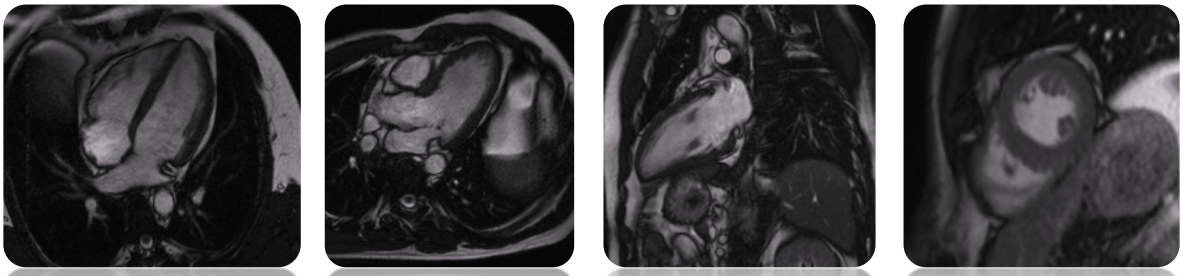
Cardiac MRI Essentials

Left ventricular size & function

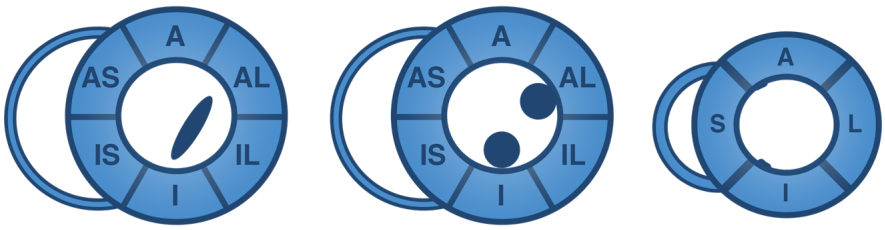
CMR allows us to assess:

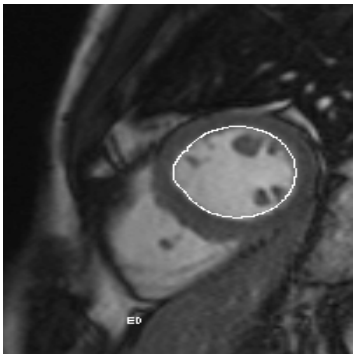
- Left ventricular systolic function
  - regional
  - global
- Left ventricular cavity volume
- Left ventricular wall thickness
- Left ventricular myocardial mass
- Left ventricular myocardial infarction/fibrosis

The left ventricle should be assessed in multiple views (4-, 3-, 2-chamber and short axis):

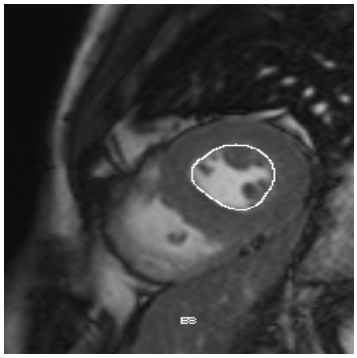


Left ventricular wall motion is described with reference to the standard myocardial segments:



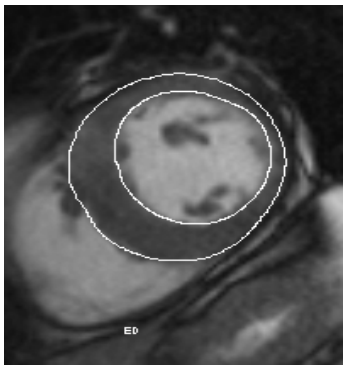


To quantify LV volumes, stroke volume and ejection fraction, the endocardium is highlighted at end-diastole (left) and end-systole (right) in the series of short axis slices. The software then makes the calculations.



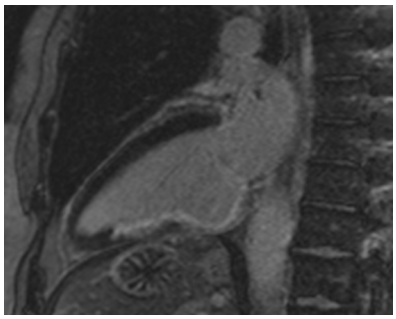
Quantifying left ventricular myocardial mass

To quantify left ventricular myocardial mass, both the endocardium and epicardium are highlighted (right). The software then quantifies the myocardial volume and, by applying a standard value for the density of myocardial tissue, can calculate the myocardial mass.



Myocardial infarction & fibrosis

Assessment of the left ventricle should include a late gadolinium enhancement study to identify any regions of myocardial infarction or fibrosis.



How do we assess left ventricular size & function using CMR?

- Two-, three-, four-chamber views
- Short axis basal, mid, and apical views
    - ‘Eyeball’ regional and global function
    - Measure left ventricular wall thickness
- Short axis cine stack - endocardium
    - Quantify left ventricular end-diastolic volume and end-systolic volume
    - Calculate left ventricular stroke volume and left ventricular ejection fraction
- Short axis cine stack - endocardium and epicardium
    - Quantify left ventricular mass
- Late gadolinium enhancement
    - Left ventricular myocardial infarction
    - Left ventricular myocardial fibrosis

Further reading

Normalized left ventricular systolic and diastolic function by steady state free precession cardiovascular magnetic resonance. *Journal of cardiovascular magnetic resonance* 2006; **8**: 417-426 [click here to access online]