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Unusual Case of a Free-floating Ball Thrombus with Preserved Attachment to the Left Atrial Appendage Causing Recurrent Obstruction of the Left Ventricular Outflow Tract

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ABSTRACT: Few cases of a left atrial thrombus without mitral valve disease have been reported. We present an unusual case in which a patient presented to the emergency department with syncope and acute cerebral ischemia caused by a ball thrombus originating from the left atrium (LA). An emergency bedside echocardiogram showed the LA ball thrombus intermittently obstructing the mitral orifice and, at times, compromising the left ventricular outflow tract. This thrombus was determined to be the source of cerebral embolization resulting in acute ischemia. Surgical excision of the mass was performed. At operation, the thrombus was found to be tethered to the left atrial appendage. This tethering was not apparent on the echocardiographic images, where the thrombus appeared to be free floating. This case demonstrates the utility of transthoracic echocardiography in establishing the etiology of emergent conditions seemingly unrelated to acute cardiac disease, in this situation a neurologic presentation with syncope and cerebral ischemia.

KEYWORDS: atrial fibrillation, ball thrombus, anticoagulation, surgical resection

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Introduction

Atrial fibrillation (AF) with progressive atrial dilation combined with inadequate anticoagulation exhibits a high risk of thromboembolic events. We present the unusual case of a ball thrombus originating from the left atrium (LA) with remaining continuity to the left atrial appendage (LAA) causing syncope and cerebral ischemia. The patient has given written consent for the publication of this report.

Case Report

An 81-year-old female presenting with syncope and aphasia was admitted to the emergency department of our hospital. The patient was diagnosed with permanent AF four years prior to presentation and was managed with rate-control therapy. However, for unknown reasons, there was no anticoagulation at the time of presentation. So far, except for AF and arterial hypertension (treated by angiotensin receptor blockers and diuretics), the patient was free from other independent risk factors for LA thrombus formation (no previous cardiac or embolic history). The electrocardiogram showed AF with normal ventricular response rate. Laboratory examinations did not reveal specific changes, especially no signs of relevant inflammation. The head computed tomography scan of the patient, who was normotensive at this time, revealed acute focal ischemia at the left temporal lobe. Transthoracic echocardiography showed the presence of a 4 × 3.5 cm measuring,

free-floating, nonhomogeneous mass in the LA. This mass did not appear to be attached to the LAA (Fig. 1A), atrial wall, or mitral leaflets. There was a rate-dependent dislocation of this mass to the mitral valve orifice (Fig. 1B) and, at times, into the left ventricle (LV). This caused intermittent obstruction of the left ventricular outflow tract, and was associated with presyncopal symptoms. In addition, echocardiography demonstrated severely dilated atria, presumed to be due to long-standing AF. The mitral valve and the tricuspid valve each displayed moderate regurgitation. The LV showed concentric hypertrophy with preserved ejection fraction. The LV showed concentric hypertrophy with a preserved ejection fraction. After excluding significant coronary stenosis by coronary angiography, the patient shortly underwent surgical removal of the mass. Access to the LA was achieved via transseptal incision. The primary operative finding was a spherical purple gelatinous mass measuring 4.5 × 4 cm, partially free floating in the LA, but attached to the LAA by a thin bridge (Fig. 2). The LAA itself appeared to be widened with an irregularly shaped main lobe. Excision of the mass including the shaft was performed, followed by suture ligation of the LAA. Histopathological examination confirmed a layered, partly necrotic, mostly organized, parietal thrombus (not displayed). Surgical inspection confirmed the echocardiographic findings of moderate mitral regurgitation, so additional valve repair was not indicated. Moreover, a MAZE procedure was considered, but because of the patient's critical status and cerebral ischemia, it was deferred.

Figure 2. Postoperative view of the ball-like parietal thrombus. Interestingly, while appearing to be free-floating in echocardiography, it was found to be attached to the left atrial appendage by a thin bridge.

At the 6-month follow-up evaluation, there were no signs of relevant postoperative complications or neurologic postischemic sequelae. The patient was anticoagulated during this period, and no new thrombus formation was identified on repeat echocardiographic examination (Fig. 3).

Discussion

In this report, we present the case of a patient with syncope and acute cerebral ischemia due to embolization from an unusual LA ball thrombus with preserved attachment to the LAA not visible on transthoracic echocardiography. Thrombus formation and embolization are the most threatening complications of an inadequate anticoagulation in the

