

Is it a thrombus or a tumor? An imaging dilemma for clinicians

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ABSTRACT

Atrial fibrillation, the most common cardiac arrhythmia in the Western world, confers a 5-fold increase in stroke, mainly due to thrombus formation in the left atrial appendage. Early rhythm control is often beneficial in reducing adverse cardiovascular events in higher-risk populations. Here, we present a patient who was found to have a 1 cm stalk-like lesion in the left atrial appendage on transesophageal echocardiogram prior to electrical cardioversion. Using multiple cardiac imaging modalities, including cardiac magnetic resonance imaging and computed tomography, the mass was eventually determined to be a chronic resolving thrombus.

KEYWORDS: atrial fibrillation; left atrial appendage thrombus; transesophageal echocardiogram; stalk lesion; anticoagulation

INTRODUCTION

Atrial fibrillation (AF) is the most common cardiac arrhythmia in Western countries, with a lifetime incidence estimated at 1 in 3 to 1 in 5 in white and black individuals, respectively [1]. AF confers a 4-5-fold increased risk of ischemic stroke [2]. The left atrial appendage (LAA) is particularly susceptible to stasis and subsequent thrombus formation, responsible for up to 90% of AF-associated strokes [3]. In patients with multiple cardiovascular (CV) comorbidities and diagnosed with new and persistent AF, an early rhythm control strategy is preferred as it confers a decreased risk of CV events [4]. Here, we present a case of a chronic left atrial appendage thrombus presenting as a stalk-like lesion on transesophageal echocardiogram in a patient pursuing an early rhythm control strategy for the management of newly diagnosed AF.

CASE PRESENTATION

A 73-year-old lady with a past medical history of hyperlipidemia, mitral valve prolapse with mitral regurgitation (MR), hypertension, and mild obstructive sleep apnea, without the need for continuous positive airway pressure (CPAP) presents to the cardiology clinic with palpitations, and dizziness for the last 2-3 weeks. Upon further evaluation, the patient was found to have new-onset AF (Figure 1). Pertinent medications included aspirin 81mg daily, simvastatin 20mg daily, and triamterene-hydrochlorothiazide

37.5-25mg daily. The biochemical evaluation was unremarkable, which included a normal high-sensitivity troponin and N-terminal pro-b-type natriuretic peptide (NT-proBNP). Given that the patient's CHA₂DS₂-VASc score was 3, she was started on apixaban. Furthermore, she was commenced on metoprolol succinate for rate control. Transthoracic echocardiogram (TTE) revealed a normal ejection fraction (60%), mild diastolic dysfunction, a mildly enlarged left atrium (measuring 34 mL/m²), and mild MR. The patient remained symptomatic [European Heart Rhythm Association (EHRA) AF score of 2], limiting her exercise tolerance and thus her functional status, despite an initial trial of rate control. After discussing the potential treatment options, the patient engaged in a shared decision-making process and ultimately elected to pursue a rhythm control strategy. Subsequently, a transesophageal echocardiogram (TEE) and electrical cardioversion were organized, with the TEE revealing a ~1.0 x 1.0 cm stalk-like echo density visualized in LAA with attachment to the coumadin ridge (Figure 2). Cardiac magnetic resonance (CMR) imaging was pursued to better characterize the mass, which revealed a 5 x 9 mm mass in the left atrial appendage with low signal on all sequences and no detectable contrast uptake (Figure 3). The decision was made to pursue anticoagulation for six weeks, with the subsequent cardiac computed tomography (CT) revealing an interval decrease in the size of the non-calcified mass, measuring 6 x 5 mm (Figure 4). Given the reduction in size and lack of calcification of the mass, it was most likely a resolving chronic thrombus. The patient remained on life-long anticoagulation without systemic side effects and metoprolol succinate for rate control.

