Rapidly developed diffuse myocardial calcification 13 days after septic shock in a hemodialysis patient

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A 71-year-old man on chronic hemodialysis (HD) presented with a few days history of general fatigue. On admission, the patient had a blood pressure of 88/54 mmHg in a supine position. Physical examination revealed left lung crackles. He was found to have left upper lobar pneumonia and septic shock. Antibiotic therapy, high-dose catecholamine therapy for blood pressure support, mechanical ventilation, and continuous renal replacement therapy were administered for approximately 1 week after admission. Compared with the computed tomography image obtained on admission (Fig. 1a), the image obtained on hospital day 13 showed a new high-density lesion involving the left cardiac ventricle circumferentially (Fig. 1b; arrow), which suggested myocardial calcification. Ultrasound echocardiography also showed a new high-echoic lesion at the same area. Subsequently, a myocardial biopsy revealed diffuse calcium depositions (Fig. 1c; von Kossa stain, arrow).

Generally, calcifications develop through two processes [1]. One process is metastatic calcification, which occurs through intracellular calcium deposits due to disorders of the calcium/phosphorus metabolism, especially in patients undergoing HD therapy. The other process is dystrophic calcification occurring in abnormal tissue within days or months, in which cardiac manifestations are mainly due to healed myocardial infarction, myocarditis, as well as myocardial trauma or cardiac surgery.

First reported by Lapatto-Reiniluoto et al. [2], myocardial calcification can also be the result of dystrophic calcification due to septic shock, as seen in the present patient. Acute-onset hypotension may result in diffuse myocardial damage, leading to dystrophic calcium deposition in devitalized or necrotic cells [3]. Furthermore, catecholamines induce myocardial injury, resulting in a special form of cardiomyopathy with eventual calcification [4, 5]. Because of the potentially immunocompromised state of this hemodialyzed patient, more time might have been required to overcome septic shock; therefore, he appeared to have been exposed to both severe hypotension and high-dose catecholamine therapy for a longer time.

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Fig. 1 **a** Computed tomography image of the chest on admission. **b** Computed tomography image of the chest on hospital day 13. The left cardiac ventricle was circumferentially involved by a new high-density lesion (arrow). **c** Diffuse calcium deposition in the biopsied myocardium (von Kossa stain, arrow)

The patient gradually improved with antibiotics and supportive therapies. However, the diffuse high-density lesion of the heart remained after general improvement in the patient's condition, and both the systolic and diastolic cardiac functions were affected.

Conflict of interest All the authors have declared no competing interest.

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