

# 'Crystal' in the heart

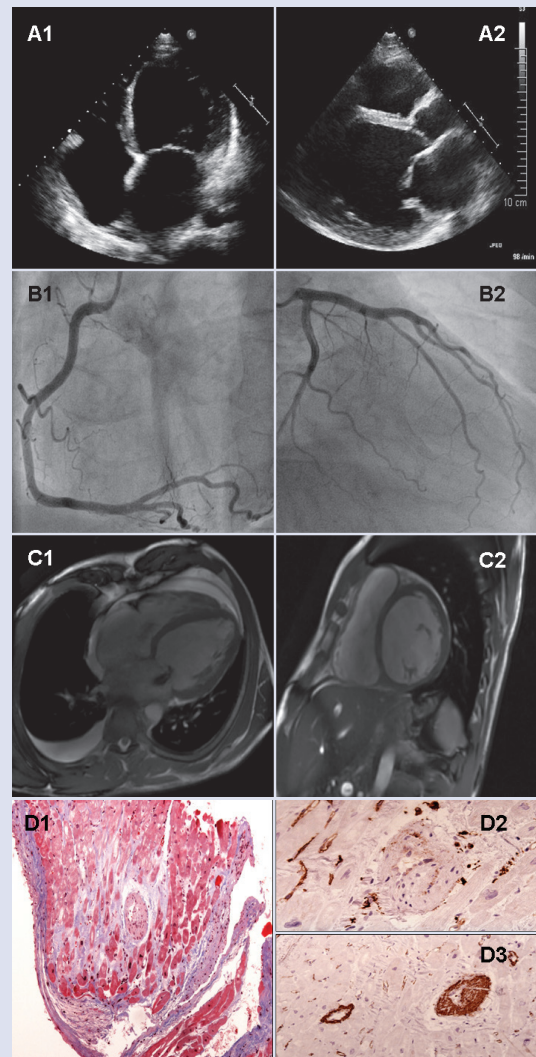
„Kryształ” w sercu

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A 35-year-old man presented to the emergency unit with progressive dyspnoea of two weeks' duration. He had no previous medical history, and denied chest discomfort. During echocardiography, a severely impaired biventricular systolic function with severe atrioventricular valve insufficiency was found. The left ventricular end diastolic diameter (LVEDD) was 74 mm (Fig. 1A). There was no evidence of coronary artery disease (CAD), as shown in Figure 1B. On inquiry, he confessed to a weekly consumption of 'crystal' (methyl amphetamine) of about 0.5–1 g. Haemodynamic findings showed a decreased cardiac index of 1.7 L/min/m<sup>2</sup>. The patient had an intra-aortic balloon pump implanted as a bridge to recovery. However, haemodynamic and echocardiographic parameters did not improve, so he received a levosimendan infusion. Left ventricular endomyocardial biopsies were taken, and histological and immunohistological examinations revealed severe methamphetamine-induced chronic myocardial injury with degeneration of hypertrophied myocytes neighbouring small arterioles with medial hyperplasia in the presence of a mild inflammatory reaction (Fig. 1D). There was no evidence of acute or chronic myocarditis, amyloidosis or preexisting dilated or other primary cardiomyopathies. No viral genomes were detected by nested PCR analysis. The results were confirmed by cardiac magnetic resonance imaging (MRI) (Fig. 1C). Late gadolinium enhancement indicating myocardial fibrosis or necrosis was not obvious. The patient slowly recovered over the course of two weeks. Long-term ECG showed a non-sustained ventricular tachycardia of 18 beats. He left hospital with a wearable cardioverter-defibrillator (LifeVest®). Chronic use of methyl amphetamine may result in severe heart failure, malnutrition, infections and permanent psychiatric illness. The patient was discharged for outpatient drug rehabilitation.



**Figure 1.** A. Echocardiography showed severely impaired biventricular systolic function (LVEF and RVEF 15%) with severe tricuspid and mitral valve insufficiency; **A1**. Apical four-chamber view showed the globally poor myocardial contractility in biventricular dilatated heart; **A2**. Parasternal long axis view showed enlarged LVEDD (74 mm); **B**. Coronary angiographic findings without evidence of CAD; **B1**. Right coronary artery; **B2**. Left main with Ramus circumflexus and Ramus interventricularis anterior; **C**. Cardiac MRI showed a severely impaired left and right ventricular function without evidence of late gadolinium enhancement; **C1**. Fiesta four-chamber view Asset; **C2**. Fiesta SA Asset; **D**. Histology and immunohistology (IH) of methamphetamine-induced cardiomyopathy; **D1**. Severe chronic myocardial injury with degeneration of hypertrophied myocytes and interstitial fibrosis in the vicinity of a hypertrophied arteriole (Masson trichrome,  $\times 100$ ); **D2**. HLA class II expression in professional antigen-presenting immune cells and in endothelial cells of small vessels (IH,  $\times 400$ ); **D3**. Proliferating smooth muscle cells within the media of a hypertrophied arteriole with luminal constriction (IH,  $\times 200$ )

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**Conflict of interest:** none declared