Giant right atrial thrombus in association with a medical device is rare\textsuperscript{1,2} but when present poses the threat of massive pulmonary embolism. Surgical resection, catheter embolectomy, and thrombolysis are the principal options for management. We present the case of a 60-year-old man with bilateral pulmonary embolism and a 6-cm right atrial thrombus adherent to an implantable cardioverter-defibrillator (ICD) wire. We treated him successfully with a prolonged intravenous infusion of catheter-directed, low-dose tissue plasminogen activator therapy.

Two weeks before admission, he had an acute myocardial infarction and had severely occlusive atherosclerotic coronary disease on coronary angiography. However, a culprit thrombotic lesion to account for the acute myocardial infarction could not be identified. Four days later, the patient survived an in-hospital ventricular fibrillation-induced cardiac arrest, after which an ICD was placed. He was discharged on aspirin 325 mg daily, clopidogrel 75 mg daily, and warfarin 5 mg daily but was nonadherent to this medical regimen.

The patient was admitted to our hospital 4 days after prior hospital discharge with a chief complaint of sudden onset of shortness of breath. The physical examination revealed a man in mild distress with a blood pressure of 118/62 mm Hg, heart rate of 103 bpm, respiratory rate of 22 breaths/min, and peripheral blood oxygen saturation level of 95% on 3 L of oxygen per nasal cannula. He had a right ventricular heave and an accentuated pulmonary component of the second heart sound.

**Figure.** Echocardiographic capture of a giant right atrial thrombus. A, Parasternal long-axis view of the right ventricular inflow tract using bedside 2D transthoracic echocardiography reveals a large, complex thrombus (arrows) adherent to an ICD wire. The clot traverses from the right atrium (RA) through the tricuspid valve (asterisk) into the right ventricle (RV). B, Transesophageal echocardiography provides enhanced resolution of the clot structure. C, Still image captured during diastole demonstrates full extension (arrows) of the clot that measures approximately 6×1.5 cm. D, Right ventricular inflow tract images acquired by transthoracic echocardiography after the completion of catheter-delivered tissue plasminogen activator (2 mg/h) administered over 24 hours reveal full clot dissolution.
sound. The patient’s Troponin I was elevated, at 0.35 ng/mL. Bedside echocardiography demonstrated a 6×1.5 cm partially recanalized thrombus-in-transit across the tricuspid valve during diastole (Figure A through C; see online-only Data Supplement).

Owing to the patient’s recent acute myocardial infarction, depressed left ventricular ejection fraction of 35%, elevated pulmonary artery blood pressure (60/35 mm Hg), and remote history of prior coronary artery bypass graft surgery, the on-call surgeon thought that the perioperative risk was insurmountable and declined to perform right atrial thrombectomy. After 3 days without improvement on continuous infusion with intravenous heparin alone, target partial thromboplastin time was 60 to 80 seconds, we proceeded with catheter-directed thrombolysis. The target partial thromboplastin time of intravenous heparin was reduced (50 seconds), and we administered tissue plasminogen activator by continuous infusion (2 mg/h) over 24 hours via a 4F, 11-cm catheter placed fluoroscopically into the mid superior vena cava. This therapy resulted in complete dissolution of the ICD-adherent right atrial clot (Figure D). There were no major bleeding complications, and the patient was discharged home on warfarin therapy without supplemental oxygen after counseling on the critical importance of medication adherence.

Prior reports suggest only mixed results with systemically administered thrombolytic therapy. 3, 4 To the best of our knowledge, this case represents the first report of catheter-directed low-dose thrombolysis for successful treatment of giant right atrial thrombus. We thought that the risk of bleeding associated with a large dose of lytic over a short period of time could be attenuated by catheter-directed low-dose lytic therapy over 24 hours. We placed special attention on the venous catheter placement in the mid superior vena cava, which we confirmed by fluoroscopy, to maximize efficacy and safety. We conclude that one option to consider for the treatment of giant right atrial thrombus is catheter-directed, continuous, prolonged infusion of thrombolysis.

**Disclosures**

Dr Goldhaber is a consultant for Genentech Inc.

**References**

Catheter-Directed Thrombolysis for Giant Right Atrial Thrombus
Bradley A. Maron, Samuel Z. Goldhaber, Anthony C. Sturzu, David K. Rhee, Bilal S. Ali, Pinak
Bipin Shah and James M. Kirshenbaum

doi: 10.1161/CIRCIMAGING.109.906487

The online version of this article, along with updated information and services, is located on the
World Wide Web at:
http://circimaging.ahajournals.org/content/3/1/126

Data Supplement (unedited) at:
http://circimaging.ahajournals.org/content/suppl/2010/01/20/3.1.126.DC1

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published
in Circulation: Cardiovascular Imaging can be obtained via RightsLink, a service of the Copyright Clearance
Center, not the Editorial Office. Once the online version of the published article for which permission is being
requested is located, click Request Permissions in the middle column of the Web page under Services. Further
information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Circulation: Cardiovascular Imaging is online at:
http://circimaging.ahajournals.org//subscriptions/
Supplemental Figure 1. Echocardiographic cine images of a giant right atrial thrombus.

(A) Transesophageal and a (B) RV inflow tract view acquired by TTE reveal a highly mobile and ‘floppy’ thrombus in transit across the tricuspid valve.