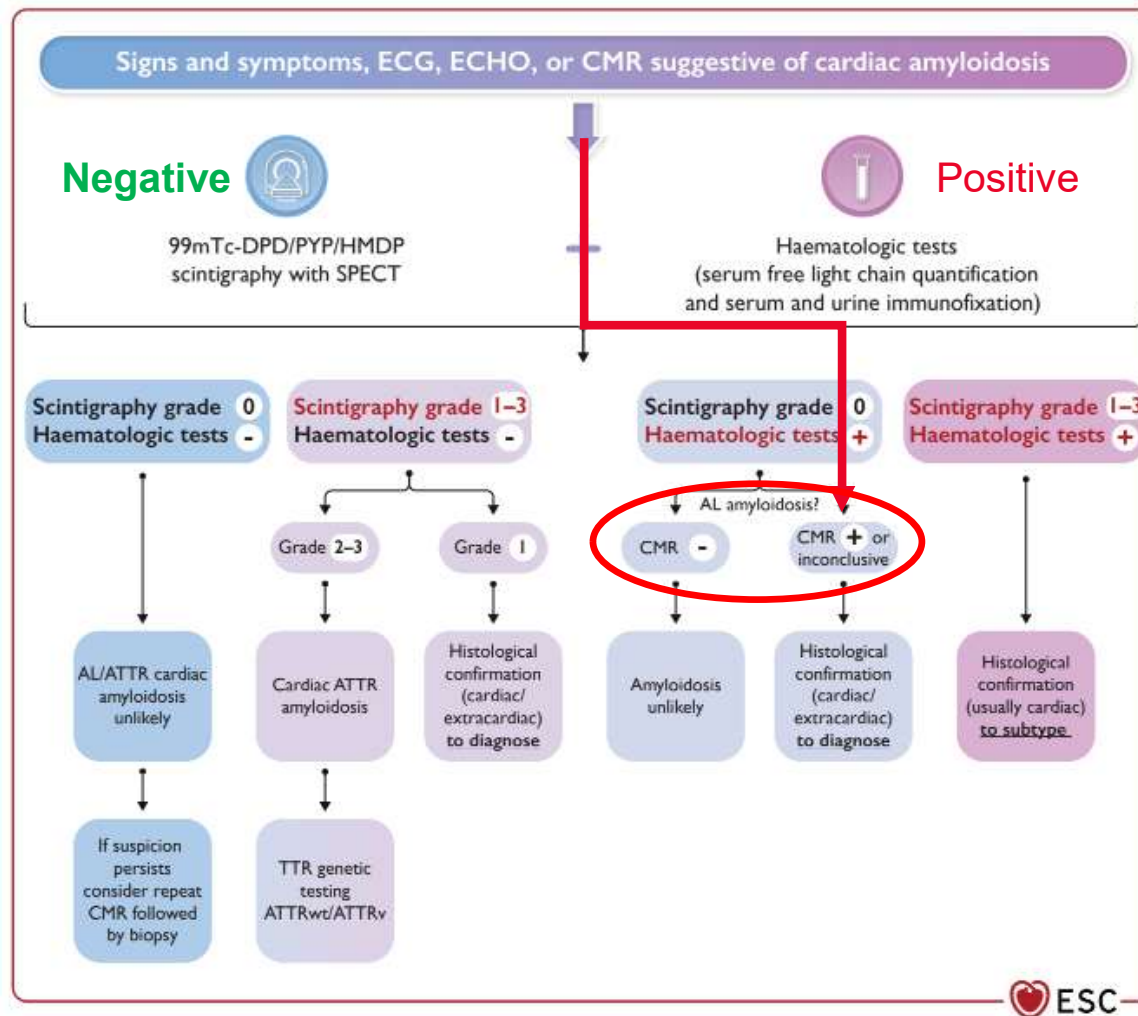


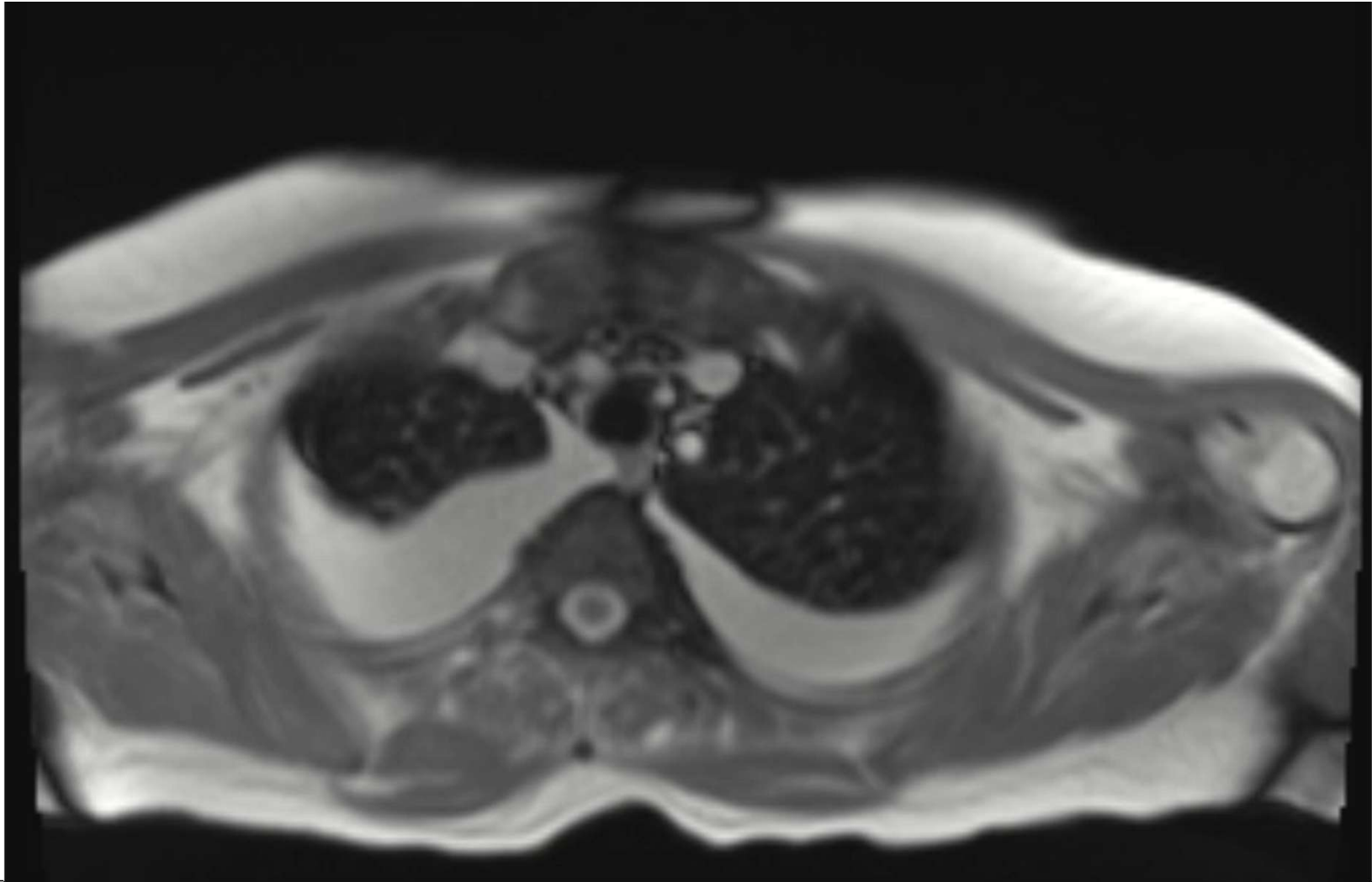
Hb	152 g/L
HCT	0.48
WCC	8.8
Platelets	257
ESR	47
INR	1.3
Kappa FLC	10.3 mg/L (3.3 - 19.4)
Lambda FLC	421 mg/L (5.7 - 26.3)
K/L ratio	0.02 (0.26 – 1.65)
Urine protein/creatinine ratio	600 g/L (normal <30)
Paraprotein	Not detected
Urine protein	6.7g/L

