Inner Spaces
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Points

- Cardiac CT with 64-slice CT scanners has come a long way since 2004
- It is the best modality for detection of coronary artery disease in patients who do not have classic signs and symptoms
- It is also useful in the post-graft setting, in those with large stents, for evaluating coronary anomalies and variants and in congenital heart diseases

Cardiac CT - Current Status

Cardiac CT with 64-slice CT scanners has come a long way, since its inception in September 2004, 4 years ago. After performing more than 5000 cardiac CT scans, this is our experience.

Current Status

1.Detection of coronary artery disease

This is its main role. The predictive value for normality is >99%, making it an ideal screening tool for identifying normal (Fig. 1) or abnormal (Fig. 2) coronary arteries in the following situations

a.Asymptomatic, medium to high risk patients

b.Equivocal or minimally abnormal stress test

c.Atypical chest pain

d.Symptomatic, but does not want a catheter coronary angiogram

In this setting, it replaces stress thallium and stress perfusion MRI and similar tests.

2.Established coronary artery disease

Used for follow-up

a.In those patients who have opted for alternative treatments like chelation, ECCP and such others (Fig. 3)

b.Patients with mild coronary artery disease and plaques

3.Post-CABG (Fig. 4)

In this setting, cardiac CT is the best noninvasive method to evaluate for graft patency / occlusion.

Fig. 1

Fig. 1: Normal coronary CT image shows exquisite depiction of the various coronary arteries.

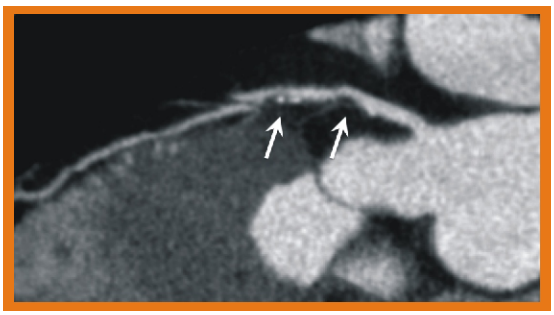

Fig. 2

Fig. 2: Coronary artery disease (CAD). Maximum intensity projection (MIP) image of the LAD shows at least two soft plaques (arrows) with calcific foci, causing approx. 30-40% stenosis of the lumen. No intervention is required, but the patient has definite CAD and needs aggressive medical management.

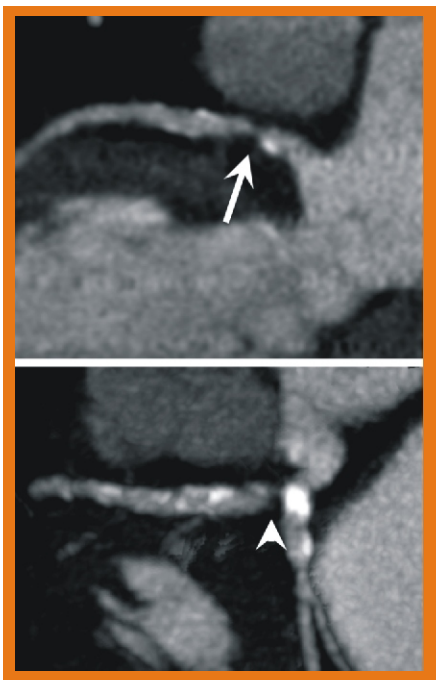

Fig. 3

Fig. 3: Follow-up. A 70-year old lady came with angina. The CT coronary angiogram (upper image) shows a severe ostial LAD stenosis (arrow). She refused treatment and came back 1 year later with the same symptoms. The ostial stenosis has further increased (arrowhead in the lower image).

4.Post-stent

Except in large stents greater than 3mm in diameter, cardiac CT is still not very good at evaluating in-stent patency, especially in stents < 2.5mm in diameter.

5.Coronary variants and anomalies

Cardiac CT is the gold standard to evaluate suspected variants and anomalies (Fig. 5).

