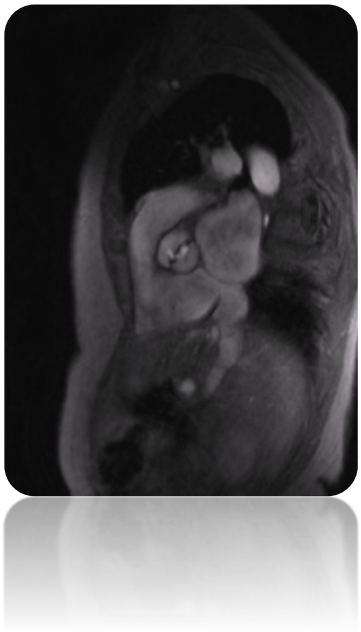
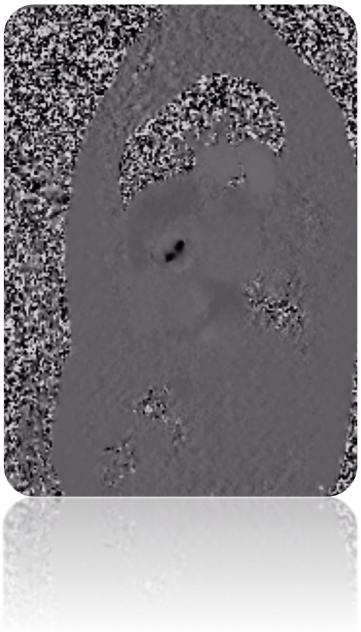
Cardiac MRI Essentials

The flow CMR study

Flow CMR studies simultaneously provide two types of cine image of the region of interest:

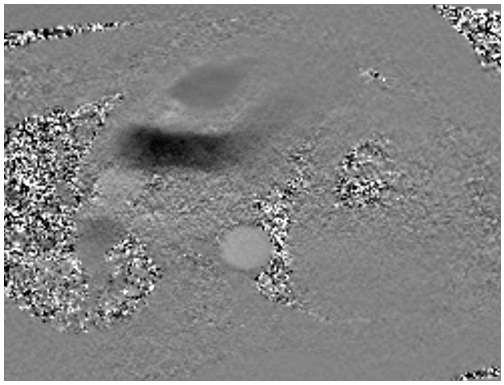


← Anatomical image
Known as a magnitude-encoded image, this helps us identify the anatomy of the heart in the region we wish to assess

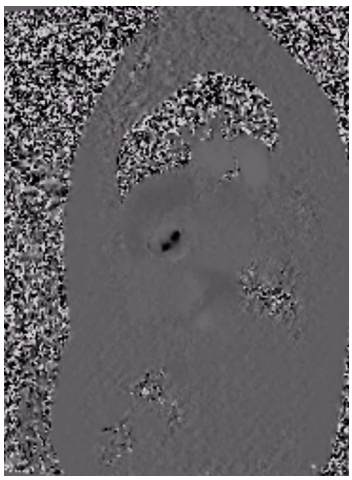


Flow image →
Known as a phase-encoded image, this contains the data that we use to analyse blood flow in the region of interest

When we perform flow CMR, we can also examine the flow in two different ways:



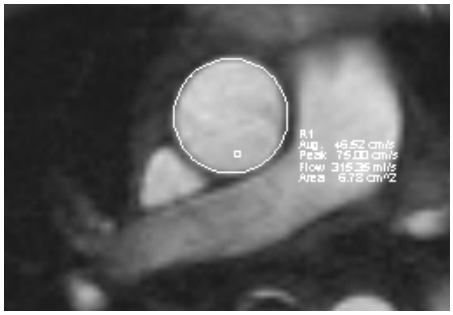
In-plane flow
This looks at blood flow *within* the imaging plane, i.e. flow across the screen from left to right or from top to bottom



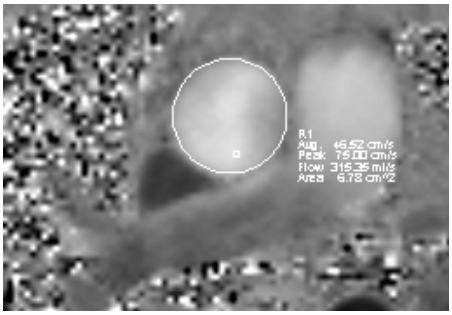
Through-plane flow
This looks at blood flow *through* the imaging plane, i.e. flow through the image into or out of the screen

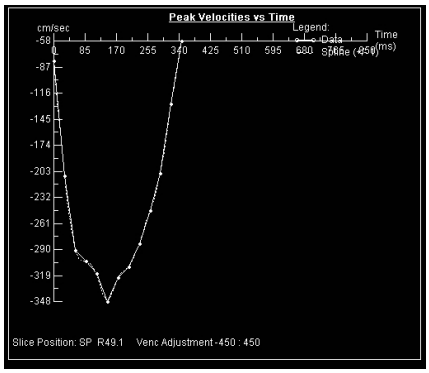
Quantifying flow

We can highlight a 'region of interest' in our flow CMR images, within which the software can assess flow velocities and/or flow volumes:

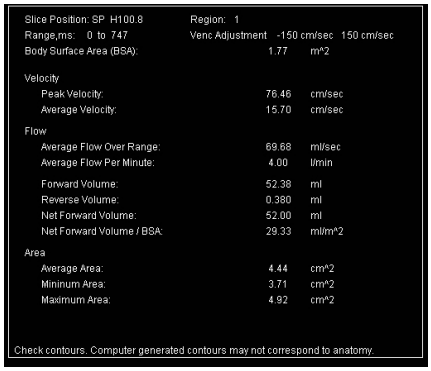


The region of interest lies within the white circle – the software looks at flow in this area





The software can display flow characteristics as a graph, and provide a table of numerical data



How do we assess flow using CMR?

- Two sets of images
  - Anatomical (magnitude-encoded)
  - Velocity (phase-encoded)
- Two types of flow imaging
  - In-plane flow
  - Through-plane flow
- Flow CMR can help us to quantify:
  - Flow volumes
  - Peak flow velocity
  - Valvular regurgitation

Further reading

Flow measurement by magnetic resonance: a unique asset worth optimising. *Journal of cardiovascular magnetic resonance* 2007; **9**: 723-728 [click here to access online]