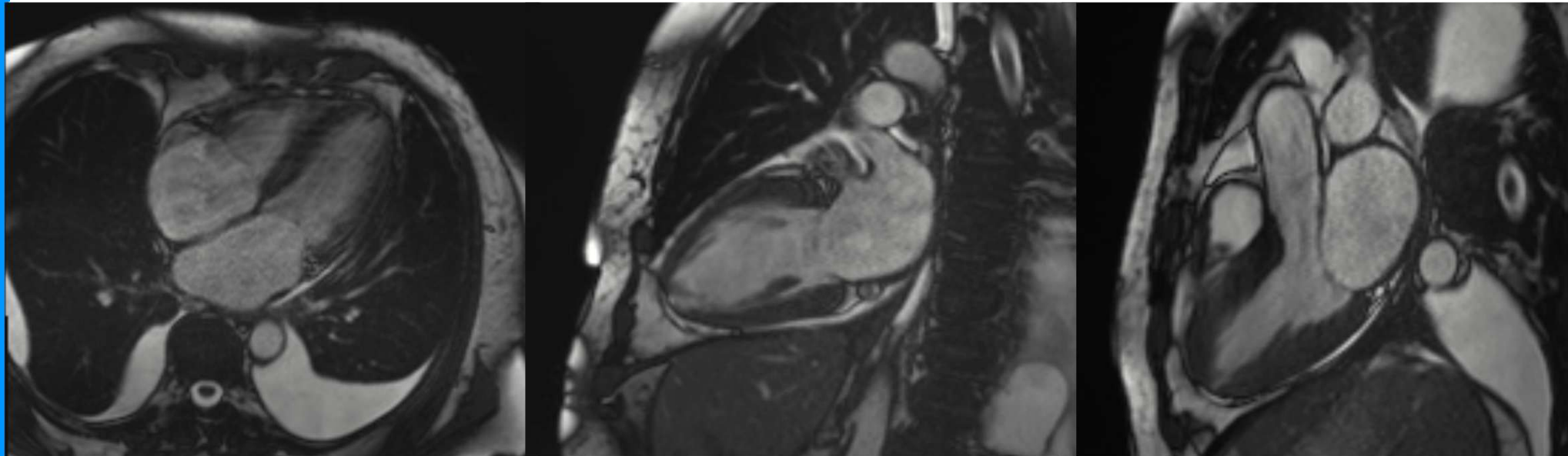
Sodium	141 mmol/L
Potassium	4.5 mmol/L
Urea	7.5 mmol/L
Creatinine	65 umol/L
eGFR	88
Corrected Ca	2.6 mmol/L
Albumin	32 g/L
Protein	66 g/L
ALP	146 U/L
GGT	137 U/L
LDH	320 U/L
BNP	1,353 ng/L (<100)



