

Images in Cardiovascular Medicine



Defining Coronary Artery Perforation with Ultrasound Contrast Agent

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OPEN ACCESS

Received: May 25, 2018

Revised: Jun 20, 2018

Accepted: Jul 17, 2018

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Conflict of Interest

The authors have no financial conflicts of
 interest.

Author Contributions

Validation: Azrin M, Khalid S; Visualization: Lee
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After recanalization and stenting a chronic total occlusion of the left anterior descending coronary artery (LAD), coronary artery perforation (CAP) was detected in the LAD (**Figure 1A** and **Supplementary Video 1**), but it was not definitive whether this CAP emptied into the pericardium (Ellis classification III) or into the right ventricle (RV) (Ellis classification III cavity spilling).¹⁾ Bedside echocardiography showed no definite pericardial effusion. Despite prolonged balloon inflation, spontaneous sealing was not achieved. To define the direction of the CAP, 2 mL of ultrasound contrast agent (UCA), Definity (Lantheus Medical Imaging, North Billerica, MA, USA) was injected into the LAD. The rapid and dense appearance of UCA in the RV on echocardiography confirmed that the CAP was connected to the RV (**Figure 1B** and **Supplementary Video 2**). Because there was felt to be no risk of cardiac tamponade the procedure was completed. The patient was hemodynamically stable at discharge and there were no subsequent complications at 1-month follow-up.

Conservative management for this type of CAP is debated, but only a medium or large sized fistula is considered as a cause of heart failure and myocardial ischemia.²⁾

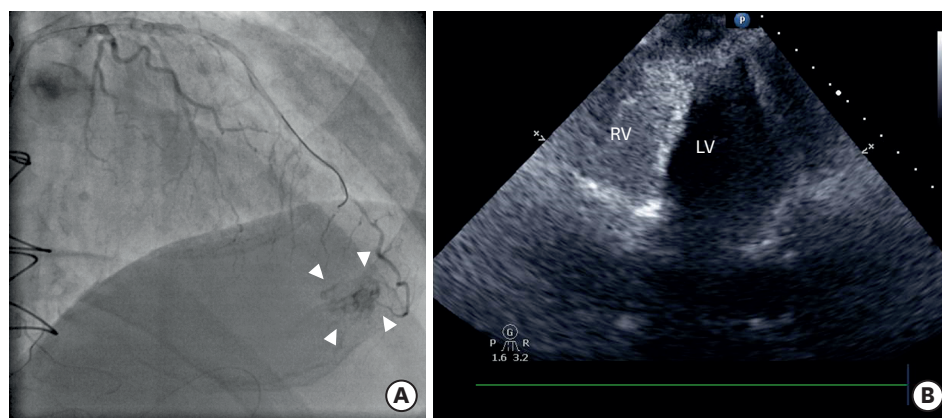


Figure 1. Coronary angiography and contrast echocardiography. (A) Post-stenting angiography shows CAP in the LAD (white arrowheads), but it is not definitive whether this perforation emptied into the pericardium (Ellis classification III) or into the RV (Ellis classification III cavity spilling). (B) After injection of UCA into the LAD, the rapid and dense appearance of UCA in the RV on echocardiography confirms the CAP of Ellis classification III cavity spilling. CAP = coronary artery perforation; LAD = left anterior descending coronary artery; LV = left ventricle; RV = right ventricle; UCA = ultrasound contrast agent.

UCA is used for better endocardial border delineation and assessment of intracardiac blood flow. Recently, the U.S. Food and Drug Administration removed the contraindications for use in patients with cardiac shunts and for administration by intra-arterial injection. Despite a concern about systemic embolization of UCA, several studies have demonstrated the safety³⁾⁴⁾ and we used only a small amount of UCA in this case. This case illustrates the utility of UAC for the diagnosis of CAP into a ventricular chamber.

SUPPLEMENTARY MATERIALS

Supplementary Video 1

Angiography demonstrates perforation of the septal branch of the left anterior descending coronary artery.

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Supplementary Video 2

Injection of contrast in the septal branch demonstrates dense opacification of the right ventricle and confirms that the exit site of the septal perforation is into the right ventricle and not into the pericardium.

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