I

Implantable Cardioverter Defibrillator

- ICD: device is able to recognize ventricular arrhythmias and deliver a shock to normalize cardiac pace.
- Patient at risk of sudden death.
- Absolute contraindication to MR.

Inferior Vena Cava Filter

- Indications: (1) anticoagulation contraindicated; (2) anticoagulation failure; (3) prophylaxis in high-risk patients.

C.N. De Cecco, M. Rengo, *MDCT and MRI of the Heart*,
A-Z Notes in Radiological Practice and Reporting,
DOI 10.1007/978-88-470-2865-4_9, © Springer-Verlag Italia 2014

Inflammatory Aortic Aneurysm

- Characterized by the presence of perianeurysmal fibrosis and a thickened aortic wall.
- Represent 5–10 % of all abdominal aortic aneurysms; ascending aorta and aortic arch involvement is much less common, and when present there is a concomitant abdominal aortic aneurysm.
- Retroperitoneal extension of the inflammatory process is seen in one-third of affected patients, and it is responsible of secondary ureteral involvement with resultant hydronephrosis, aortic–sigmoid colon fistula with bleeding, and secondary bacterial infection.
- *CT*: (1) hypoattenuating mass with periaortic wall thickening that spares the posterior wall; (2) post-contrast enhancement of the soft-tissue component.
- *MR*: may detect periaortic inflammation, adventitial fibrosis, and turbulence in intraluminal flow.
- *FDG-PET*: identifies the extent of inflammation.

Interventricular Septum Movement

- Abnormal movement in RV volume and pressure overload and in case of abnormal electrical activity.
- Major causes of RV volume overload: (1) severe tricuspid or pulmonary regurgitation; (2) severe left-to-right shunt.
- Major causes of RV pressure overload: (1) severe pulmonary hypertension; (2) pulmonary stenosis.
- Systolic septal flattening/bouncing: RV pressure overload (RVOT obstruction, pulmonary hypertension).
- Early diastolic septal flattening: increased RV filling pressure, but still not pressure overload.

- Inspiratory septal bowing during early diastole: constrictive pericarditis.
- D-shape: RV overload (left-to-right shunt, tricuspid, or pulmonary regurgitation).
- Paradoxical septal movement: abnormal electrical activity (LBBB).

Intra-aortic Balloon Counterpulsation

- Catheter with a balloon positioned in the descending thoracic aorta which inflates in diastole and deflates in systole.
- Effects: (1) increases diastolic coronary perfusion; (2) reduces LVED pressure; (3) reduces myocardial oxygen consumption; (4) increases cerebral and peripheral blood flow.
- Indications: (1) cardiogenic shock post-MI; (2) acute severe mitral regurgitation; (3) preoperative; (4) weaning from cardiopulmonary bypass.
- Complications: (1) aortic dissection; (2) aortic regurgitation; (3) thrombocytopenia; (4) limb ischemia; (5) peripheral embolism.

Intramural Hematoma

- IMH: crescent-shaped thickening of the wall of the aorta that showed higher attenuation than that of the lumen on the unenhanced CT image or blood catabolite signal in MR, having no contrast enhancement in the aortic wall on the CT/MR image obtained after contrast enhancement.
- 10–20 % of patients with clinical features of aortic dissection exhibit an IMH.

- Same mortality of aortic dissection and should be treated in the same way.
- *Differential diagnosis*: dissection with completely thrombosed false lumen.

Intravascular Ultrasound

- A miniaturized ultrasound probe attached to distal end of an angiographic catheter.
- Gold standard for coronary wall evaluation and in vivo atherosclerotic plaque analysis.

Inversion Time

- LE: from 250 to 320 ms after 7 to 20 min from contrast medium injection.
- EG: 460 ms after 2–5 min from contrast medium injection.
- Null point: zero signal from myocardium.
- Bright myocardium: inversion time is too high.

Iodine

- Risk of severe anaphylactic reaction: ~1/2 in 10,000.
- Should be avoided in patient with renal impairment (GFR <30 ml/min) for the risk of contrast-induced nephropathy or dialysis should be planned.
- Premedication in adult patients at risk: 50 mg prednisone per os 13, 7, and 1 before the injection and antihistamine drugs (1 mg/kg) intravenous within 1 h of the injection.

Iron Overload, Myocardial

- Hereditary or acquired.
- Acquired: repeated transfusion in patient with hematological disorders (e.g., thalassemia, myelodysplasia).
- Iron accumulated in the liver and heart.
- $T2^*$ imaging can detect iron overload.
- Iron loading reduce tissue $T2^*$ with lower signal intensity.
- Measure $T2^*$ from the septum to reduce artifacts.
- $T2^*$ values at 1.5 T: <20 ms, significant overload; <10 ms severe overload.
- *MR*: (1) ventricular dilatation and dysfunction; (2) severity of iron overload.
- Liver overload demonstrated with biopsies does not correlate well with myocardial overload.

Ischemic Heart Disease

- Disease characterized by ischemia (reduced blood supply) of the heart muscle, usually due to coronary artery disease.
- *Characteristics*: (1) contractile dysfunction; (2) inducible perfusion defects; (3) infarction.
- *CT*: CAD detection.
- *MR*: inducible perfusion defects and myocardial infarct detection.
- *Differential diagnosis*: (1) dilated cardiomyopathy; (2) myocarditis; (3) valve disease; (4) other cardiomyopathies.
- See also *Myocardial Infarction*.

Suggested Reading

American College of Radiology (2012) ACR Manual on Contrast Media. Version 8. ISBN: 978-1-55903-009-0

Chu WC et al (2012) MRI of cardiac iron overload. J Magn Reson Imaging 36:1052–1059

Hiratzka FL et al (2010) 2010 ACCF/AHA/AATS/ACR/ASA/SCA/SCAI/SIR/STS/SVM guidelines for the diagnosis and management of patients with thoracic aortic disease. Circulation 121:e266–e369

Holloway BJ et al (2011) Imaging of thoracic aortic disease. Br J Radiol 84:S338–S354

Mendez C et al (2011) Magnetic resonance imaging of abnormal ventricular septal motion in heart diseases: a pictorial review. Insights Imaging 2:483–492

Stillman AE et al (2011) Assessment of acute myocardial infarction: current status and recommendations from the North American society for cardiovascular imaging and the European society of cardiac radiology. Int J Cardiovasc Imaging 27:7–24