H/CL ratio
> 1.5 at 1 hour
> 1.3 after 3 hours

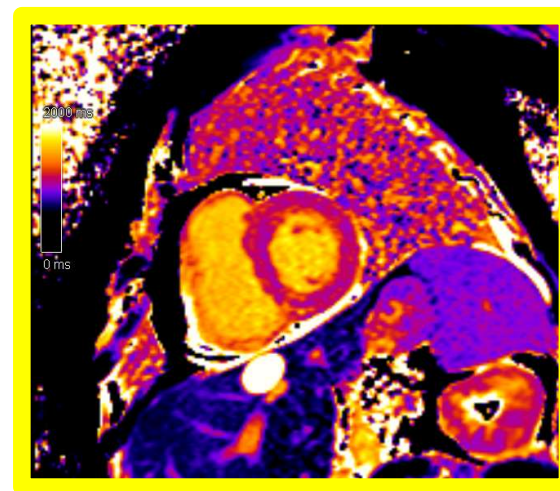
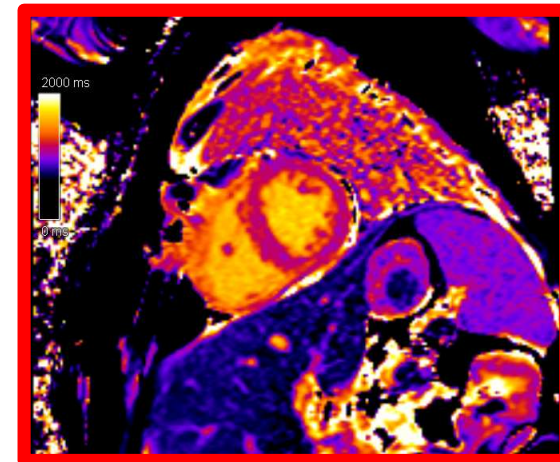
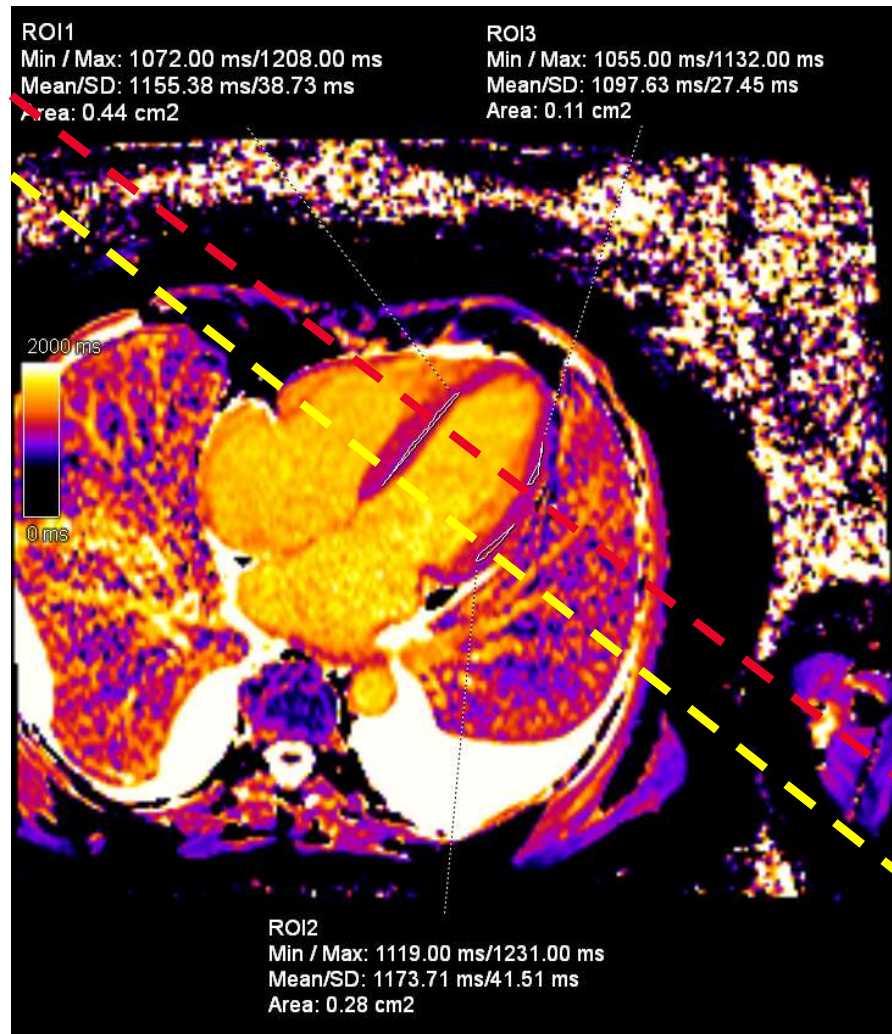






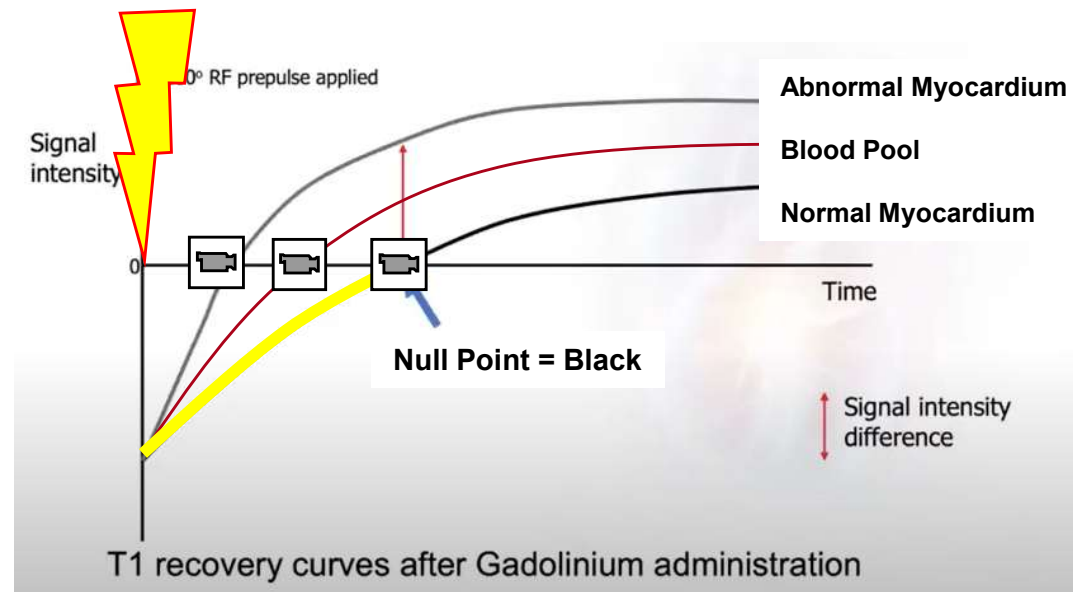
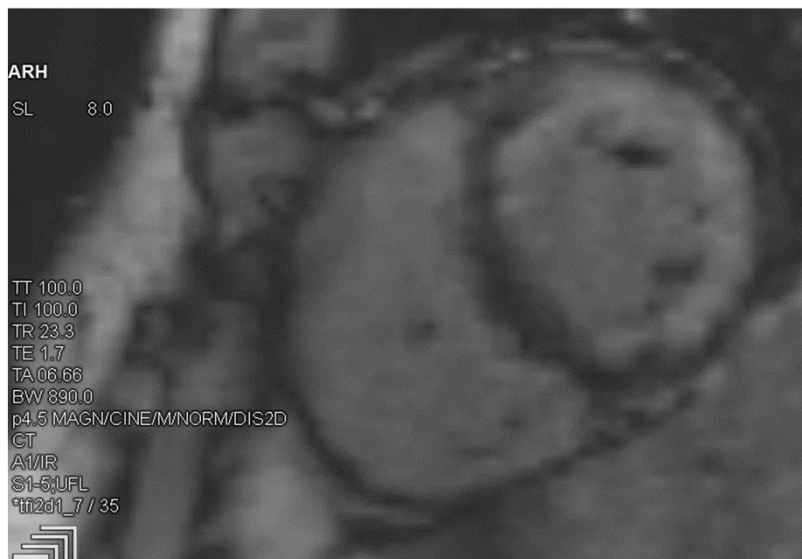
LVEDVi 66ml/m²
LV SVi 30ml/m²
LVEF 45%
LVMi 61 g/m²
Lateral MAPSE 5mm

