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Giant apical pseudoaneurysm in the left ventricle as a late complication of Takotsubo syndrome: Not a benign course of the disease

Short title: Giant left ventricular pseudoaneurysm in Takotsubo Syndrome

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Left ventricular pseudoaneurysm (LVP) is a rare and life-threatening complication that is most often reported after myocardial infarction or cardiac surgery but can also occur after bacterial endocarditis, chest trauma, or myocardial tumor invasion [1, 2]. The LVP develops when a zone of free wall cardiac rupture is contained by the pericardium or scar tissue without myocardial tissue involvement while fatal rupture can be prevented by urgent surgical aneurysmectomy [3]. Patients with LVP treated with surgery have a mortality rate of 23% while those treated medically die in 48% of cases [4]. To the best of our knowledge, LVP as a late complication of Takotsubo syndrome (TS) has not been described in literature while Jaguszewski et al. reported on ventricular rupture as an early complication of TS thus confirming that this entity might not always have a benign course [5].

A 77-year old female with a medical history of arterial hypertension, non-insulin-dependent type 2 diabetes mellitus, dyslipidemia, hypothyreosis, and rheumatoid arthritis presented with crushing substernal chest pain that started 5 hours earlier. Her ECG showed sinus tachycardia (104 bpm) and diffuse ST segment elevations in inferior and anteroseptal leads. She reported that the symptoms started following an intense emotional event (a large family reunion dinner). Cardioselective biomarkers were markedly high (high-sensitivity troponin I level of 4894 ng/L and NT-proBNP level of 4221 pg/ml). The diagnosis of acute coronary syndrome was made and urgent invasive work-up was indicated. We performed a coronary angiography with left ventriculography that revealed akinetic/dyskinetic midsegment and apical parts of the left ventricle (LV) accompanied by apical ballooning and hyperkinesis of basal LV segments, consistent with TS diagnosis (Figure 1; Supplementary material, *Video S1*) with no obstructive coronary artery disease (Figure 1B). Furthermore, a transthoracic echocardiographic examination (TTE) showed the formation of inferoapical mural thrombus (Figure 1C, far left), reduced left ventricular ejection fraction (LVEF) of 42% thus the patient was discharged with an oral anticoagulant in full therapeutic dose along with optimal medical therapy. Eight weeks later, the patient received a follow-up TTE that showed a recovery of systolic function (LVEF 53%) with complete resolution of the thrombus while the presence of a small inferoapical LV aneurysm was noted (Figure 1C, middle image).

Eight months after this first hospitalization, she presents again to the ED with worsening dyspnoea upon minimal exertion, dry cough, and generalized weakness. An NT-proBNP was 3041 pg/mL and urgent TTE was performed. It showed a gigantic oval non-contractile structure connected to LV *via* a narrow neck (Figure 1C, far right). The LVEF was preserved and ~55%. Coronary angiography and left ventriculography were performed again - coronary arteries were patent while ventriculography showed a massive oval structure connected to LV *via* a narrow neck (Figure 1D, Supplementary material, *Video S2*). The cardiac magnetic resonance showed that the pseudoaneurysm wall dominantly consisted of a “sickle-like“ mural thrombus up to 15 mm in size surrounded with a thin layer of visceral pericardium up to 2 mm with the absence of perfusion thus the diagnosis of giant LVP was made (Supplementary material, *Video S3*). Due to the high risk of spontaneous rupture, the patient was referred for urgent surgical aneurysmectomy that was performed by using a double-layer heterologous pericardial patch (Figure 1E). The patient was discharged six days after the surgery and she was followed-up for one year.

Supplementary material

Supplementary material is available at https://journals.viamedica.pl/kardiologia_polska.

Article information

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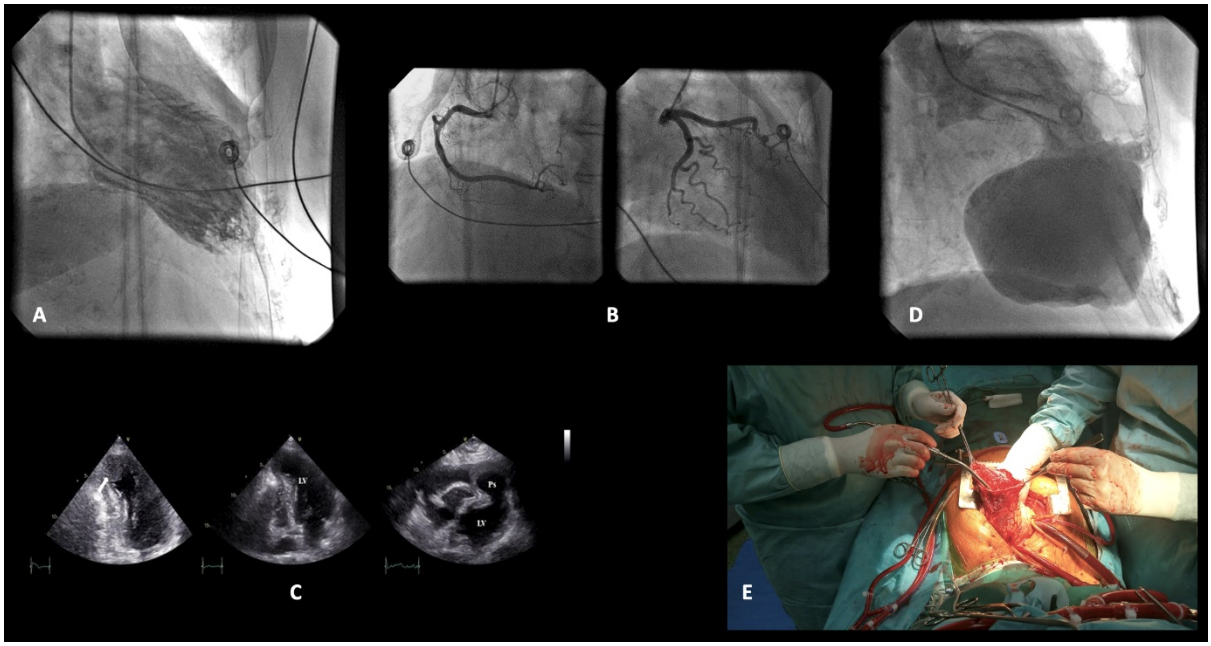

Figure 1. A. Left ventriculography performed at the first hospital admission showed apical ballooning with basal hypercontractility consistent with the diagnosis of Takotsubo syndrome as well as the presence of contrast filling defect in inferoapical region suspicious for thrombus formation. **B.** Coronary angiography performed at the first hospital admission showed normal coronary anatomy without obstructive atherosclerotic disease. **C.** Images from transthoracic echocardiographic examination (TTE) performed at first hospital admission showing a left ventricular (LV) thrombus (22 × 28 mm, white arrow) at the far left image followed by the complete dissolution of thrombus 8 weeks later later at the follow-up TTE (middle image) and huge oval non-contractile structure connected to LV *via* narrow neck surrounded by the isoechogenic wall up to 17 mm of thickness visualized at the second hospitalization. **D.** Left ventriculography performed at the second hospitalization revealing an inferoapical pseudoaneurysm structure 72 × 65 mm in size with the neck diameter measuring approximately 21 mm. **E.** Surgical resection of the pseudoaneurysm (aneurysmectomy) and closure of the LV by the double-layered pericardial patch was performed by the cardiac surgeons