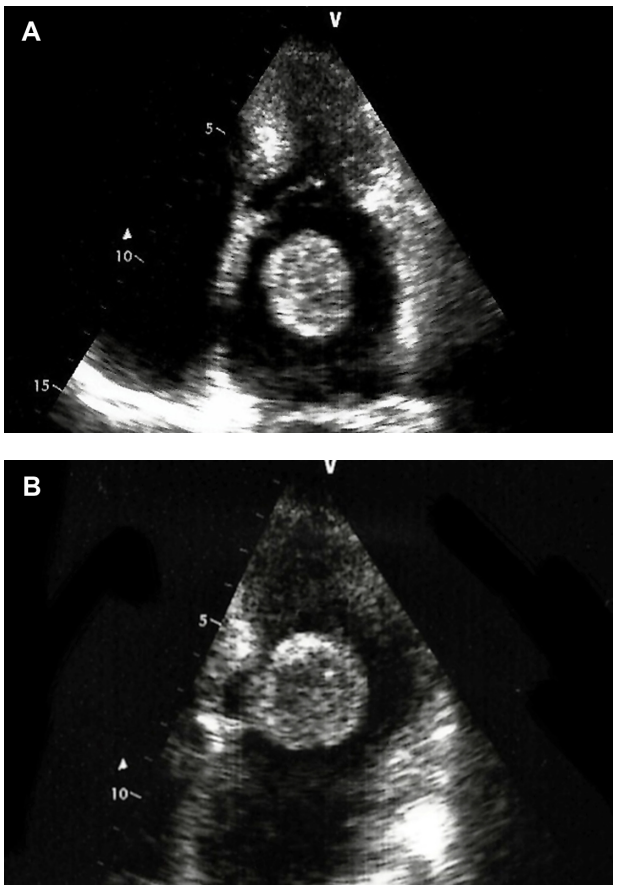

Figure 1. Apical four-chamber view of a mass (~4 × 3.5 cm) in the left atrium without recognizable attachment to the left atrial appendage, atrial wall, or mitral leaflets (**A**). Note the recurrent dislocation through the mitral valve orifice (**B**).

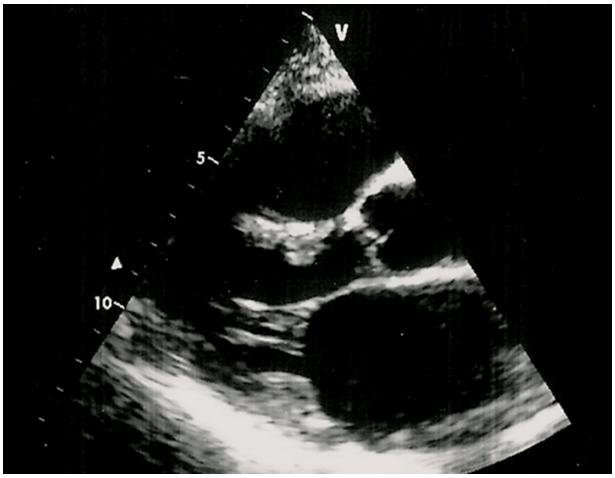

Figure 3. Parasternal long-axis view of the same patient at 6 months follow-up showing no residuals, at this time a mild mitral regurgitation beside the known enlargement of the left atrium.

presence of AF. As in this case, the presence of a mass in the LA often presents a diagnostic challenge for cardiologists. Echocardiography can help distinguish between solid benign or malignant mass, and organized or disorganized thrombus formation. Shape and echogenicity are important characteristics that help to distinguish among these potential etiologies of atrial mass. To date, there have been few reports of the presence of an LA ball thrombus without mitral valve disease.[1–3] Most frequently, the presence of a ball thrombus suggests mass formation by continuous increase in size independently from the LA wall. Such a ball thrombus formation arising from the LAA is quite unusual.

Therapeutic decision-making and optimal treatment strategy selection, ie, thrombolysis versus surgical intervention, require prompt evaluation of clinical parameters and evaluation of the thrombus' morphofunctional characteristics. Several authors have reported recurrent ischemic episodes after thrombolysis in the presence of LA thrombus.[4,5] When a free-floating thrombus is identified in the LA, emergent cardiac surgery for embolectomy is often required because of the high risk for sudden circulatory collapse or systemic embolization.[3,6] As in the case we present here, accurate transthoracic echocardiographic evaluation of the mass provides critical information required for initiating timely therapeutic procedures.[7] Continuous anticoagulation treatment for patients with AF remains extremely important to prevent embolic complications.[8]

Conclusions

Selection of the optimal treatment strategy for atypical LA thrombus is a challenging clinical scenario. Unfortunately, no guidelines exist to direct the selection of the most appropriate evaluation and treatment for these cases. The use of transthoracic echocardiography in emergency situations can be a cost-effective and time-saving tool impacting immediate therapeutic decision-making.

Author Contributions

Conceived and designed the experiments: BA, FB. Analyzed the data: AH, JS, DB, FB. Wrote the first draft of the manuscript: BA, FB. Contributed to the writing of the manuscript: AH, JLG. Agree with manuscript results and conclusions: BA, AH, JS, DB, JLG, FB. Jointly developed the structure and arguments for the paper: FB, AH. Made critical revisions and approved final version: BA, AH, JS, DB, JLG, FB. All authors reviewed and approved of the final manuscript.

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