RVEDVi 66ml/m²
RV SVi 27ml/m²
RVEF 41%
TAPSE 9mm



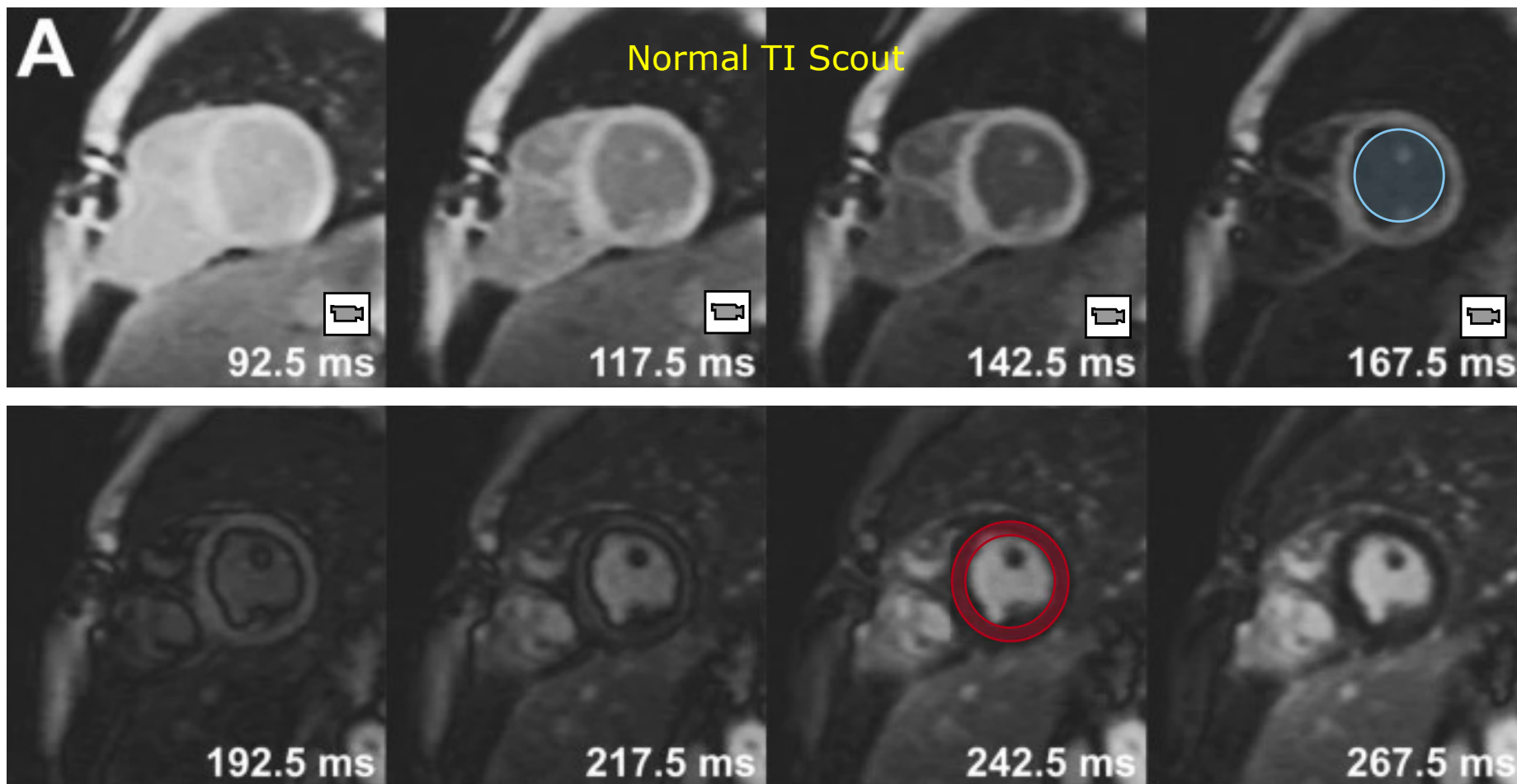
Prolonged T1 recovery time: 1157ms
1.5 T Normal range of 934 - 1079ms

