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## **Multivessel coronary disease in a young patient with sarcoidosis: A case report**

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## **Multivessel coronary disease in a young patient with sarcoidosis: A case report**

Short title: CAD and sarcoidosis

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A 43-year-old angina-free, physically inactive male with a one-year history of heart failure (New York Heart Association class II/III) was admitted to the Department of Cardiology for diagnostic workup. History included type 2 diabetes of 8-years duration, hypercholesterolemia and nicotine addiction in the past (15 pack-years), without family history of premature atherosclerosis. He had never been treated for long-standing, diagnosed 12 years earlier pulmonary sarcoidosis without confirmed extracardiac involvement. Current medication included sacubitril/valsartan 97/103 mg twice daily; bisoprolol 10 mg once daily; eplerenone 25 mg once daily; empagliflozin 10 mg once daily; rosuvastatin 10 mg once daily; ezetimibe 10 mg once daily; gliclazide 60 mg once daily; insulin Gensulin N 10 u. subcutaneous. Cardiac magnetic resonance performed 3 months earlier revealed general left ventricular (LV) hypokinesis with apical akinesis and decreased left ventricular ejection fraction (LVEF) — 31%. Late gadolinium enhancement was found in the middle and apical segments of the LV —

which might correspond to non-ischemic foci of endocardial fibrosis and a spotty focus to granulomas (Figure 1A–B). There were no signs of sarcoidosis in the chest X-ray (Figure 1C). Electrocardiogram demonstrated sinus rhythm with a rate of 75/min with no patterns of myocardial ischemia. Laboratory findings showed: low-density lipoprotein cholesterol — 76 mg/dl, lipoprotein(a) — 3.2 mg/dl, HbA1c — 5.6% and N-terminal pro-B-type natriuretic peptide — 2030 pg/ml. Transthoracic echocardiography confirmed LVEF 33% and moderate mitral regurgitation. Coronary angiography revealed occluded anterior descending branch (LAD), 75% stenosis in the circumflex branch and 70% stenosis in the right coronary artery (RCA) (Figure 1D and E). The cardio-group council recommended coronary artery bypass grafting. During successful coronary artery bypass grafting (left interior mammary artery-LAD and saphenous vein graft-marginal branch and RCA) tissue surrounding occluded LAD was sampled. Biopsy demonstrated fatty and fibrous tissue with small, scattered lymphoid infiltrates, without signs of inflammatory lesions in the walls of small vessels (Figure 1F). Right after the surgery the slight improvement of the LV contractility has been observed (33% → 36%). Also three months follow-up revealed no exertional chest pain and dyspnea.

This is the report of a patient with heart failure in whom sarcoidosis did not express in extensive granulomatous disease of myocardium. The premature atherosclerosis in the presence of several moderate classic risk factors could be related, at least to a significant extent, to longstanding sarcoidosis causing long-term inflammatory systemic stimulation. Although the incidence of myocardial involvement in sarcoidosis is estimated at 76%, epicardial coronary artery infiltration is very rare including biopsy proven cases [1, 2]. Few analyzes conducted on large populations have shown the association of sarcoidosis with increased risk of cardiovascular diseases [3]. These analyzes mainly come from studies on patient populations with connective tissue diseases [4]. Further investigation of the patient revealed an incident of septic shock in 2019 and severe course of COVID-19 infection one year later. Recently published papers confirmed the association of COVID-19 infection with morbidity due to peripheral atherosclerosis [5]. Sarcoidosis was raised as a risk factor for atherosclerotic coronary disease and the awareness of resulting accelerated coronary disease leading to ischemic LV dysfunction should be elevated. The patient remains under constant pulmonary monitoring and is currently not on immunosuppressive treatment.

#### **Article information**

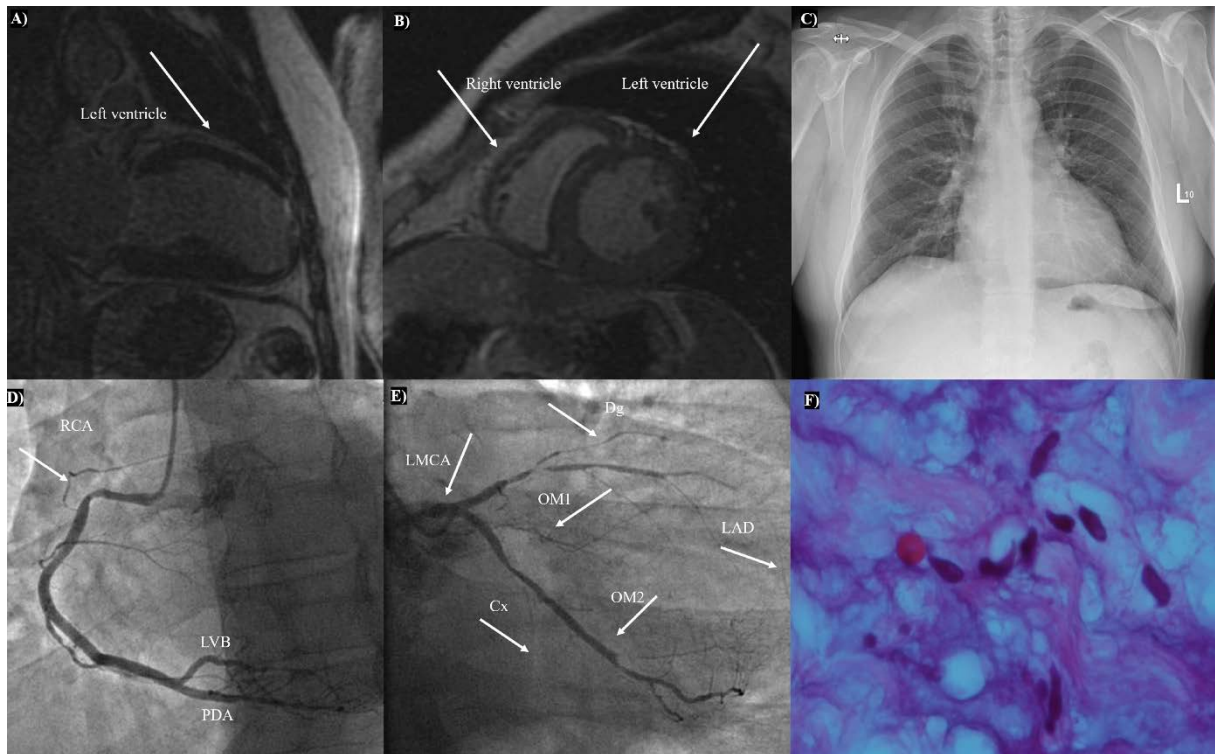
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**Figure 1.** Coronary angiography findings. **A.** Cardiac magnetic resonance — longitudinal view. **B.** Cardiac magnetic resonance — transverse view. **C.** Chest X-ray, posterior anterior view. **D.** Left anterior oblique (LAO) caudal view: RCA — white arrows show significant stenosis in segment 1. **E.** Right anterior oblique (RAO) caudal view: left main coronary artery (LMCA) — with no significant stenoses; LAD and diagonal branch — white arrows indicate significant stenoses in segment 6 and 7 and total occlusion in segment 8 and 9; circumflex branch (Cx) — white arrows indicate significant stenoses in segment 11 and 14, and total occlusion in segment 12 and 15. **F.** Histopathological examination — lymphocytic infiltrates in the perivascular adipose tissue

Abbreviations: Cx, circumflex coronary artery; LAD, left anterior descending artery; LMCA, left main coronary artery; LVB, left ventricular branch; Mg, marginal branch; PDA, posterior descending artery; RCA, right coronary artery