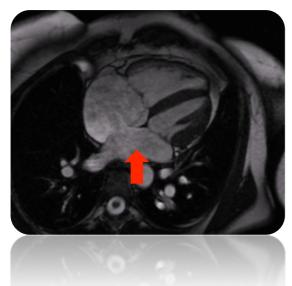


# **Cardiac MRI Essentials**

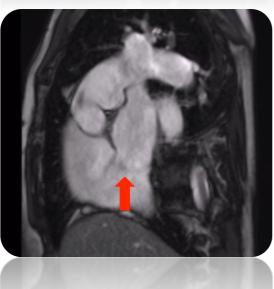
# Atrial septal defect

- In cases of ASD, CMR provides valuable information on:
  - o Defect location, size, and anatomy
  - o Right and left atrial size
  - Right ventricular size and function
  - o Evidence of volume/pressure overload
  - o Shunt calculation
  - Anomalous pulmonary venous drainage.



## Secundum ASD: 4-chamber view

- Shows evidence of a defect in the interatrial septum
- Also shows right heart dilatation in keeping with volume overload



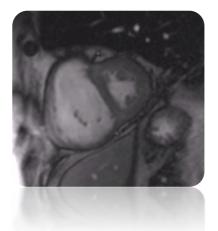
# Secundum ASD: Short axis view

 Shows evidence of a secundum atrial septal defect with left-to-right flow

Blice Position: SP H50.6	Region: 1	Slice Position: SP H100.8	Region: 1
Range,ms: 0 to 769	Venc Adjustment -150 cm/sec 150 cm/sec	Range,ms: 0 to 747	Venc Adjustment -150 cm/sec 150 cm/sec
Body Surface Area (BSA):	1.77 m*2	Body Surface Area (BSA):	1.77 m^2
Velocity		Velocity	
Peak Velocity:	129.93 cm/sec	Peak Velocity:	76.46 cm/sec
Average Velocity:	22.76 cm/sec	Average Velocity:	15.70 cm/sec
Flow		Flow	
Average Flow Over Range:	233.22 ml/sec	Average Flow Over Range:	69.68 ml/sec
Average Flow Per Minute:	13.44 l/min	Average Flow Per Minute:	4.00 l/min
Forward Volume:	180.06 ml	Forward Volume:	52.38 ml
Reverse Volume:	0.828 ml	Reverse Volume;	0.380 ml
Net Forward Volume:	179.23 ml	Net Forward Volume:	52.00 ml
Net Forward Volume / BSA:	101.11 ml/m*2	Net Forward Volume / BSA:	29.33 ml/m*2
Area		Area	
Average Area:	10.25 cm*2	Average Area:	4.44 cm*2
Mininum Area:	9.30 cm^2	Mininum Area:	3.71 cm*2
Maximum Area:	11.09 cm^2	Maximum Area:	4.92 cm*2
eck contours. Computer generated contours may not correspond to anatomy. Pulmonary artery flow		Check contours. Computer generated contours may not correspond to anatomy	

CMR allows quantification of the shunt ratio, from flow volumes in the pulmonary artery and aorta

Shunt ratio = 180 / 52 ≈ 3.5:



### **Pulmonary hypertension**

 In patients with pulmonary hypertension secondary to ASD, a D-shaped left ventricle (due to septal flattening) is evidence of right ventricular pressure overload

#### How do we assess VSD with CMR?

CMR assessment in atrial septal defect should include:

- Description of ASD type, size, and location
- Description of left and right atrial size
- Quantification of right ventricular size and function
- Assessment of evidence of volume/pressure overload
- Flow assessment (shunt ratio)
- Description of pulmonary venous connections.

### **Further reading**

EACVI CMR Pocket Guide: Congenital Heart Disease (2014) [click here to access online]