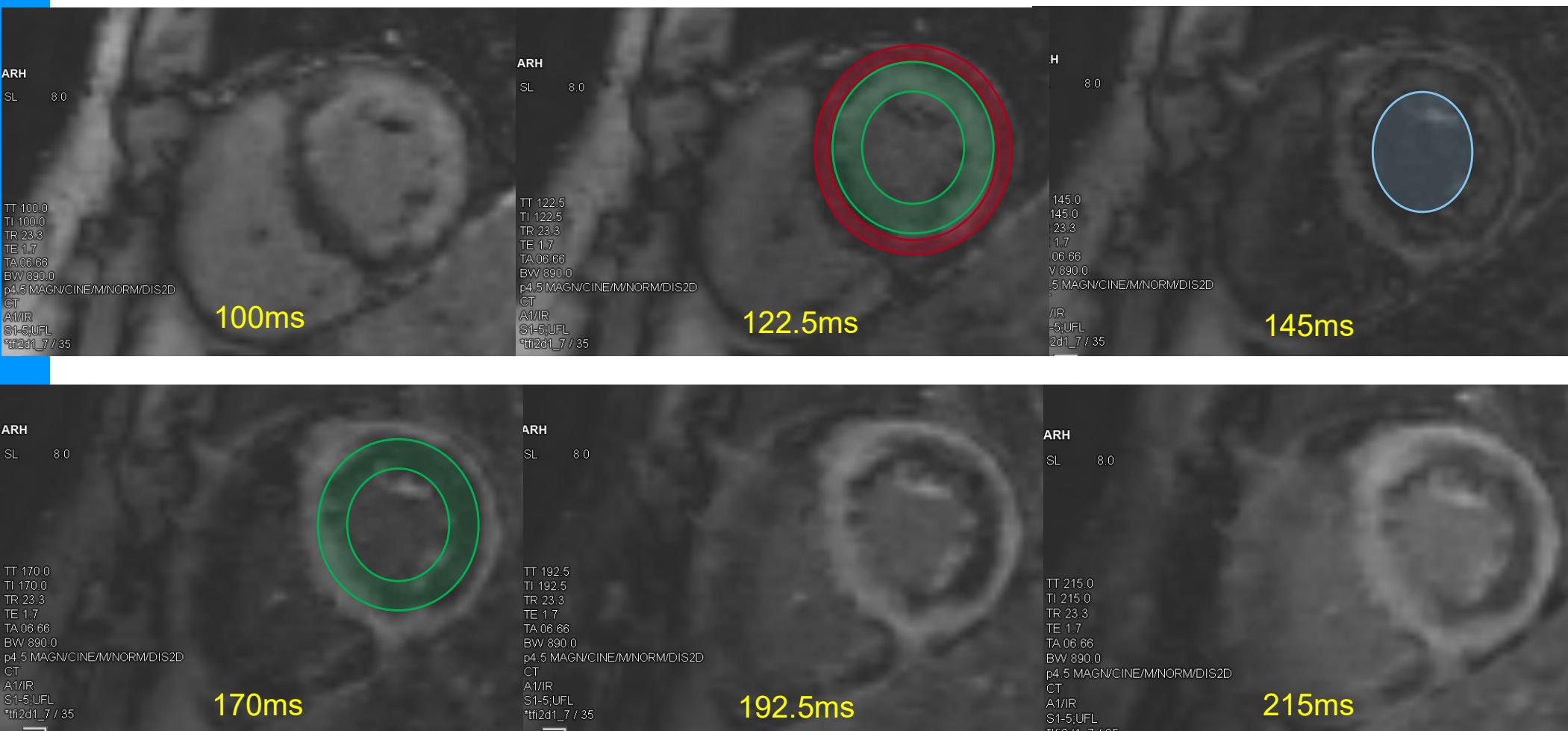
Prolonged T2 decay time
52ms (N 39 – 49ms)

