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CASE IMAGE IN CARDIOVASCULAR ULTRASOUND

Acute left ventricular free wall rupture treated by percutaneous intra-pericardial fibrin-glue infusion

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A 65-year-old woman was admitted to our hospital with left shoulder pain for 3 days, and subacute inferior myocardial infarction was suspected. Three years prior to presentation, she underwent implantation of 3 drug-eluting stents [one to the mid-left anterior descending artery and the others to the mid-right coronary artery (RCA)] for angina pectoris. Transthoracic echocardiography (TTE) produced unclear images because she had breast implants. Emergency coronary angiography (CAG) did not reveal significant stenosis or occlusion, but there was a filling defect in one of the RCA stents. Her anti-platelet therapy was changed, and we continued to administer intravenous heparin for 5 days because of persistent back pain. On the 6th hospital day, complete atrioventricular block with ST-segment elevation in inferior leads was noted. Emergency CAG was performed, and occlusion of the distal RCA was identified. Immediately after CAG, the patient went into cardiopulmonary arrest. Resuscitation was carried out by tracheal intubation, and intra-aortic balloon pumping and percutaneous cardiopulmonary support (PCPS) were initiated. Although TTE failed to provide clear images, plain computed tomography (CT) demonstrated marked hemorrhagic pericardial effusion. Pericardial drainage was performed immediately, and the PCPS flow rate was increased to maintain hemodynamics. As CT suggested aortic dissection, contrast CT was performed. However, instead of aortic dissection, a large myocardial defect was observed (Fig. 1a). Furthermore, transesophageal echocardiography demonstrated blood flow at the rupture site (Fig. 1b). It was considered difficult to surgically repair the posterior wall rupture; therefore, fibrin-glue was infused into the pericardial space via the drain on the same day. After the infusion of fibrin-glue, the pericardial effusion decreased in size and PCPS flow increased. Although the left ventricular pseudoaneurysm became slightly enlarged (Fig. 1c), her hemodynamics were stable and there was no restriction of ventricular motion. She transferred to a rehabilitation center on the 62nd hospital day.

The effectiveness of percutaneous intra-pericardial fibrin-glue infusion therapy (PIFIT) has been reported by several authors. According to these reports, bleeding was stopped not by adhesion in the pericardial space, but by a thin layer of fibrin that covered the pericardial membrane after PIFIT [1–4]. These histological findings suggest that diastolic dysfunction due to constrictive pericarditis will not occur after PIFIT. Indeed, a good prognosis without complications, including adhesion and constrictive pericarditis, has been achieved with this method in all clinical cases. Therefore, when drainage of the effusion is successful, PIFIT may be useful, especially if surgical repair is difficult.

