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Case report

Follow-up assessment of myocardial calcification secondary to fulminant myocarditis with computed tomography

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1. Case report

A 16-year-old man underwent venoarterial extracorporeal membrane oxygenation (VA-ECMO) therapy due to hemodynamic collapse caused by viral fulminant myocarditis. [Supplementary Figure 1](#) presents the time course of treatment. High-density areas were initially detected by computed tomography (CT) 10 days after admission which was not observed on admission ([Fig. 1A](#)). And CT value reached 106 Hounsfield Unit (HU) 40 days after admission ([Fig. 1B](#)), the left lateral wall was more evident than other areas. The patient's hemodynamic condition gradually improved and he was discharged 2 months after admission with cardiac function meeting with New York Heart Association class II criteria.

The patient's myocardial calcification and cardiac function were followed up periodically with CT and echocardiography, respectively. As shown in [Supplementary Figure 2](#), [Supplementary Figure 3](#) the cardiac function remained stable after discharge. And the density of calcification reached the peak (CT value of 142 HU) seven months after admission, followed by a subtle decline ([Fig. 1C](#)). Furthermore, the right ventricular calcification almost disappeared at 1-year follow-up ([Fig. 1D](#)), while the left ventricular calcification just regressed slightly 3 years after admission ([Fig. 1E](#)).

2. Discussion

Dystrophic myocardial calcification is a rare but possibly life-threatening complication of viral myocarditis. Dystrophic calcification is the pathological calcification occurred in the ischaemic and injured areas. As in our case, the calcium salts accumulated in the myocardium damaging by inflammatory cytokines released from Epstein-Barr (EB) virus. Additionally, previous reports pointed out that the use of VA-ECMO support and high-dose exogenous glucocorticoids could lead to an imbalance in calcium-phosphate homeostasis.^{1,2} However, serum calcium levels of the patient were always normal or decreased slightly, the exact mechanisms are still unclear. In our case, repeated CT scans manifested a detailed progression of calcium deposition during follow-up. Remarkably, cardiac magnetic resonance (CMR) and echocardiography during follow-up suggested normal left ventricular function although there was massive ventricular calcification, which was different from several prior reports.^{3,4} Perhaps it is linked with a timely and effective comprehensive treatment regimen. The exact mechanisms still need further investigation.

In conclusion, myocardial calcification can progress over time and is probably not a marker of a pathological process that influences cardiac

Abbreviations: VA-ECMO, venoarterial extracorporeal membrane oxygenation; CT, computed tomography; HU, Hounsfield Unit; EB, Epstein - Barr; CMR, cardiac magnetic resonance.

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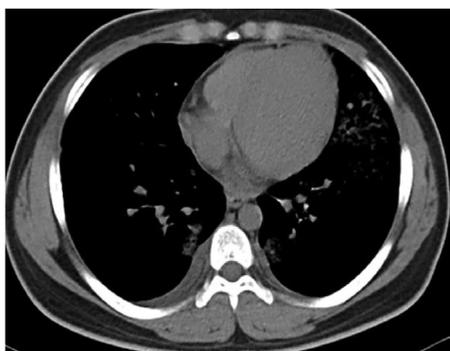
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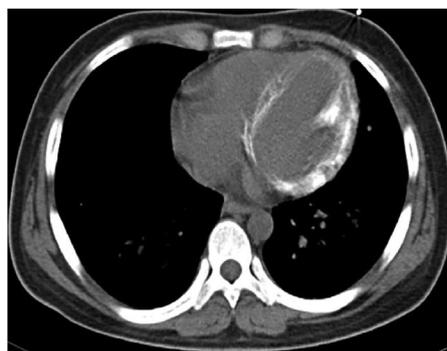
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A



B



C



D



E

Fig. 1. The time course of myocardial calcification on computed tomography (WW: 400HU, WL: 40HU, ST: 7mm). [A] Chest computed tomography (CT) images showing pleural effusion, patch shadows in bilateral lungs, and no morphological abnormalities in the left ventricular wall on admission, [B] CT scan showing high-density areas in the left ventricular wall 40 days after admission, especially in the left lateral wall, [C] Follow-up CT scan 7 months after admission showing extensive ventricular myocardial calcification, [D-E] CT scans 1 year after admission and 3 years after admission showing gradual regression of calcium deposition in the left ventricular septal and apex wall.

function. Our reports underline the importance of early intervention, efficient management in patients, and the utility of CT which plays a key role in thoroughly managing and evaluating the prognosis of patients with myocardial calcification secondary to viral myocarditis.

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Declaration of competing interest

All authors declare no conflict of interest.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jcct.2022.06.138>.

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