

Simultaneous cardiac free-wall rupture and ventricular septal rupture following acute myocardial infarction treated with emergency balloon inflation

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Before the era of fibrinolytic reperfusion, free-wall rupture (FWR) complicated 1% to 6% of ST-segment elevation myocardial infarction (STEMI) cases, and ventricular septal rupture (VSR), 1% to 3%. With the introduction of primary percutaneous coronary intervention (PCI), the reported incidence of VSR has dropped and ranges from 0.2% to 0.5%. However, there is no evidence on whether primary PCI reduces the risk of FWR.¹⁻⁴ We present our unique treatment strategy in a patient with simultaneous FWR and VSR following acute STEMI.

A 66-year-old woman was admitted within 2 hours of the onset of chest pain at rest with anterior-wall STEMI. Physical examination on admission did not reveal any signs of heart failure. Baseline troponin T levels were 0.439 ng/ml (upper limit of normal, 0.014 ng/ml). Immediately after the examination, she experienced

a cardiac arrest with pulseless electrical activity (PEA). A resuscitation procedure using the Lucas 2 system (Jolife, Lund, Sweden) was promptly initiated. Because of the PEA and the suspicion of cardiac tamponade, urgent transthoracic echocardiography was performed, which showed a large amount of pericardial effusion (FIGURE 1A). During pericardiocentesis with subsequent drainage, 200 ml of blood was aspirated (FIGURE 1B). Despite successful pericardiocentesis, the patient remained in shock with a systolic blood pressure of only 80 mm Hg on a high dose of epinephrine and norepinephrine. Therefore, she was transferred to the catheterization laboratory where a VSR near the left ventricular apex was found (FIGURE 1C). Under transesophageal echocardiography guidance, a balloon catheter (size, 20 × 40 mm) was introduced over the wire from the left to right ventricle and subsequently

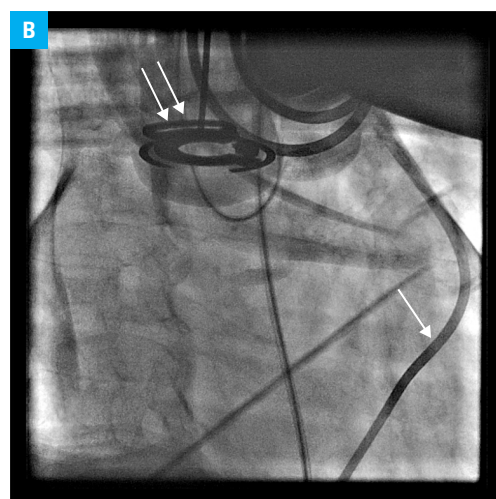
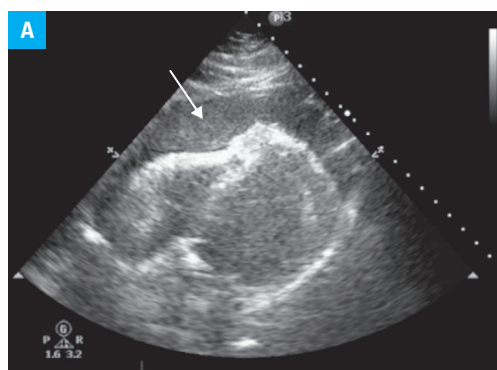


FIGURE 1 Echocardiography showing pericardial effusion (arrow) due to free-wall rupture (A); chest X-ray showing pericardiocentesis (arrow) and chest compression with the Lucas2 system (arrows) (B)

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Received: August 14, 2019.

Revision accepted:
September 10, 2019.