6.Congenital heart disease

For evaluating extracardiac vessels (aorta, pulmonary arteries and veins), cardiac CT is the best non-invasive modality. It is used in the following settings

a.TOF with pulmonary atresia to look for MAPCAs (Fig. 6)

b.Complex congenital heart disease to look for pulmonary artery and venous anatomy

c.Coarctation of aorta and similar abnormalities (Fig. 7)

7.Future roles

a.Aortic and mitral valvular planimetry to see valve areas

b.Viability imaging when performed as part of a coronary artery study

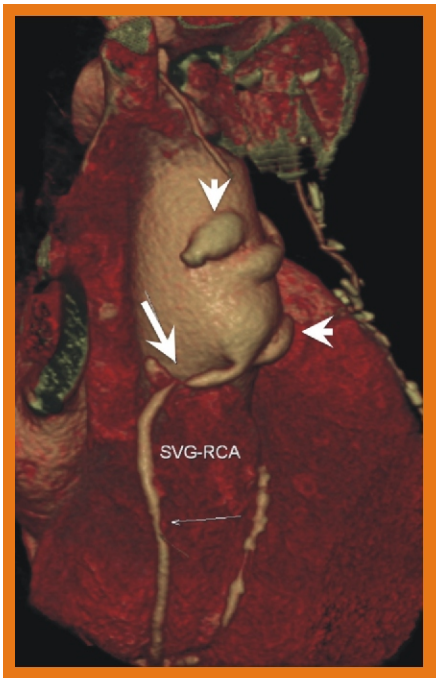

Fig. 4

Fig. 4: Post-CABG status. This patient has a patent LIMA-LAD and had four saphenous vein grafts, two of which are occluded (arrowheads). The SVG-RCA is patent and shows a severe stenotic lesion proximally (large arrow) with an approx. 50% stenosis more distally (thin arrow).

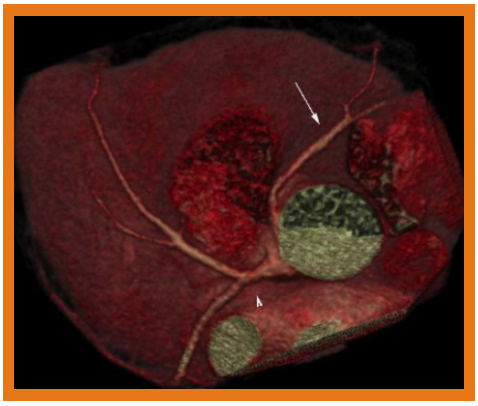

Fig. 5

Fig. 5: Anomalous coronary artery. The RCA (arrow) arises from the left coronary sinus and courses between the pulmonary artery and the aorta this is a malignant inter-arterial course and can lead to angina and sudden cardiac death.

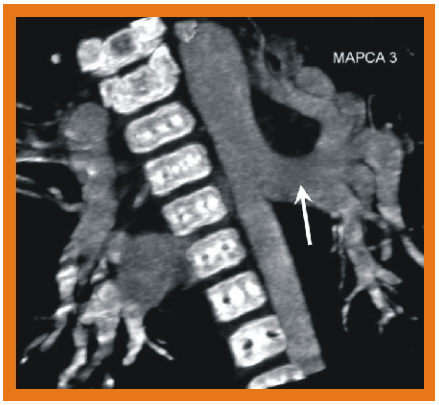

Fig. 6

Fig. 6: Congenital. In this patient with tetralogy of Fallot and pulmonary atresia, a large major aorto-pulmonary collateral (MAPCA) (arrow) is seen arising from the descending aorta and supplying the left lung

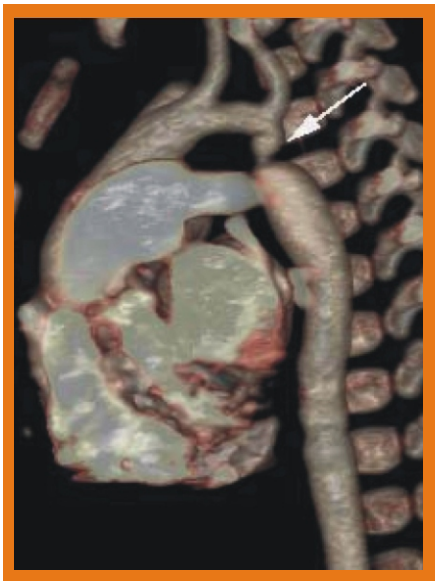

Fig. 7

Fig. 7: Congenital. An oblique 3D image shows a severe coarctation of the aorta (arrow).

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