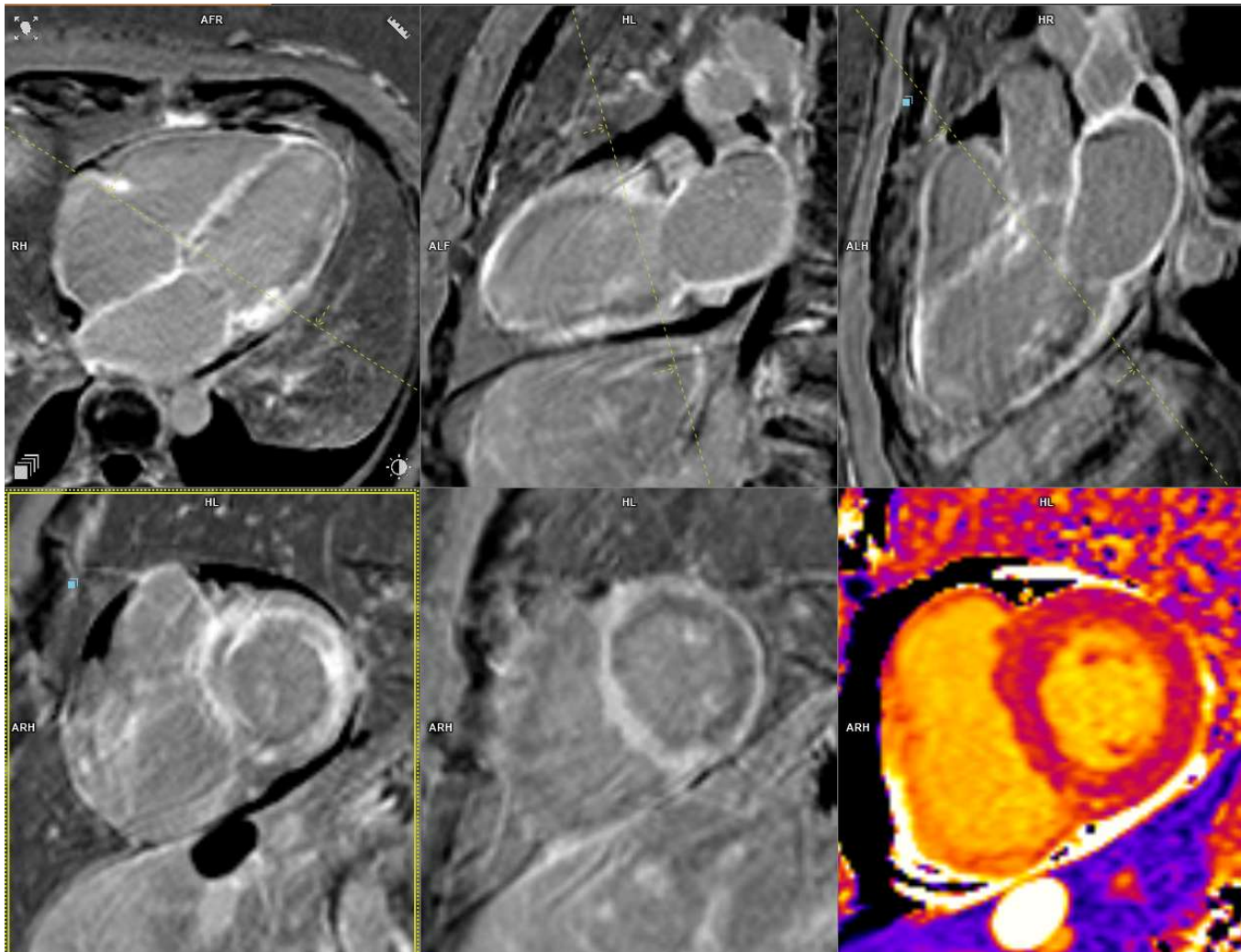


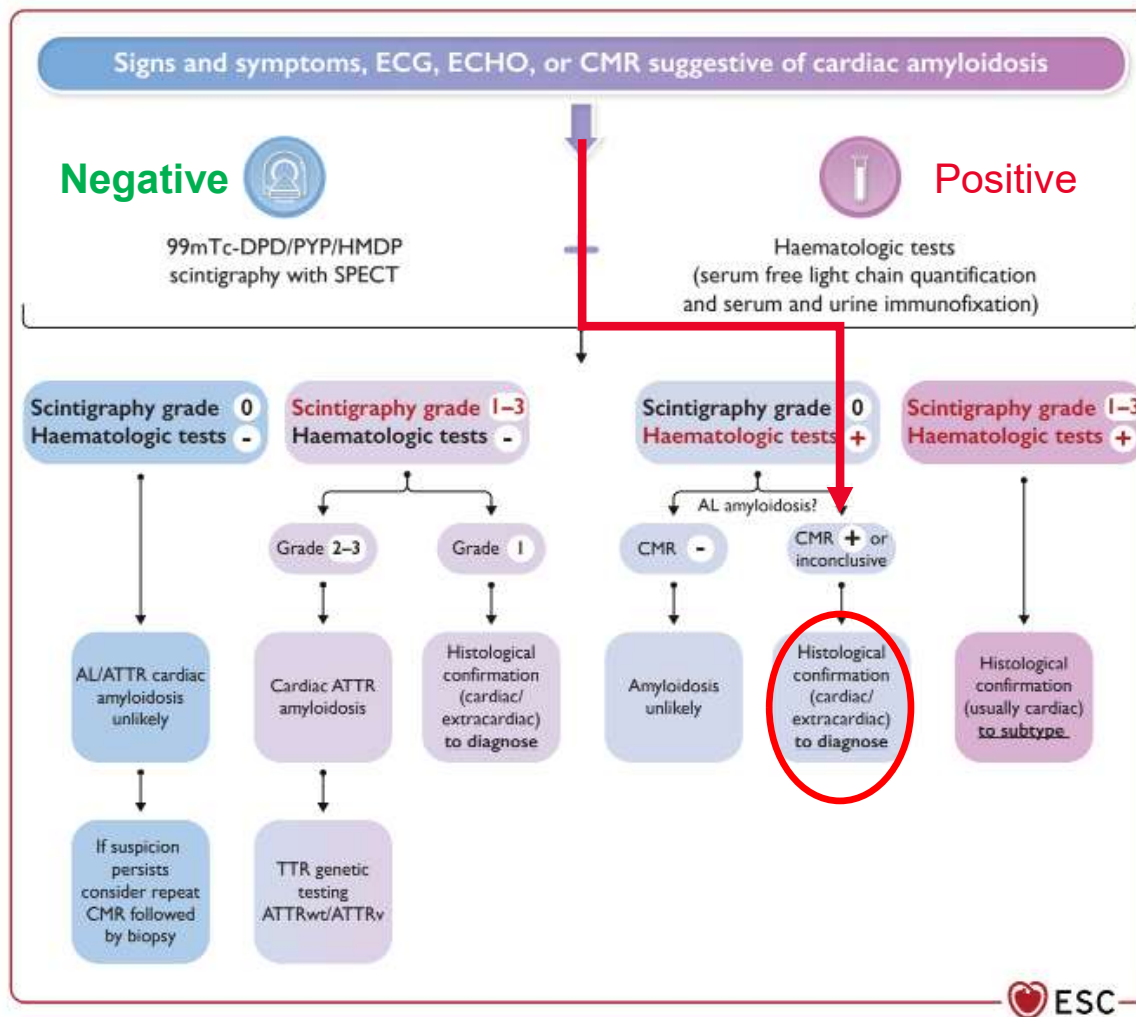
TI scout – inversion time

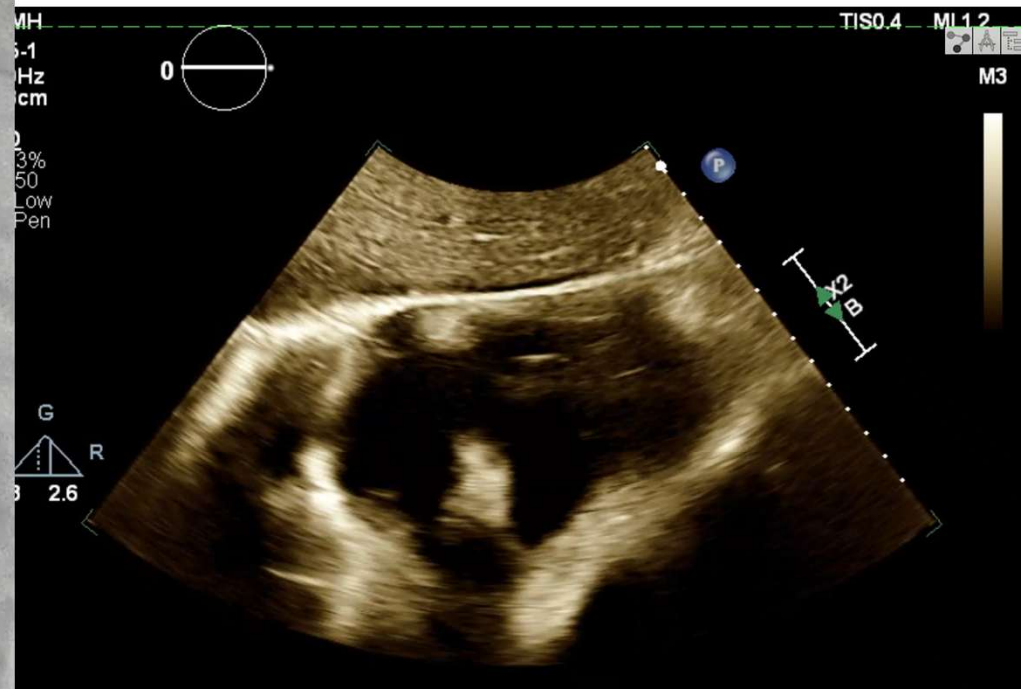
- Aim: Determine when normal myocardium crosses null point = black
- Why: Improve contrast resolution between normal vs abnormal myocardium
- How: Administer IV gadolinium -> inversion pulse -> take images at different time points
- Gadolinium - increases rate of recovery i.e shortens inversion time
- Normal gadolinium kinetics - blood pool crosses the null point first before normal myocardium
- “Difficult to null myocardium”, “reversed gadolinium kinetics”

