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Pinball-Like Free-Floating Left Atrial Ball Thrombus Presenting with Hemiplegia: A Challenging Treatment Decision

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ABSTRACT

We describe a case of a patient with a history of chronic atrial fibrillation who presented with sudden onset of left hemiplegia. Nine months earlier the longstanding warfarin therapy had been suspended due to a hemorrhagic stroke. Transthoracic echocardiography revealed a large free-floating highly mobile mass in the left atrium and severe mitral valve regurgitation. Due to the potential risk of an embolic event or a hemodynamic collapse, a decision to carry out an emergency operation was made irrespective of the neurological condition of the patient. Unfortunately, the patient died on the 18th postoperative day after a freshly occurring hemorrhagic stroke.

INTRODUCTION

Free-floating ball thrombus in the left atrium is rare. Atrial fibrillation is the most common predisposing factor for thrombus development in the left atrium, especially in patients who are not being adequately anticoagulated [Lee 2008]. Potential catastrophic consequences are distal embolization and sudden circulatory collapse due to left ventricular inflow obstruction, the so-called "hole-in-one" effect [Agrawal 2012]. Prompt surgical removal of the ball thrombus is recommended immediately after the diagnosis is established. We present a case of surgically removed free-floating ball thrombus in the left atrium causing cerebral infarction.

CASE REPORT

An 82-year-old woman with chronic atrial fibrillation presented with sudden onset of left hemiplegia. Four years earlier, the patient was diagnosed with atrial fibrillation and was treated with digitalis and warfarin. Nine months earlier the longstanding warfarin therapy had been suspended due to a hemorrhagic stroke. At the time of presentation she had been only receiving aspirin for anticoagulation. The electrocardiogram showed atrial fibrillation. Immediate brain magnetic resonance imaging revealed a new large right cerebral infarction due to embolic occlusion of the right middle cerebral artery. Subsequent transthoracic echocardiography revealed a large free-floating highly mobile mass measuring 2.8 cm in diameter in the left atrium (Figure 1). The mass was noted to have wedged into the mitral orifice during diastole and pushed back into the left atrium by the

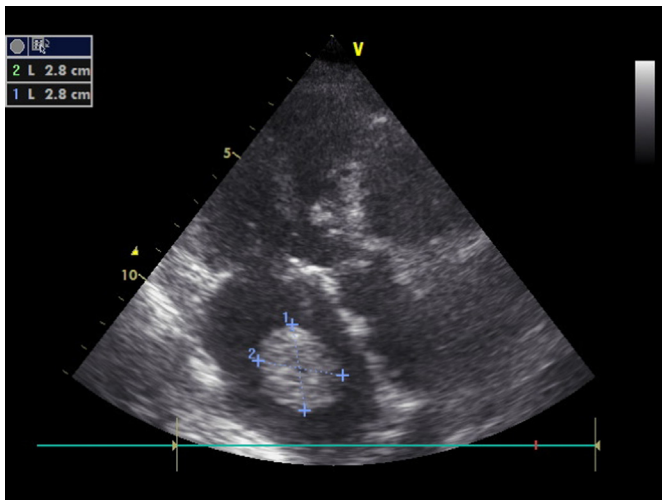

Figure 1. Transthoracic echocardiography showing a large free-floating mass in the left atrium.

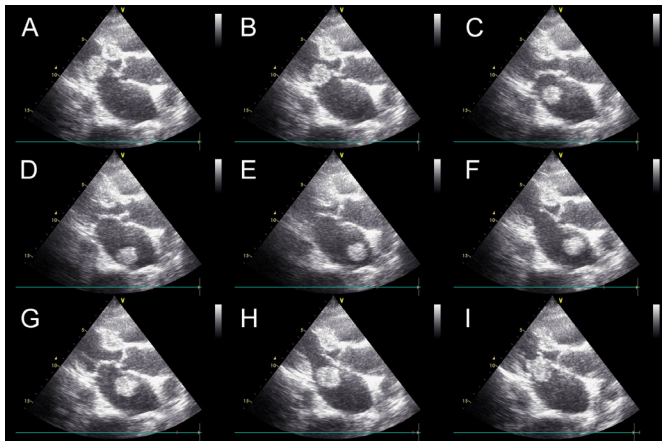

Figure 2. Transthoracic echocardiography series showing the movement of the floating mass in the left atrium (A-I).