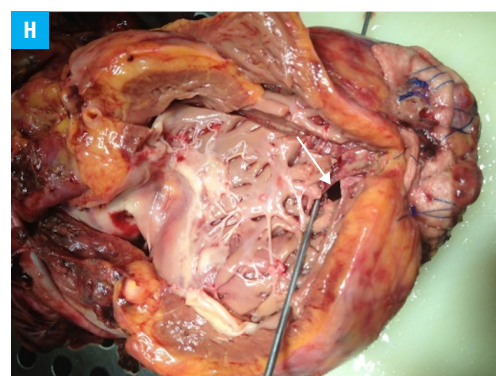
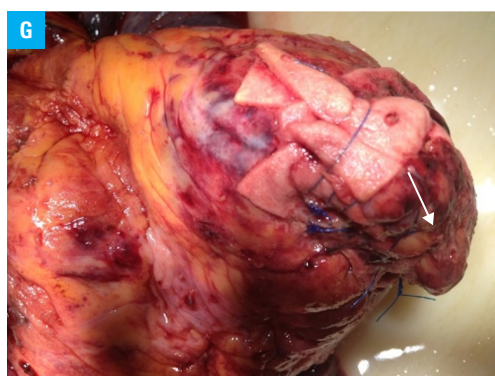
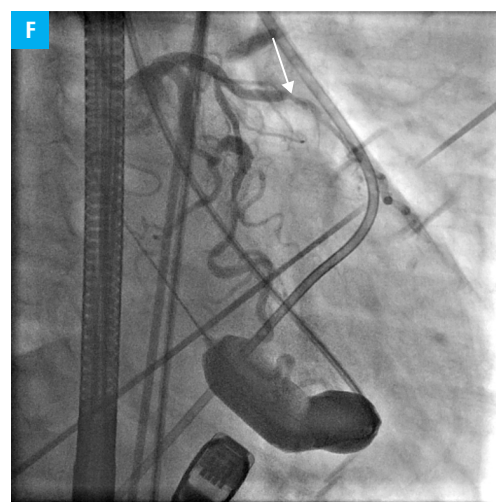
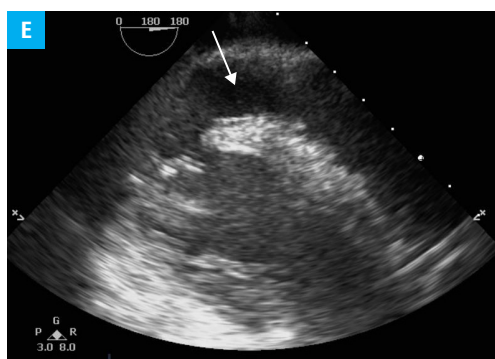
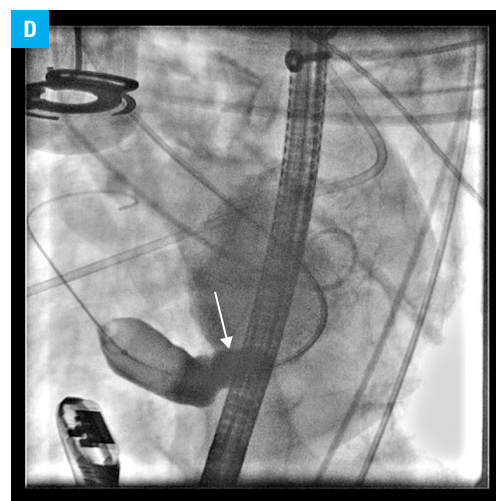
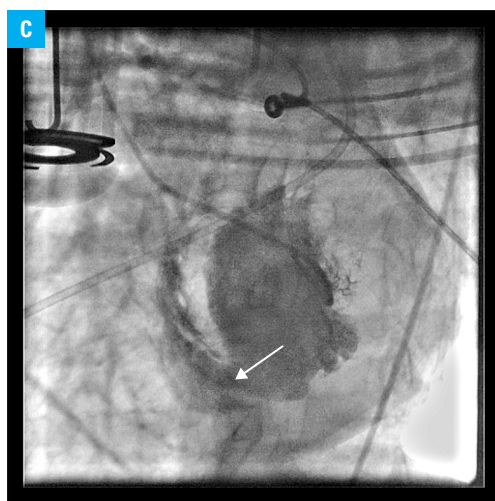
Published online:
September 17, 2019.

Pol Arch Intern Med. 2019;
129 (11): 830-832

doi:10.20452/pamw.14976

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FIGURE 1 Left ventricular angiography showing ventricular septal rupture (arrow) near the left ventricular apex (**C**); left ventricular angiography (**D**) and transesophageal echocardiography (**E**) showing no left-to-right cardiac shunt following balloon inflation in the ventricular septal rupture (arrows); coronary angiography showing occlusion in the mid part of the left anterior descending artery (**F**, arrow); suture on the apex of the heart (**G**, arrow) and recanalization of the ventricular septal rupture (**H**, arrow) on autopsy



inflated in the septum. As a result, the VSR was closed and the left-to-right cardiac shunt was stopped (**FIGURE 1D** and **1E**). Hemodynamic stability was achieved on a low dose of epinephrine and the pericardial hemorrhage was stopped. Afterwards, an occlusion in the mid part of the left anterior descending artery was revealed (**FIGURE 1F**). The patient, with the balloon inflated in the VSR, was transferred to the operating room, where the surgeons sutured both the VSR and FWR (**FIGURE 1G**). Two days after the surgery, the patient was conscious and was recovering without catecholamine infusion. Unfortunately, she died 2 days later. Autopsy revealed recanalization of the VSR (**FIGURE 1H**).

Cardiac arrest with PEA in a patient with STEMI is an extremely rare clinical situation,⁵ in which FWR should always be suspected. Therefore, to confirm any clinical suspicion, transthoracic echocardiography is mandatory, followed by pericardiocentesis. When the removal of pericardial effusion does not result in hemodynamic stability, other causes of cardiogenic shock should be considered. In our patient, we found VSR near the left ventricular apex that was not suitable for percutaneous closure. Therefore, we performed a transcatheter balloon inflation in the ruptured septum.

To the best of our knowledge, this is the first description of an emergency procedure with

temporary balloon inflation in the septum that fully closed the VSR, rapidly improved the patient's hemodynamics, and made it possible to perform a cardiac surgery.

ARTICLE INFORMATION

ACKNOWLEDGMENTS This work was supported by a grant from Jagiellonian University Medical College (N41/DBS/000006, to JZ). JZ was assigned an online identifier (ORCID iD, <https://orcid.org/0000-0002-4374-3694>).

CONFLICT OF INTEREST None declared.

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HOW TO CITE Molek P, Włodarczyk A, Gajos G, et al. Simultaneous cardiac free-wall rupture and ventricular septal rupture following acute myocardial infarction treated with emergency balloon inflation. *Pol Arch Intern Med*. 2019; 129: 830-832. doi:10.20452/pamw.14976

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