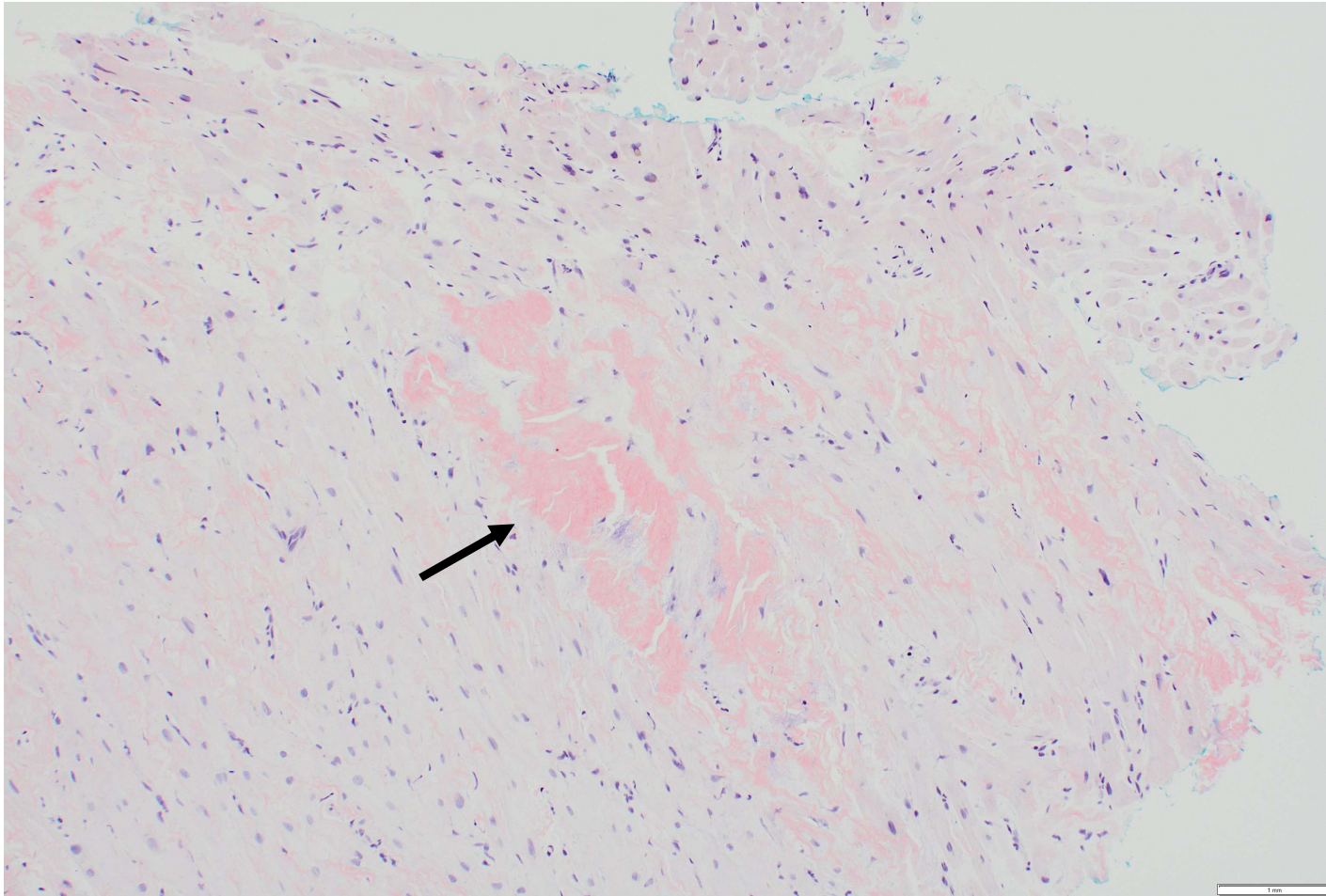






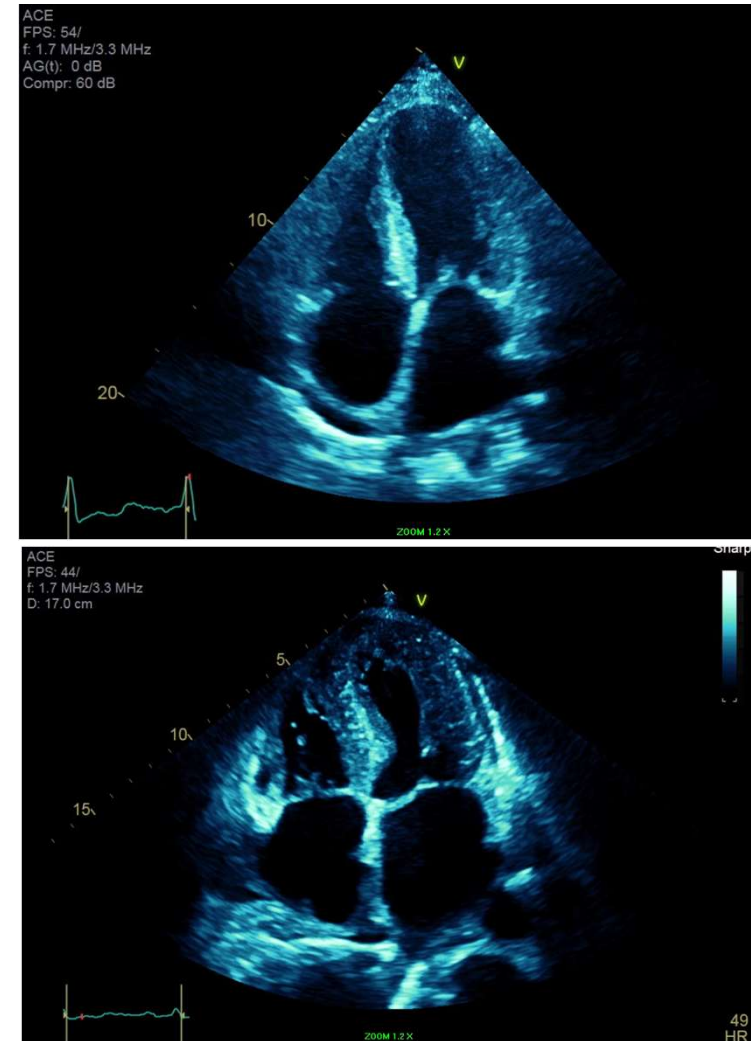






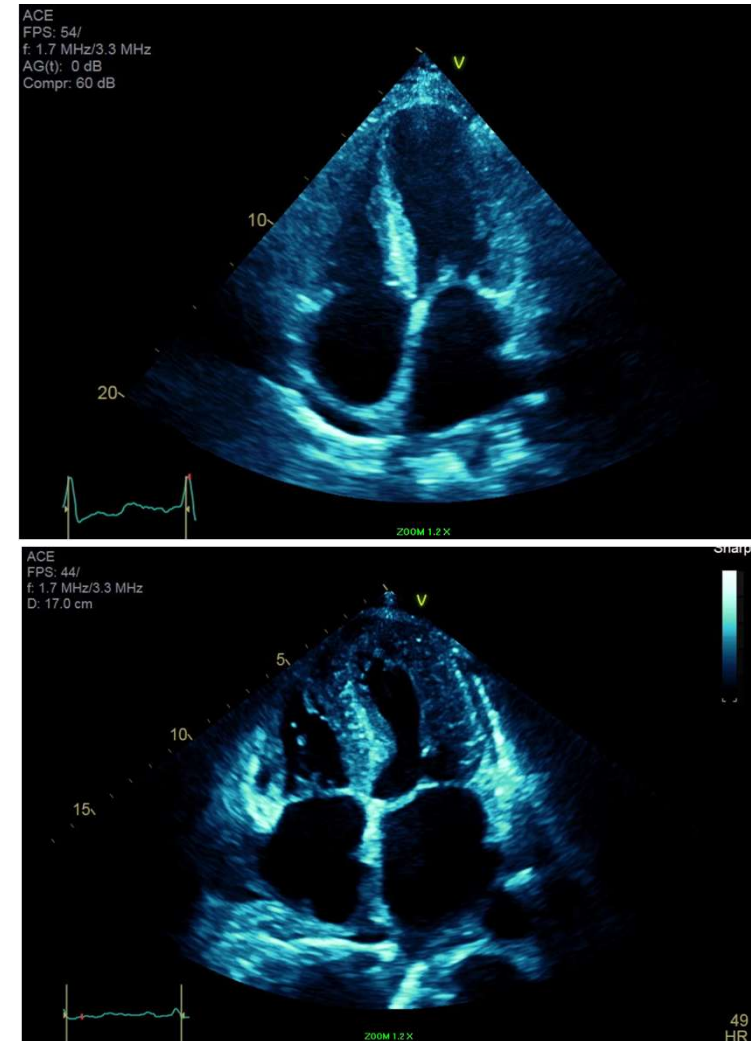
Take Home Points

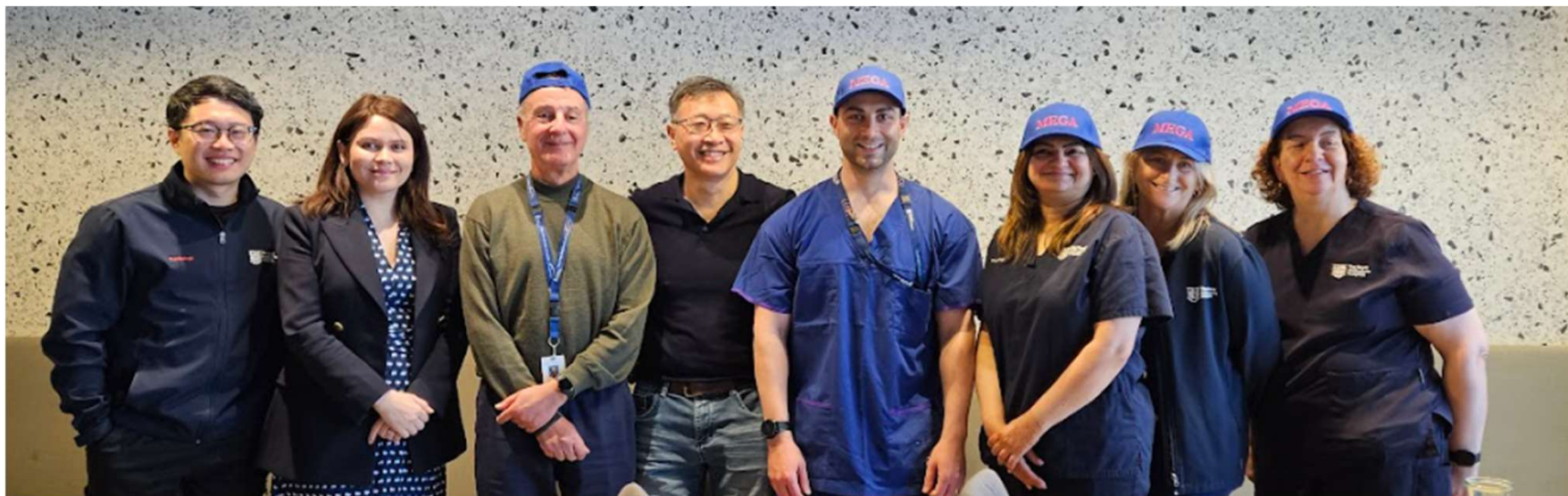
- **Clinical**
 - Male predominant disease - ATTR (M:F of 95:5)
 - Difficult diagnosis to make in early stages with a delay in diagnosis
 - Dyspnoea out of proportion
 - Don't forget the humble ECG
 - Utilise NT-proBNP (*new MBS item 66829 as of 1st Nov 2024*)
- **TTE**
 - Mildly increased LV wall thickness
 - Apical sparing pattern is not exclusive to amyloidosis
 - Quantitative; *RASR >1 and LVEF to Strain Ratio >4.1*
- **Bone scan (PYP) and myeloma screen (*immunofixation electrophoresis*)**
 - *20% of AL can have false positive bone scan*
 - *20% of ATTR can have MGUS*
 - *HCM can also have positive bone scan!*
- **MRI**
 - Utility of T1 scout as a diagnostic tool; abnormal gadolinium kinetics
 - Expected LGE pattern is subendocardium or transmural, our case was atypical as it was predominantly subepicardial
 - Unable to differentiate AL vs ATTR definitely but there will be clues
- **Biopsy – “target” vs “off-target” – required for non-ATTR or in some cases of MGUS, or negative bone scan + myeloma screen**



Take Home Points

- **Clinical**
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#MEGA

Making Echo Great Again