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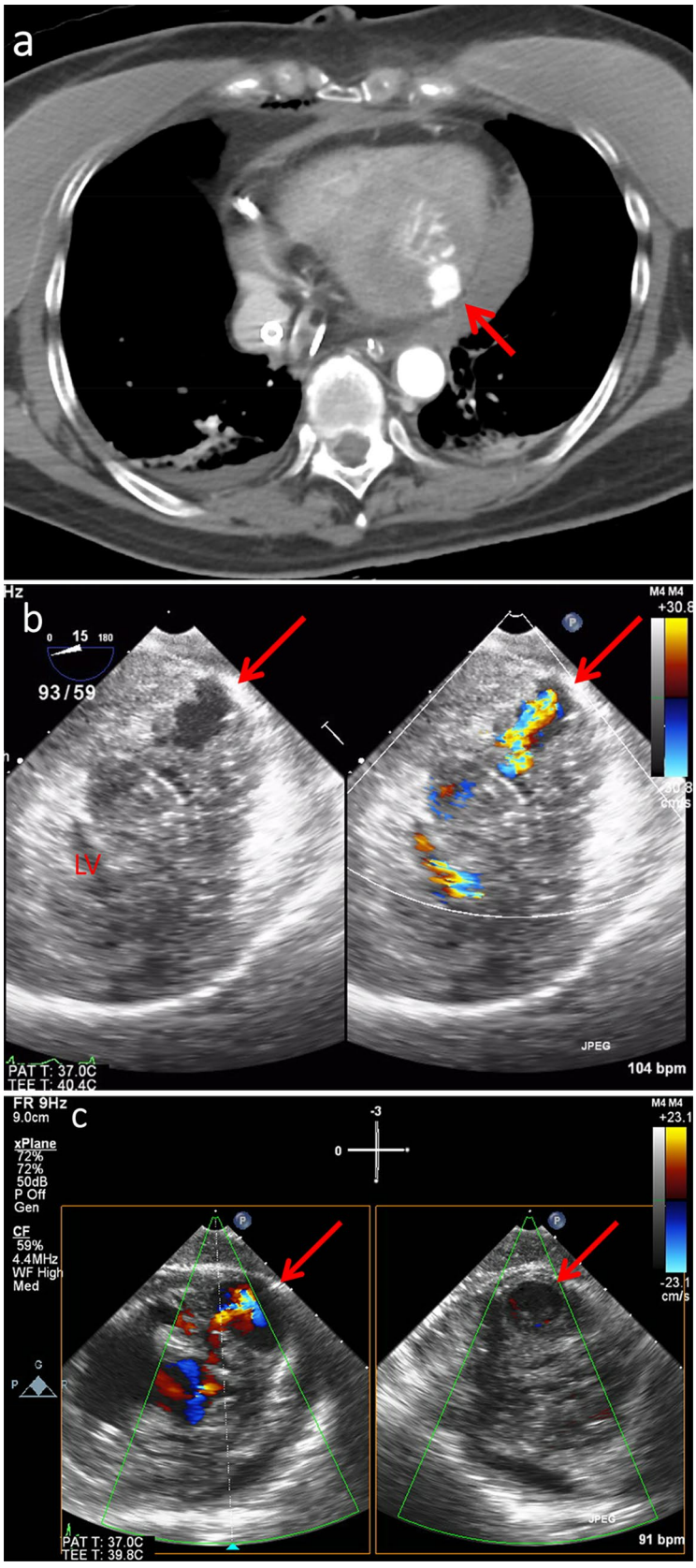

Fig. 1 **a** Contrast computed tomography leading to the diagnosis of left ventricular free wall rupture on the 6th hospital day. Non-electrocardiogram-gated computed tomography was performed because it was an emergency examination. This image revealed rupture of the left ventricular posterior wall (arrow). There was no leakage of contrast medium into the pericardial cavity through the rupture site. As computed tomography was performed after pericardial drainage, pericardial effusion was reduced and cardiac tamponade did not progress. **b** Transgastric mid short-axis view on transesophageal echocardiography demonstrated a transmural myocardial defect measuring approximately 16 × 18 mm at the left ventricular posterior wall (arrows). Color flow was visible through the wall defect. The color flow velocity was approximately 1.5 m/s from the left ventricular cavity through the defect in the systolic phase, and approximately 0.8 m/s to the left ventricular cavity through the defect in the diastolic phase. The myocardium was edematous and hematoma-like, and the left ventricular cavity had collapsed, making the left ventricular cavity nearly invisible. Inferoposterior asynergy was also observed. **c** Follow-up transesophageal echocardiography on the 54th hospital day revealed slight enlargement of the pseudoaneurysm in the left ventricular posterior wall. Color flow was visible in the pseudoaneurysm in both systolic and diastolic phases. The image showed sliding motion between the pseudoaneurysm and pericardium, and there was no complete adhesion

Compliance with ethical standards

Conflict of interest Ayumi Suzuki, Joji Ishikawa, Yoshiko Nemoto, Jun Tanaka, Takashi Nishimura, Shunei Kyo, and Kazumasa Harada declare that they have no conflict of interest.

Human rights statement All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1964 and later versions.

Informed consent Informed consent was obtained from the patient for being included in this report.

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