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IMAGES IN CARDIOVASCULAR INTERVENTION

Percutaneous closure of iatrogenic ventricular septal rupture following septal branch obstruction during elective coronary angioplasty

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A 73-year-old female underwent percutaneous coronary intervention (PCI) for the mid-left anterior descending artery (LAD) (Fig. 1a, b). After a stent was implanted in the mid-LAD, the third septal branch was occluded, and her creatinine kinase peaked at 847 mg/dl. At 6 months' follow-up, she complained of breathlessness. Contrast-enhanced multidetector computed tomography (MDCT) revealed patent mid-LAD stent, spontaneous reperfusion of the third septal branch, and a previously undetected ventricular septal defect (VSD) at the middle level of the muscular portion. The volume-rendering fusion image of the left coronary artery and two-dimensional myocardium in diastole demonstrated that the third septal branch perfused the entire VSD (Fig. 1c). Although she was hemodynamically stable, echocardiography detected clinically significant pulmonary hypertension and the calculated Q_p/Q_s was 2.42. A consultation with cardiovascular surgeons concluded that transcatheter closure was the best candidate because of reasons mentioned below. After a written informed consent and approval from Institutional Review Board (IRB) at Sendai Kousei Hospital, we performed a percutaneous repair of VSD (Fig. 1d).

A 16 mm Amplatzer Post-Infarction VSD Occluder (St. Jude Medical, Inc., Minneapolis, USA) was successfully implanted; mild residual shunt was observed. Left ventriculography at 6 months' post-procedure follow-up showed disappearance of the residual shunt (Fig. 1e).

VSD is a rare but potential complication of septal branch obstruction. To our knowledge, a few reports describe ventricular septal rupture following septal branch obstruction, during elective PCI [1], and this is the first report of successful percutaneous closure for such iatrogenic VSDs. Current surgical techniques for post-infarction VSD, including the David–Komeda exclusion technique, sometimes impair the left ventricular function [2]. In the present case, such a disadvantage would exceed the potential benefits, because the pre-procedural LV function was preserved and also because the VSD's location at the middle level of the inter-ventricular septum would require extensive ventricular incision. On the other hand, the VSD was surrounded by healthy tissue and was thought to be anatomically suitable for the transcatheter closure.

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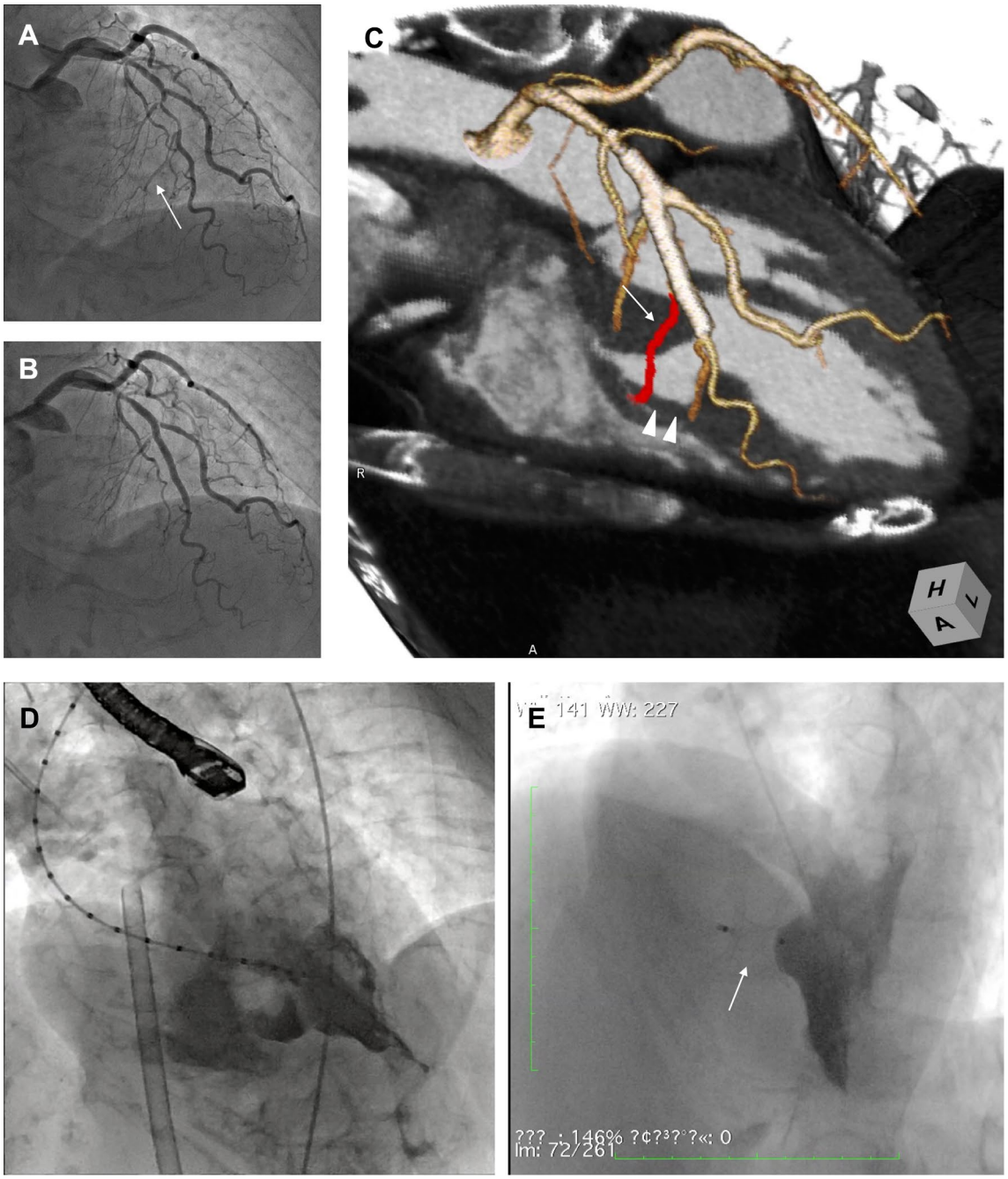

Fig. 1 **a**, **b** Left coronary artery angiography before and after the PCI, showing the occlusion of the stent-jailed third septal perforator (**a**, arrow). **c** Fusion imaging: combined visualization of volume rendering in the left coronary artery and a two-dimensional image of the myocardium in diastole 6 months after the PCI. The third septal branch (arrow) was spontaneously reopened, perfusing the entire area of the VSD (arrow heads). **d**, **e** Preoperative and 6 months' follow-up left ventriculography showing complete closure of the VSD with the Amplatzer device (**e**, arrow) in systole

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