

Images in Cardiovascular Disease



A Novel Use of Echocardiographic Contrast in Cardiac Tamponade

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Conflict of Interest

The authors have no financial conflicts of interest.

Lumason (sulfur hexafluoride lipid-type A microspheres) (Bracco Diagnostic, Monroe Township, NJ, USA) is an ultrasound enhancing agent approved for patients with suboptimal echocardiographic windows to define endocardial borders.¹⁾ Microspheres reflect ultrasound waves enhancing the image.²⁾ We present a case where Lumason successfully identified a myocardial perforation leading to cardiac tamponade.

75-year-old male presented with an inferior wall ST-segment elevation myocardial infarction and underwent emergent percutaneous coronary intervention of the right coronary artery. During intervention, he developed unstable complete heart block and required a 6-French non-balloon tip transvenous pacemaker (TVP). He converted to normal sinus rhythm post-revascularization. TVP was removed a few hours later after resolution of conduction issues. Upon removal, hemodynamic collapse occurred and the patient developed facial fullness and dyspnea. Emergent bedside transthoracic echocardiogram demonstrated a large pericardial effusion with right atrial and ventricular diastolic collapse concerning for cardiac tamponade (**Figure 1, Movie 1**). Emergent pericardiocentesis removed 1.5L of sanguineous fluid, concerning



Figure 1. Transthoracic echocardiogram after transvenous pacemaker removal. Subcostal view showing large pericardial effusion with coagulum (white arrow) in pericardial space and right ventricular collapse consistent with cardiac tamponade physiology.

Author Contributions

Conceptualization: Rao A, Lala V; Data curation: Rao A; Resources: Rao A; Visualization: Rao A; Writing - original draft: Rao A, Rao L, Mohan J; Writing - review & editing: Rao A, Rao L, Parekh A, Mohan J.

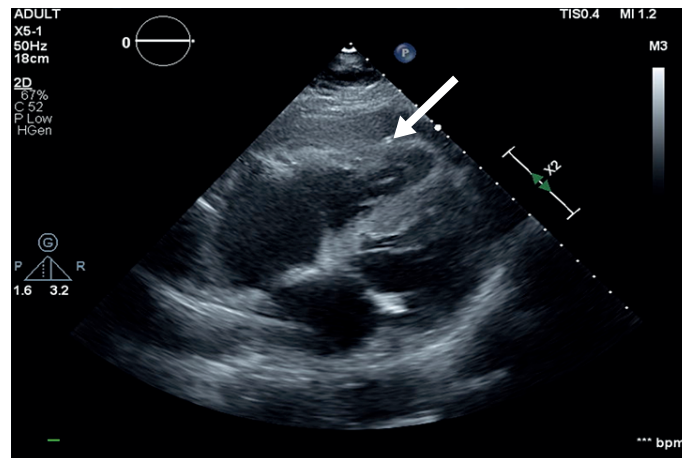


Figure 2. Transthoracic echocardiogram after transvenous pacemaker removal. Subcostal view showing improvement of pericardial effusion after pericardial drain placement (white arrow) with re-expansion of right ventricle.

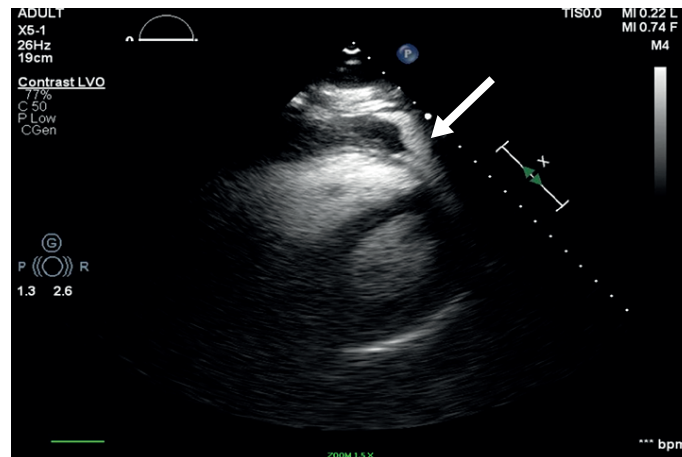


Figure 3. Transthoracic echocardiogram with Lumason ultrasound enhancing agent. Subcostal view showing large pericardial effusion with active Lumason extravasation (white arrow) into pericardial space consistent with right ventricular free wall perforation.

for intravascular fluid. Pericardial drain was placed (**Figure 2**), and pericardial pressures were increased at 25 mmHg (normal <10 mmHg). Despite initial improvement, his hemodynamics declined. Repeat transthoracic echocardiogram with Lumason displayed active Lumason extravasation into the pericardial space (**Figure 3**, **Movie 2**); thus, confirming our suspicion for right ventricular free wall perforation. Cardiothoracic surgery performed an emergent pericardial window with removal of hemorrhagic effusion (**Figure 4**). Surgery visualized a right ventricular anterior wall perforation at the former TVP site and sealed it with a fibrin sealant collagen patch. The patient did well post-operatively and discharged home days later.

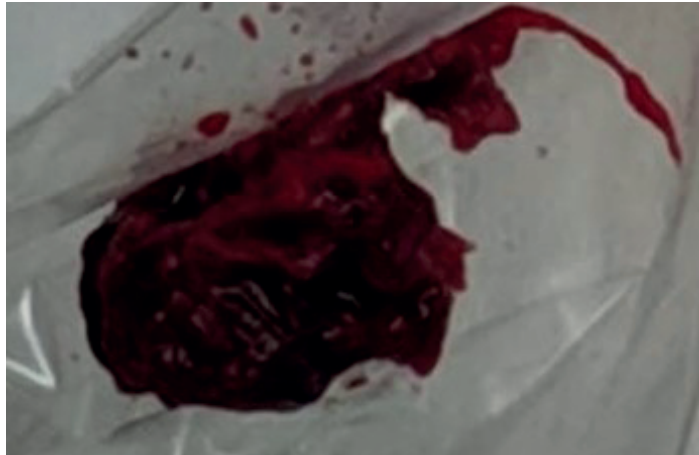


Figure 4. Hemorrhagic effusion removed during pericardial window. Clotted hemorrhagic effusion due to the presence of coagulation factors in the effusion.

SUPPLEMENTARY MATERIALS

Movie 1

Transthoracic echocardiogram after transvenous pacemaker removal. Subcostal view showing large pericardial effusion with coagulum in pericardial space and right atrial diastolic collapse consistent with cardiac tamponade physiology.

[Click here to view](#)

Movie 2

Transthoracic echocardiogram with Lumason ultrasound enhancing agent. Subcostal view showing large pericardial effusion with active Lumason extravasation into pericardial space consistent with right ventricular free wall perforation.

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REFERENCES

1. Bracco Diagnostics Inc. Lumason® [package insert]. Monroe Township, NJ: Bracco Diagnostics Inc.; 2014.
2. Porter TR, Mulvagh SL, Abdelmoneim SS, et al. Clinical applications of ultrasonic enhancing agents in echocardiography: 2018 American Society of Echocardiography Guidelines Update. *J Am Soc Echocardiogr* 2018;31:241-4.