



Left Atrial Wall Hematoma After Radiofrequency Ablation for Atrial Fibrillation

Sarah Kelly¹
Simon G. Bicknell²
Sudheer Sharma³

Atrial fibrillation, the most common cardiac arrhythmia and an important cause of stroke, is increasingly being managed with radiofrequency ablation of the pulmonary vein ostia because many ectopic beats originate at this site. Radiologists viewing images after ablation may identify complications such as pulmonary vein stenosis. We report a case of left atrial intramural hematoma after radiofrequency ablation.

Case Report

A 67-year-old woman had ectopic atrial tachycardia and atrial fibrillation intolerant of standard rate control and rhythm control strategies. After an electrophysiologic consultation, a permanent pacemaker was implanted in July 2004, and transvenous radiofrequency ablation of the atrioventricular node was scheduled. Marked atrial tachycardia was found during an electrophysiologic study in August 2004, and it was determined that discrete radiofrequency ablation of the atrial reentrant tachycardia would be more beneficial than atrioventricular node ablation. Electrophysiologic mapping in September 2004 showed inferoposterior left atrial tachycardia. The electrophysiologist was unable to ablate the focus for technical reasons and abandoned the attempt after several hours. The atrioventricular node was later ablated. The procedure required 2 transeptal punctures under fluoroscopic guidance. The patient was discharged from the hospital that evening. Over the next 2 days she began to feel nonspecifically unwell with fatigue, lethargy, weakness, and headaches. She denied the existence of specific cardiac symptoms. She was taking warfarin and sotalol on a weaning schedule. The medical history included breast carcinoma managed with lumpectomy and radiation therapy 7 years previously. All laboratory values were normal except that the international

normalized ratio was subtherapeutic at 1.2. A transthoracic echocardiogram showed a smoothly contoured, 6 × 3 cm mass within the posterior wall of the left atrium (Fig. 1A). CT showed a homogeneous, hyperdense, nonenhancing, intramural mass consistent with hematoma (Figs. 1B and 1C). There was no evidence of stenosis of the pulmonary veins (not shown) as a result of the hematoma.

Discussion

Transcatheter radiofrequency ablation has gained popularity as nonpharmacologic therapy for cardiac arrhythmias. Some forms of atrial fibrillation can be managed in this way because it has been shown that most of the ectopic beats originate within sleeves of atrial myocardium that extend into the pulmonary veins [1]. The treatment is desirable because when successful it allows patients to discontinue antiarrhythmic and anticoagulation medications.

Transcatheter radiofrequency ablation typically is performed through a percutaneous approach under fluoroscopic guidance. The foramen ovale is probed, or a transeptal puncture is made if a patent foramen ovale is absent. Once the left atrium has been accessed, the pulmonary veins are mapped for identification of electrically conducting myocardial fascicles. Ablation of these fascicles with radiofrequency energy is performed at or just within the pulmonary vein ostia to reduce the risk of stenosis [2].

Because transcatheter radiofrequency ablation is a relatively new procedure, the gamut of complications has yet to be identified. Immediate complications reported include pericardial effusion, embolic events, pulmonary vein dissection, and bleeding secondary to anticoagulation [3–5]. A complication that manifests later is pulmonary vein stenosis, which is mild in most cases but when severe can result in pulmonary venoocclusive disease, pulmonary vein thrombosis, and venous infarction [6, 7].

Keywords: ablation, atrium, CT, radiofrequency

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¹Department of Radiology, University of British Columbia, Vancouver, BC, Canada.

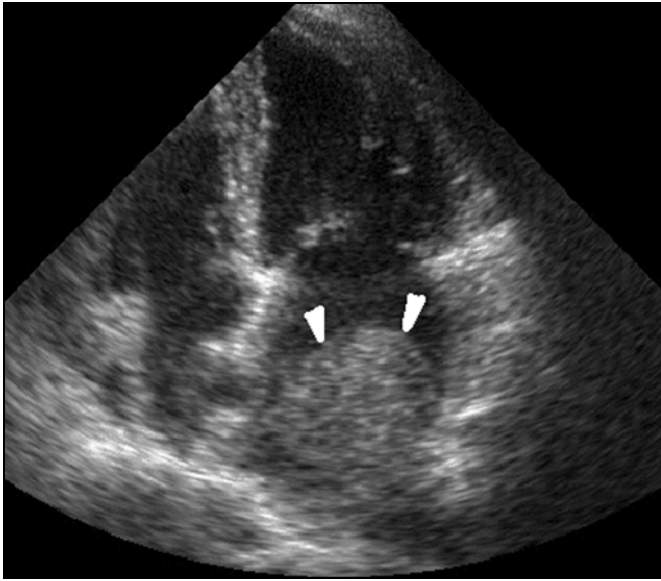
²Department of Radiology, Lions Gate Hospital, 231 E 15th St., North Vancouver, BC V7L 2L7, Canada. Address correspondence to S. G. Bicknell (sbicknel@interchg.ubc.ca).

