

antiviral-directed immune response, are under investigation in experimental and clinical studies.<sup>70,114,136,137</sup> Because of the low rate of diagnosis, multi-centre collaborations with standardized evaluations and treatment protocols, mechanistically oriented registries, and core molecular diagnostic facilities will be needed.

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## References

The list of references is available in the online version of this paper.

## CARDIOVASCULAR FLASHLIGHT

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# Hybrid cardiac magnetic resonance/computed tomographic imaging: first fusion of three-dimensional magnetic resonance perfusion and low-dose coronary computed tomographic angiography

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A 65-year-old male patient with typical chest pain underwent low-dose coronary computed tomographic (CT) angiography (CCTA) with 1.4 mSv for evaluation of coronary artery disease (CAD). *Panel A* shows a curved multiplanar reformation of the left circumflex artery with a high-grade stenosis (white arrow) in the large first obtuse marginal branch (OM1). Subsequently, a stress cardiac magnetic resonance perfusion imaging (CMR) (adenosine 140 µg/kg/min, 0.1 mmol/kg Gadobutrolum, kt-SENSE) was performed with a new sequence allowing three-dimensional (3D) perfusion assessment. This revealed a lateral perfusion defect, involving 13% of the left ventricular myocardium (*Panel B*, white arrowheads). The 3D hybrid CMR/CCTA (obtained using PMOD Technologies Ltd and CardIQ Fusion, GE Healthcare) showed a perfect match of the perfusion defect (white arrowheads) and the culprit lesion (white arrow) (*Panel C*), documenting a prognostically important finding requiring revascularization. A 50% stenosis of the proximal left anterior descending artery was not associated with any perfusion defect on 3D hybrid CMR/CCTA. Finally, the patient underwent invasive coronary angiography confirming a sub-total occlusion of the OM1 (*Panel D*, white arrow) which was successfully revascularized. On clinical follow-up, the patient was well and reported no further anginal episodes. To our knowledge, this is the first report on 3D CMR/CT hybrid imaging integrating full-coverage perfusion information from 3D stress CMR and anatomical information from low-dose CCTA. By spatial colocalization of complementary data sets, hybrid 3D CMR/CT imaging may help to guide revascularization strategies in CAD patients. This latest technical advancement is an important further step in the attempt to reduce radiation burden in non-invasive hybrid imaging (cumulative radiation dose 1.4 mSv).