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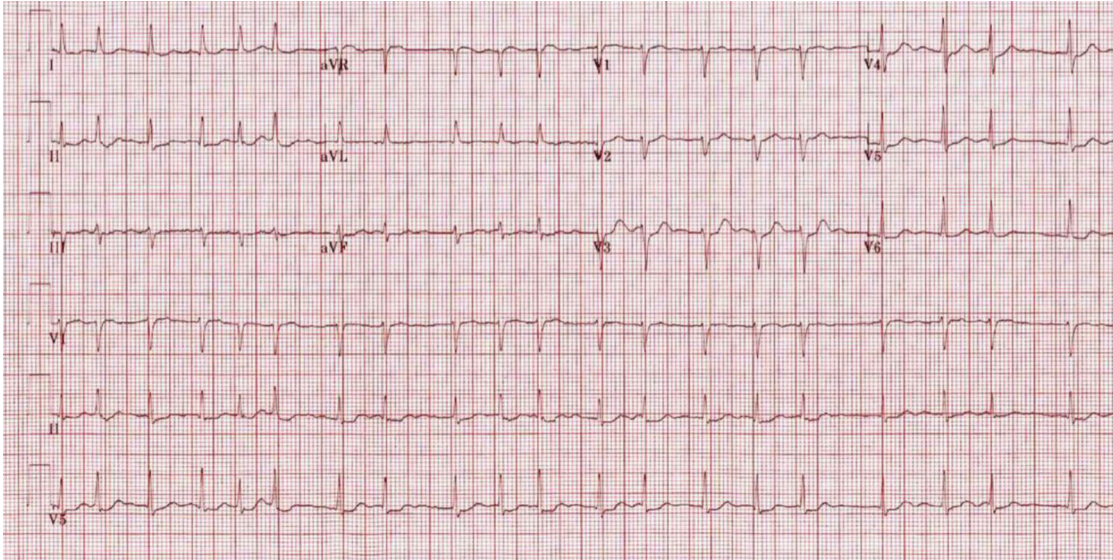


Fig. 1. Electrocardiogram demonstrating irregularly irregular intervals, without any p waves suggestive of atrial fibrillation.

DISCUSSION

The stalk-like lesion identified on TEE was initially concerning for an atypical thrombus or an atrial myxoma. Typically, myxomas are mobile masses with stalk-like attachments to the fossa ovalis or mitral annulus, but they can be located throughout the endocardium [5]. Thrombi are avascular and do not typically enhance on CMR. On cardiac CT, there generally are no differences between attenuation and calcification between myxomas and thrombi; however, shape, mobility, and prolapse are often helpful distinguishing features. Given the lack of significant enhancement on CMR and interval decrease in lesion size on anticoagulation, the mass was most consistent with a resolving thrombus.

A notable differential is the 'Coumadin ridge', a band-like embryological remnant in the left atrium between the left superior pulmonary vein and the LAA. It is a normal anatomic variant that has often been mistaken for a thrombus, resulting in unnecessary anticoagulation with Coumadin, hence earning the name 'Coumadin ridge'. The fixed location, lack of mobility, and unique linear structure usually distinguish the LA ridge from other masses [6]. More importantly, TEE, in the mid-esophageal view, may provide additional images for differentiation. In complex cases, cardiac MRI is recommended, utilizing T1- and T2-mapping with contrast to facilitate accurate diagnosis [7].

The decision to pursue sinus rhythm in this patient, employing a rhythm control strategy, aligns with current EHRA guidelines due to the persistence of symptoms despite rate control [8]. Previous studies have typically favored a more conservative approach utilizing rate control over a routine strategy of rhythm control. However, there is mounting evidence supporting the advantages of early rhythm control [9]. The findings from the Early Treatment of Atrial Fibrillation for Stroke Prevention Trial (EAST-AFNET 4) trial suggest that early initiation of rhythm control therapy for all patients presenting with AF correlated with a reduced risk of cardiovascular-related mortality and decreased hospitalizations due to heart failure. Furthermore,

a recent meta-analysis has corroborated these findings, providing evidence of the superiority of this treatment approach [4,10].

The current American College of Cardiology/American Heart Association/ Heart Rhythm Society (ACC/AHA/ACCP/HRS) practice guidelines recommend three weeks of uninterrupted therapeutic anticoagulation or imaging evaluation to exclude intracardiac thrombi before elective cardioversion [11]. However, the prevalence of LA thrombi in anticoagulated patients with AF is non-negligible at ~3% [12]. This renders the question of whether three weeks is a sufficient anticoagulation period before elective cardioversion and whether TEE should be required prior to the procedure. This case presents a unique instance of an atrial thrombus mimicking a cardiac myxoma and underscores the necessity of using various imaging techniques, such as TEE, cardiac MRI, and CT, to accurately diagnose cardiac masses.

