

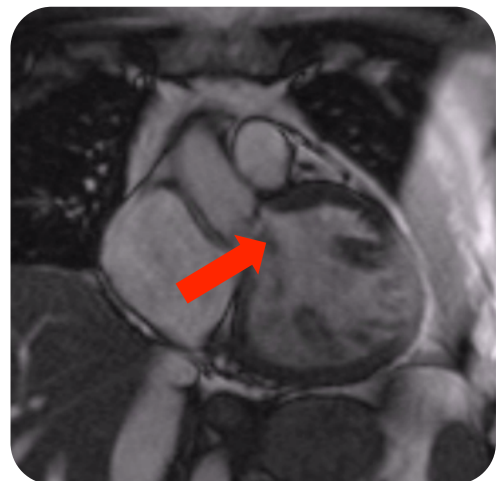
# Cardiac MRI Essentials

## Aortic regurgitation

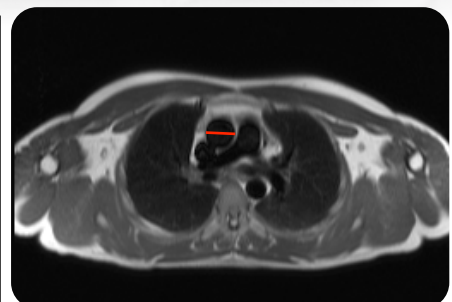
- CMR provides:
  - Insights into the etiology of aortic regurgitation
    - Valvular abnormalities
    - Aortic abnormalities
  - Quantification of the severity of aortic regurgitation
    - Regurgitant volume/fraction
  - Assessment of the consequences of aortic regurgitation
    - LV size
    - LV mass
    - LV systolic function

## Aortic regurgitation – cine CMR

- LVOT view cine CMR (still frame)
- Aortic regurgitation jet shown by red arrow
- Can also visualised in:
  - 3-chamber view
  - Short axis (aortic valve) view

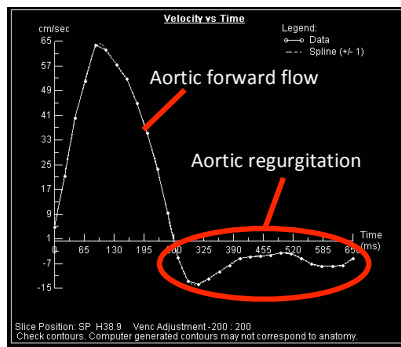


Assess aortic morphology (and measure aortic diameter) in the 3-chamber view (left) and transverse 'HASTE' view (right)



## Aortic regurgitation quantification

The aortic regurgitant volume is usually measured *directly* using through-plane flow CMR:



Do not use the size of the regurgitant jet to assess aortic regurgitation severity on CMR

The aortic regurgitant volume can also be calculated *indirectly* from the difference between left and right ventricular stroke volumes:

$$\text{AR volume} = \text{LV stroke volume} - \text{RV stroke volume}$$

The aortic regurgitant fraction is the regurgitant volume divided by the aortic forward flow volume:

$$\text{AR fraction} = \frac{\text{Aortic regurgitant volume}}{\text{Aortic forward flow volume}}$$

## How do we assess aortic regurgitation with CMR?

- Cine CMR – aortic valve anatomy
  - Long axis (three-chamber and LVOT) views
  - Short axis (*en face* view at cusp tips)
- Flow CMR – aortic valve hemodynamics
  - Regurgitant volume/fraction
- Aortic anatomy and dimensions
- Left ventricular size and systolic function
- Left ventricular hypertrophy/mass

## Further reading

Cardiovascular magnetic resonance imaging for valvular heart disease. Technique and validation. *Circulation* 2009; **119**: 468-478 [[click here to access online](#)]