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Case report (includes case series that include 5 or fewer patients)

Title: Recurrent Enteroviral Myocarditis in Transplanted Heart From Induced Immune Deficiency

Description: We present a rare case of recurrent enteroviral myocarditis post-transplant in a patient with prior CAR-T cell therapy exposure posing a diagnostic challenge.

Recurrent Enteroviral Myocarditis in Transplanted Heart From Induced Immune Deficiency

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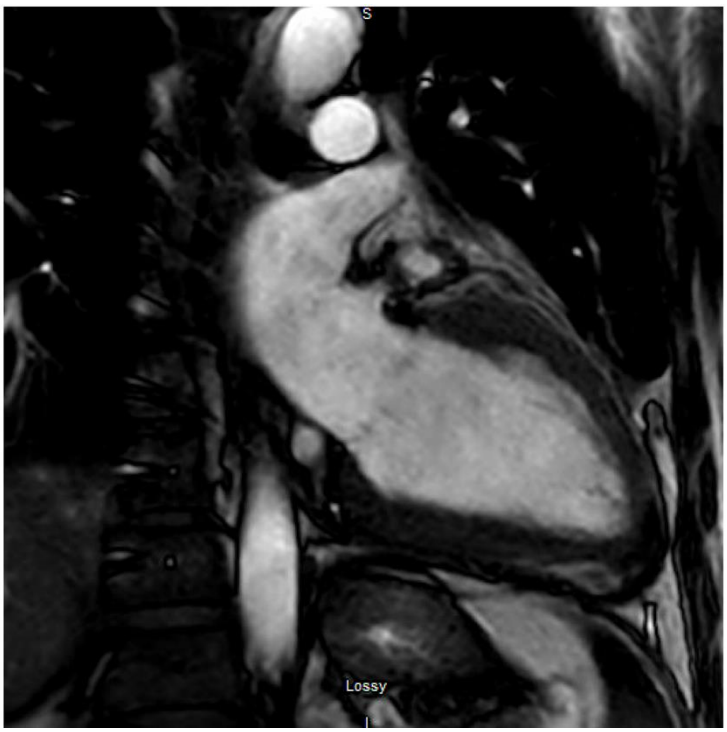
Background: Group B enteroviruses are known to cause fulminant myocarditis requiring heart transplantation. We present a case of recurrent enteroviral myocarditis post-transplant posing a diagnostic challenge.

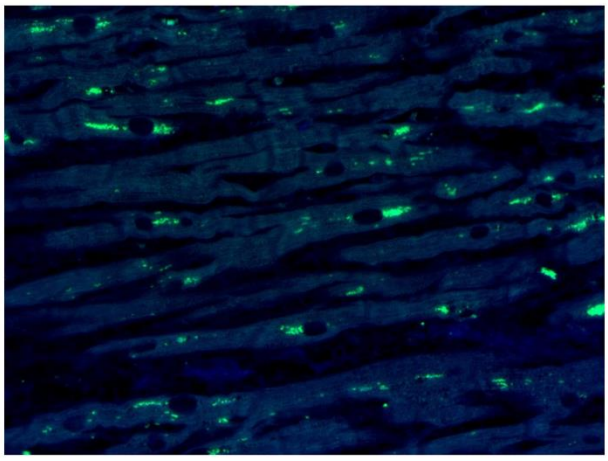
Case: A 37-year-old male with a history of Diffuse large B-cell lymphoma (DLBCL) in remission for six years after chimeric antigen receptor T-cell therapy (CAR-T), underwent heart transplant for enteroviral myocarditis. He presented within 2 weeks with worsening left ventricular ejection fraction (LVEF). Cardiac MRI (CMR) demonstrated diffuse, patchy mid myocardial and subepicardial enhancement of multiple segments (Figure 1) with increased signal on T2 imaging suggestive of edema. Endomyocardial biopsy (EMB) showed mild cellular rejection (grade 1R) with negative C4 complement (C4d) without myocyte necrosis. He developed cardiogenic shock with a decline in his LVEF to 20% and required VA-ECMO support.

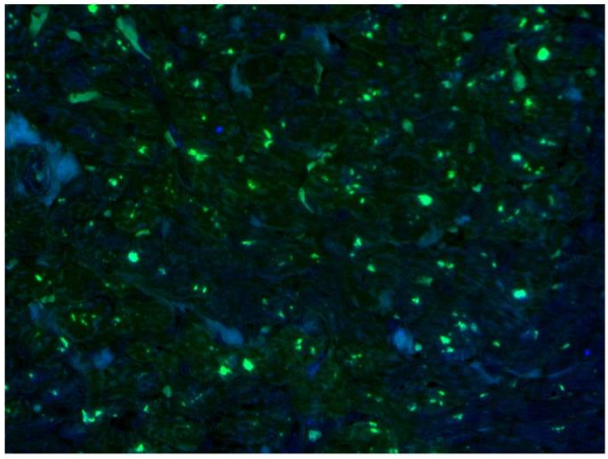
Decision making: A repeat EMB and molecular microscope diagnostic system was negative for rejection. He received plasma exchange therapy, intravenous immunoglobulin (IVIG), and thymoglobulin. Lymphocyte counts performed on admission showed an absolute count of 31 for CD3 (normal:427 cell/mm3) and no detectable CD19 cells suggesting severe combined immune deficiency. EMB was positive for enterovirus by reverse transcriptase polymerase chain reaction (RT-PCR) suggesting recurrent enteroviral myocarditis (Figure 2). After an extended course of Intravenous Immune globulin (IVIG), he had clinical recovery with an improvement of his LVEF to 55%.

Conclusion: This is the first case in literature that highlights recurrence of biopsy-negative enteroviral myocarditis post-transplant, particularly with persistent B cell depletion from past exposure to anti-CD19 CAR-T cell therapy. We hypothesize that the severity of his presentation was due to this unforeseen combined immune deficiency in addition to intensive immunosuppression.



cMRI-
T2-imaging showing diffuse, patchy mid-myocardial & subepicardial enhancement suggestive of edema





NATIVE HEART **DONOR HEART**

Enterovirus was detected using Real-Time Reverse Transcriptase and DNA amplification