Images in Cardiovascular Disease

Repeated Transcatheter Closure of Postinfarction Ventricular Septal Defect

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Conflict of Interest

The authors have no financial conflicts of
interest.

A 77-year-old male with a history of coronary bypass graft surgery 15 years previously was referred to the cardiology department for management of a huge thoracic aortic aneurysm. After debranching of the innominate artery and left common carotid artery, hybrid thoracic endovascular aortic repair was planned two days later. On postoperative day (POD) 1, ST elevation in the precordial leads and cardiac marker elevation were noted. Echocardiography revealed newly developed akinesias of the apical wall and mid to basal septal walls. Medical stabilization was performed after confirming the patency of the bypass grafts.

On POD 5, echocardiography revealed two postinfarct ventricular septal defects (PIVSD) at the apical septum (**Figure 1A, Movie 1**). The patient's vital signs worsened despite appropriate inotropic supports. We performed device closure with an Amplatzer septal occluder (16 mm, Abbott, MN, USA) on POD 10 (**Figure 1B-G, Movie 2, 3**). Four days later, echocardiography showed detachment of the distal anchoring site, resulting in a large PIVSD (**Figure 2, Movie 4**). On POD 16, a surgical patch closure was performed with a small remnant shunt flow (**Figure 3A, B**). However, the defect size increased to 13 mm 5 days after surgery. Device closure with the Amplatzer septal occluder (25 mm) was repeated. While a small shunt flow remained, it was stable after the final closure (**Figure 3C-F**).

PIVSD is a fatal complication of myocardial infarction, and mortality is high if left untreated. Surgical repair carries a mortality rate close to 50%, and the incident rate of residual shunt is about 20%.¹⁾ Transcatheter closure of PIVSD is one of the most challenging procedures because the margins of defect may have necrotic, friable borders.²⁾ This case highlights the importance of echocardiography for both detection of PIVSD and guidance during the intervention.³⁾

Figure 1. (A) Postoperative day 5 transthoracic echocardiography in apical 4 chamber view revealed a postinfarct ventricular septal defects. (B) Ventriculography showed a shunt flow (yellow arrow). (C, D) Transesophageal echocardiography showed a tissue defect (black arrow) and shunt flow on color Doppler. (E-G) The first device closure was performed under the guidance of transesophageal echocardiography.

Figure 2. (A, B) Transthoracic echocardiography after the first device closure demonstrated no remnant shunt flow. (C, D) Tissue defect with detachment of the device (yellow arrow) and recurrent shunt flow were observed on postoperative day 14.

Figure 3. (A, B) Transthoracic echocardiography after surgical closure demonstrated a small remnant shunt flow. (C, D) Ventriculography and transesophageal echocardiography showed shunt flow on postoperative day 18. (E, F) After the second device closure (red arrow), a small remnant shunt flow was observed.

SUPPLEMENTARY MATERIALS

Movie 1

Transthoracic echocardiography images in apical 4 chamber view showing a postinfarct ventricular septal defect on postoperative day 5. LV: left ventricle.

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Movie 2

Transesophageal echocardiography guidance was employed during the first percutaneous device closure of the postinfarct ventricular septal defect.

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Movie 3

Movie clip from transthoracic echocardiography images in apical 4 chamber view after the first device closure.

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Movie 4

Movie clip shows detachment of the device and recurred shunt flow on postoperative day 14.

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