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EDITORIAL COMMENT

Left Atrial Intramural Hematoma After Radiofrequency Catheter Ablation

Beware of the Unexpected*

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Radiofrequency catheter ablation (RFCA) is a common method for the treatment of symptomatic and/or drug-refractory supraventricular tachycardia and is increasingly used successfully as a therapeutic option for supraventricular tachycardias related to accessory pathway connections (1). Left-sided accessory pathways are more common in clinical practice, and these patients are usually referred for catheter ablation. The incidence of major complications associated with RFCA of left atrial (LA) arrhythmias has been estimated to be as high as 6%, but bleeding complications, such as intramural hematoma, are rare (2).

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LA intramural hematoma (LAIH) is an infrequent, but potentially severe complication that may occur either spontaneously or iatrogenically. It is defined as a false, blood-filled cavity that is created through a gap in the mitral or tricuspid annulus and extending to the interatrial septum or LA walls. LAIH has been described as a rare complication associated with mitral valve surgery, aortic valve replacement, coronary artery bypass grafting, and cardiac mass excision (3–6). Nonsurgical causes of LAIH are related to myocardial infarction, blunt cardiac trauma, percutaneous coronary intervention, and RFCA (7–10). There have also been cases of spontaneous LAIH without any intracardiac manipulations, with a postulated underlying disorder of mitral annular calcification, systemic amyloidosis, or no apparent etiological factor (11–13).

In this issue of *JACC: Case Reports,* Giudicatti et al. (14) present the case of a 43-year-old woman who experienced pleuritic chest pain immediately following RFCA of a symptomatic left posterolateral accessory pathway. Transthoracic echocardiography demonstrated a large mass, almost entirely occupying the left atrium. Subsequent chest computed tomography (CT) and transesophageal echocardiography (TEE) revealed an intramural hematoma arising from the posterolateral LA wall. The patient became hemodynamically unstable and required emergency surgery. Subsequent follow-up echocardiography at 6 h and at 24 h post-operatively demonstrated partial reaccumulation of the mass. The patient was managed conservatively in light of her stable hemodynamic status and because of the high-risk of surgical reintervention. The patient improved and remained in sinus rhythm, and the mass resolved completely by 6 weeks. The case described by Giudicatti et al. (14) provides valuable insights into the management of a rare complication post-RFCA and highlights the usefulness of a hemodynamically based approach in managing this potentially life-threatening complication.

The true incidence of LAIH is poorly understood because most of the available information is based on individual cases, and the presentation of LAIH with premature death cannot be excluded. Nevertheless, LAIH has been increasingly reported secondary to the use of RFCA in the last decade because of the routine use of TEE monitoring, improvements in diagnostic detectability, and an increase in the frequency of catheter-based procedures (6). LAIH caused by RFCA may result from

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catheter manipulation within or adjacent to the left atrium or secondary to a pulmonary vein laceration. It may be induced by mechanical force and/or thermal energy causing damage to the LA walls, thus resulting in the creation of an endocardial flap (6). In the present case, Giudicatti et al. (14) postulate that mechanical trauma to the lateral and posterior mitral annulus may have resulted in epicardial and endocardial separation of the left atrium that created a dissection flap. It is worthwhile to note that accessory pathway ablation, as performed in the present case (14), focuses on a small segment of the mitral annulus as compared with atrial fibrillation ablation, which may be associated with higher thermal energy and increased manipulation of the LA walls. To avoid such complications, TEE or intracardiac echocardiography can be used to guide the ablation procedure. In addition, avoidance of forceful catheter manipulation and overdistention along the posterior LA wall and the vulnerable atrioventricular groove can be important for the prevention of this injury.

As highlighted by Giudicatti et al. (14), a multimodal imaging approach can be extremely valuable in the noninvasive evaluation of an unidentified LA mass. A presumptive diagnosis can be made on the basis of transthoracic echocardiography, TEE, CT, and cardiac magnetic resonance. TEE or intracardiac echocardiography can be useful for early recognition, whereas CT and cardiac magnetic resonance can be useful adjunctive tools for accurate anatomic identification and evaluation of the extent of the suspected hematoma. Differential diagnostic considerations include LA mass, localized pericardial effusion with cardiac tamponade, and LA thrombus. A dissecting hematoma secondary to coronary artery perforation is also an important differential diagnosis in patients undergoing percutaneous coronary intervention.

No definitive protocols exist to help guide the management of this rare complication. In most cases, surgical intervention is undertaken if there is significant obstruction of blood flow leading to hemodynamic instability (15). Surgical repair is aimed at adequately evacuating the hematoma, obliterating the false lumen, and addressing the entry point to prevent recurrence. In stable and asymptomatic patients with LAIH, a conservative approach under close supervision and with serial echocardiographic imaging seems to be appropriate, with reported outcomes of natural resolution of the hematoma over time (10). In the present case (14), the decision for operative intervention was guided by the patient's deteriorating hemodynamics. Interestingly, there was a partial reaccumulation of the mass, which was managed conservatively because of the patient's stable hemodynamic status, and this showed complete resolution of the hematoma.

LAIH is an exceptionally rare but potentially life-threatening complication of interventional procedures such as RFCA. Operators should be familiar with the multimodality imaging techniques that can be used for the early recognition of acute complications and with the hemodynamically based approach to guide further management.

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