Clinical picture

Coronary–pulmonary artery fistula: value of 64-MDCT imaging

A 57-year-old previously healthy male presented following an episode of sudden-onset central chest tightness and syncope whilst driving. There was no prior history of such episodes. Baseline observations, physical examination, electrocardiograph and chest radiograph were all normal. Cardiac biomarkers were negative and transthoracic echocardiography revealed a structurally and functionally normal heart. The coronary arteries were assessed using 64-slice multi-detector computed tomography (64-MDCT). This unexpectedly revealed a large fistula (Figure 1, arrow) connecting the septal branch of the left anterior descending (LAD) coronary artery to the main pulmonary trunk (PA). An extensive reticulum of smaller feeder vessels (Figure 1, arrowhead) was also seen connecting the left coronary arterial system to the PA. Invasive coronary angiography was then performed through the femoral route that confirmed the presence of the fistula (Figure 2, arrow). The patient underwent surgery during which the 8 mm fistula and the feeder vessels were disconnected and ligated. Repeat 64-MDCT (Figure 3) demonstrated complete resolution of the fistula.

The common cardiac causes of chest pain include coronary artery disease, pericarditis, myocarditis and type A aortic dissection. There are, in addition, a variety of non-cardiac conditions causing chest pain including pulmonary embolism, type B aortic dissection, gastro-oesophageal disease, lung and musculoskeletal pathology. Syncope, similarly is associated with a wide range of diagnoses including arrhythmias, structural cardiovascular problems and cerebrovascular disease. Coronary–pulmonary fistulae are rare causes of chest pain and syncope.

Figure 1. Volume-rendered 64-MDCT image showing a large fistula measuring 8 mm (arrow) connecting the septal branch of the LAD to the main PA. An extensive network of smaller feeder vessels (arrowhead) draining into the PA is also seen. LAD = left anterior descending artery, PA = main pulmonary artery.

Figure 2. Invasive coronary angiography demonstrating the fistula (arrow) draining the LAD. LAD = left anterior descending artery, LCx = Left circumflex artery.
The commonest point of origin for such fistulae is the left coronary system and the commonest exit point, the pulmonary artery.\(^1,2\) Although they have been previously reported, it is most unusual for a fistula of this size (8 mm) with an additional extensive network of feeder fistulae to be seen. Many coronary–pulmonary fistulae are incidentally diagnosed and do not cause symptoms. But those causing symptoms can be associated with significant morbidity and mortality.\(^2\) Many of these fistulae close spontaneously, but surgical or percutaneous closure may be indicated in young, symptomatic patients or in those with large or multiple fistulae.\(^2,3\) With large fistulae, the intracoronary diastolic perfusion pressure can progressively diminish resulting in run-off from the coronary vasculature into a low-pressure receiving cavity.\(^4\) Such a ‘steal’ phenomenon can manifest clinically as angina, dyspnoea or syncope.\(^5\) Early closure was necessary given the young age of the patient, presence of symptoms and the large size of the fistula. And as there were multiple fistulous connections, a surgical approach was preferred. The outcome from surgery was good and the patient was noted to be asymptomatic at 1-year follow-up. This case demonstrates the value of 64-MDCT in detection and follow-up of coronary anomalies in a non-invasive manner.

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References