It remains to be determined whether there is a benefit to a procedural intervention for the management of existing LAA thrombi. LAA thrombosis is generally considered a contraindication to percutaneous LAA occlusion due to the high risk of intra-procedural thrombus dislodgement [13]. However, there have been reports of successful percutaneous occlusion utilizing additional safety precautions, including a case series of 28 patients [14,15]. Prophylactic LAA resection in patients with AF undergoing cardiac surgery with a CHA₂DS₂-VASc score of ≥ 2 has been shown to significantly reduce the risk of future embolic events [16]. However, there has been no guidance on LAA resection conducted in patients with existing thrombi.

CONCLUSION

This case highlights the significance of identifying alternative etiologies of thrombi in the left atrial appendage, particularly in situations of diagnostic uncertainty, as management strategies may be contingent upon the underlying cause. In such scenarios, judicious utilization of multimodal imaging techniques proves advantageous.

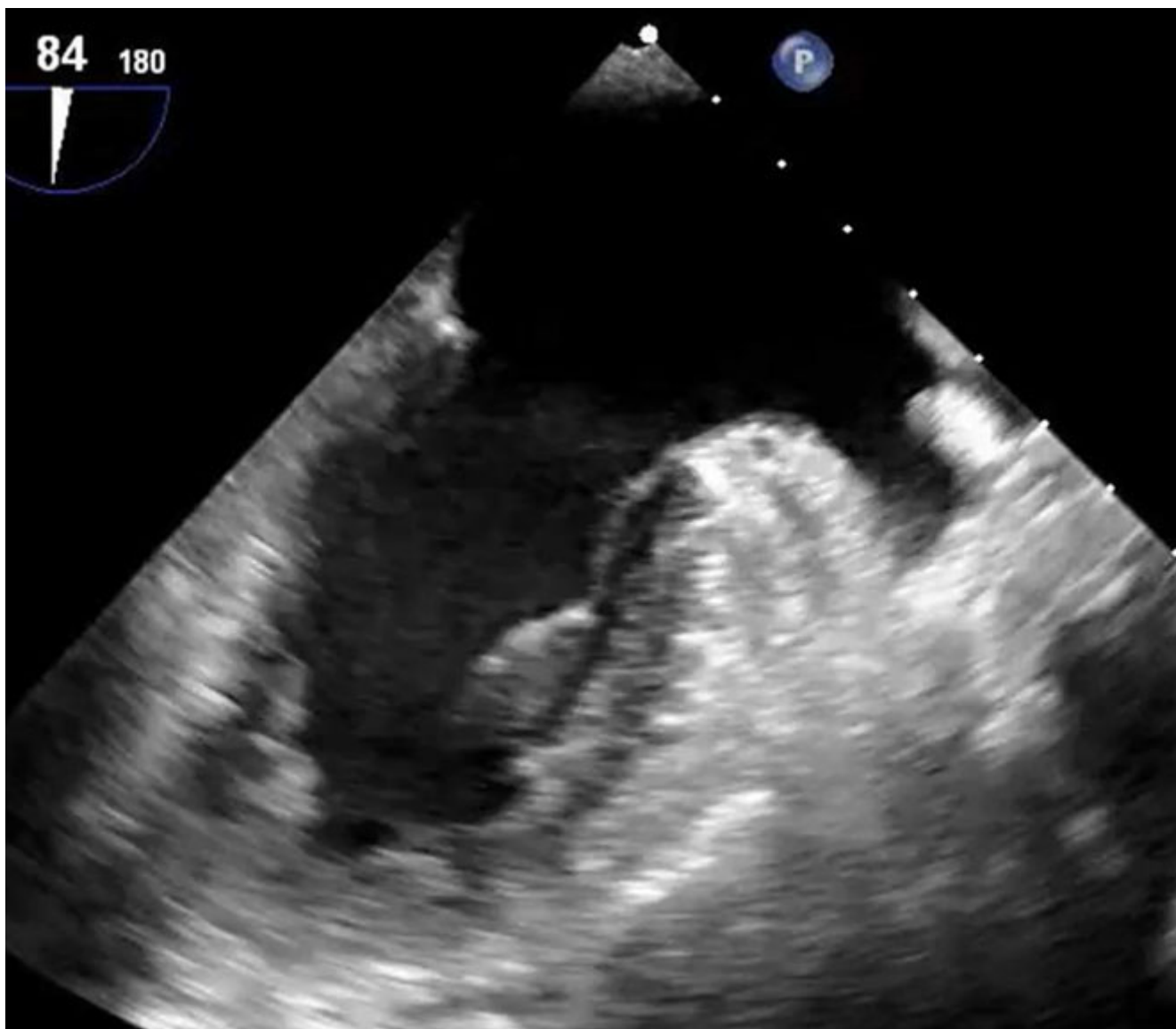


Fig. 2. Transthoracic echo demonstrating stalk-like lesion in the left atrial appendage.

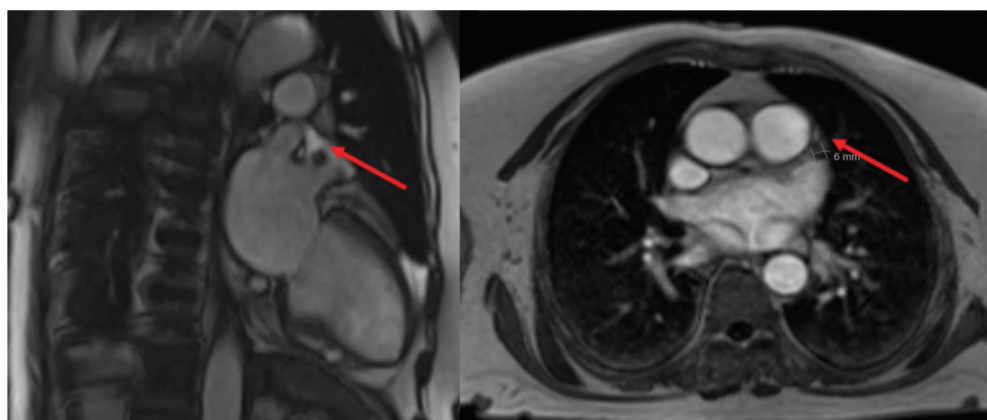


Fig. 3. Cardiac magnetic resonance imaging of the stalk-like lesion, measuring 5 mm x 9 mm.

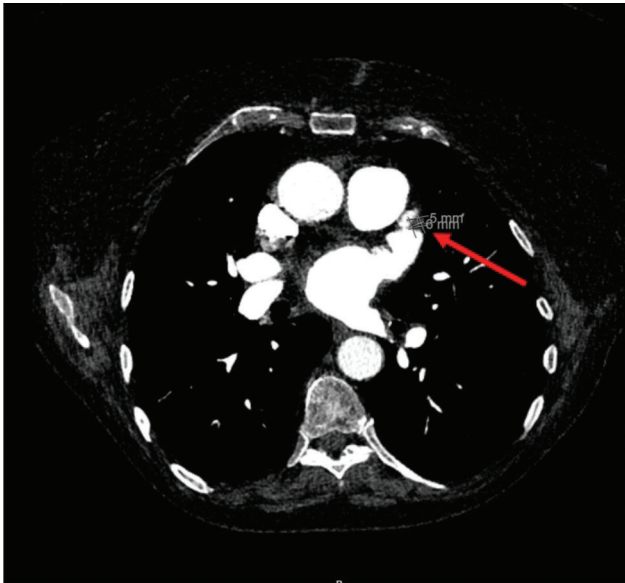


Fig. 4. Cardiac computed tomography demonstrating an interval decrease in the lesion, measuring 5 mm x 6 mm.

Informed Consent

Written informed consent was obtained from the patient's family for publication of this case report. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

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Conflict of interest

The Authors declare that there is no conflict of interest.

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