³Department of Cardiology, Lions Gate Hospital, Vancouver, BC, Canada.

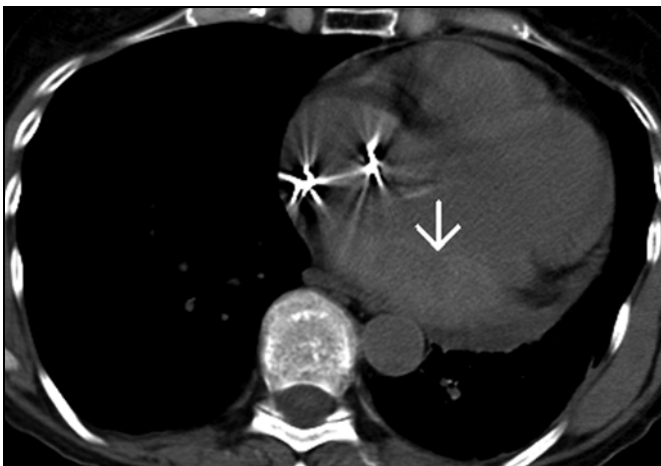
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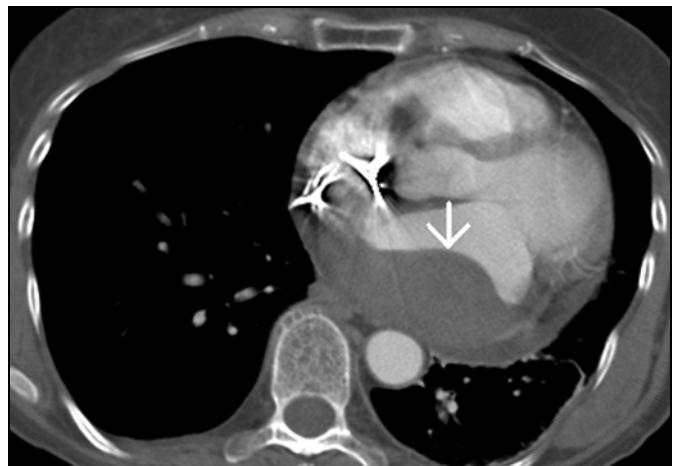
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A



B



C

Fig. 1—67-year-old woman with intramural hematoma in left atrium after attempted radiofrequency ablation of pulmonary vein ostia.
A, Transthoracic echocardiogram in apical view shows smoothly contoured hematoma (*arrowheads*) in posterior left atrial wall.
B and **C**, CT scans through chest show large intramural hematoma within posterior left atrium that is hyperdense on unenhanced image (*arrow*, **B**) but more readily visible after IV administration of contrast medium (*arrow*, **C**). Note pacer wire in right atrium.

Treatment failure with persistent or recurrent atrial fibrillation occurs in less than 30% of cases with careful patient selection.

Our patient became intolerant of her medications and needed rate control. A permanent pacemaker was implanted first, and the initial plan was atrioventricular node ablation. The possibility of ablation of the focal atrial tachycardia led to rescheduling for a second procedure. The ectopic tachycardia was mapped to the inferoposterior aspect of the left atrium, but the ablation attempt was unsuccessful. The procedure required two transseptal punctures of the interatrial septum. The ablation attempt was abandoned, and the atrioventricular node was ablated to allow nonpharmacologic rate control with the pacemaker. Transesophageal echocardiography was

not used to aid the transseptal puncture. Although transthoracic echocardiography was useful for initial documentation of the hematoma, CT depicted not only the size but also the extent of the mass. Knowledge of these features was critical in this case to ensure the pulmonary veins were not compromised. Both imaging techniques but especially CT showed that the hematoma was intramural and not intraluminal.

To our knowledge, no cases of left atrial intramural hematoma have been reported. Our patient's symptoms were nonspecific, and the mass found with echocardiography was not suspected before the examination. We speculate that the standard mapping and ablation catheters were probably not the cause of the intramural hematoma given the precision of

these instruments. It is more probable that damage to the left atrial wall occurred during transseptal puncture and caused the hematoma. At follow-up evaluation, the patient had had no further sequelae, was symptom-free, and had a therapeutic international normalized ratio. The hematoma continued to contract but did not resolve.

We conclude that intramural atrial hematoma is a possible complication of radiofrequency ablation for atrial fibrillation, particularly in patients taking anticoagulants. Routine use of transesophageal echocardiography for precise guidance of transseptal puncture may be a method for mitigating the risk of this complication. CT is best suited for documenting the extent of such hematomas.

Atrial Hematoma After Radiofrequency Ablation

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