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Role of cardiovascular magnetic resonance imaging in syncope

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Clinical Presentation: A 38-year old male patient was presented after recent episodes of syncope at exertion. His medical history included ankylosing spondylitis in remission and he was not on medication. On general examination, vital signs and the blood tests were normal including TSH and inflammatory parameters.

Diagnostic Investigation: The electrocardiogram showed a sinus rhythm with a left axis deviation, PQ interval of 200ms in combination with left anterior hemiblock and right bundle branch block. The chest x-ray showed bronchopathy and bronchiectasis, but no lymphadenopathy. Transthoracic echocardiography was normal. Bicycle ergometry exercise test was inconclusive, however no progressive atrioventricular (AV) conduction disturbances detected.

Within the first 24 hours of telemetric clinical observation, an episode of symptomatic high grade AV block with 7 seconds of asystole was observed. Ischemia was considered unlikely due to low risk profile and absence of angina. Myocardial involvement of ankylosing spondylitis and potentially sarcoidosis were involved in differential diagnosis.

CMR on a 1.5T MR system was performed to assess tissue characterization of the myocardium to evaluate involvement of systemic diseases and/or active myocarditis. Cine imaging revealed normal systolic function of left ventricle and no regional wall motion abnormality. T2w imaging demonstrated high signal intensity in basal/mid anterolateral segments consistent with edema/active inflammation. Late gadolinium enhancement imaging (LGE) showed intense and heterogeneous contrast enhancement, on basal/mid anterolateral/lateral walls indicating non-ischemic systemic pathologies. During LGE imaging, intense and multifocal nodular contrast enhancement was noted in liver and spleen suggesting presence of granulomas. The findings were highly suggestive for myocardial involvement of active sarcoidosis. The patient was treated immediately with high dose prednisolone. Later on, diagnosis was confirmed by a liver biopsy. The patient responded well to treatment and did not experience a new syncope, nor AV conduction disturbances during admission. Afterwards, given the recurrent syncope attacks related to high AV block as a result of discontinuation of treatment by patient and the extensive involvement of myocardium by sarcoidosis, ICD implantation was performed in addition to prednisolone treatment.

Learning Points: Our case illustrate the crucial role of CMR in identifying the culprit behind syncope attacks related to rhythm disorders. While T2w imaging allowing identification of inflammatory activity, LGE helps determination of intra and extra-cardiac burden and distribution of the disease. Therefore, CMR as a standalone technique is able to provide prompt diagnosis and adds incremental value for treatment and prognosis. Early integration of CMR in the diagnostic process provides a time and cost efficient approach in arrhythmia related syncopes with unknown etiology.
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Findings of T2w imaging in assessment of Syncope

Findings of LGE imaging in assessment of Syncope