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Figure 3. The operative specimen of the left atrial ball thrombus.

mitral valve leaflets during systole like a "pinball game" (Figure 2; Video). In addition, the transthoracic echocardiography also revealed severe mitral valve regurgitation with preserved ejection fraction. Due to the potential risk of an embolic event or a hemodynamic collapse, a decision to carry out an emergency operation including removal of the thrombus, mitral valve repair, and surgical ablation for atrial fibrillation was made irrespective of the neurological condition of the patient. Access to the left atrium was achieved via transseptal incision. Exploration of the left atrium revealed a spherical, smooth non-pediculated thrombus ball measuring 2.8 × 2.8 cm that was floating freely in the left atrial cavity (Figure 3). The thrombus ball was removed and the atrial cavity inspected carefully. Unipolar radiofrequency ablation was performed by using a unipolar pen (Cardioblate; Medtronic, Minneapolis, MN, USA). The left atrial appendage was closed by sewing over its orifice with a 4-0 polypropylene running suture. Mitral annuloplasty was carried out to plicate the posterior annular dilatation with a 28-mm saddle ring (St. Jude Medical, St. Paul, MN, USA). Intraoperative transesophageal echocardiography demonstrated sufficient mitral valve repair without residual mitral regurgitation. The patient was taken off cardiopulmonary bypass and had a normal sinus rhythm. The patient received anticoagulation with warfarin postoperatively.

Histopathological examination of the removed material revealed a layered, partly necrotic, organized thrombus.

The patient was weaned from mechanical ventilation on the 5th postoperative day without an aggravation of the preexisting stroke symptoms. However, on the 18th postoperative day a dramatic deterioration occurred; she suddenly lost consciousness, and respiratory insufficiency required mechanical ventilation. Brain computerized tomography was performed and revealed a large right frontal cerebral hemorrhage with rupture into the right lateral ventricle and extension into the fourth ventricle. Unfortunately, the patient did not recover neurologically and died within the next 24 hours.

DISCUSSION

Atrial free-floating ball thrombus was first described by Wood in 1814 during an autopsy of a 15-year-old girl with mitral stenosis [Wrisley 1991]. Since then, several cases have been reported, due to the widespread use of echocardiography. Most of these were associated with atrial fibrillation and mitral stenosis [Tanoue 2009]. However, the formation of a free-floating ball thrombus in the left atrium is extremely rare in patients with mitral regurgitation.

The precise mechanism of the formation of a floating ball thrombus is not clear. It has been suggested that a fixed mural thrombus in the left atrial wall forms in relation to a dilated left atrium and the resulting atrial fibrillation, especially in patients receiving inadequate anticoagulant therapy [Yoshida 2002]. The thrombus grows gradually and gets detached, free floating under its own weight. It is speculated that the spherical and smooth shape of the mass is attributed to the numerous collisions with the atrial wall [Lee 2008; Vitale 1997].

The presence of a free-floating thrombus in the left atrium has the potential of sudden hemodynamic collapse due to the occlusion of the mitral orifice [Fraser 1988]. Another major problem of the ball thrombus is the systemic embolization subsequent to the fragmentation of the mass.

There are no clear guidelines to direct the selection of the most appropriate evaluation and treatment for these patients [Muller 2010]. However, due to the risk of sudden death and systemic embolization, prompt surgical removal of the mass is recommended immediately after the diagnosis is established [Lee 2008; Oquendo 1989]. Moreover, the surgery permits the treatment of the underlying valve disease. Furthermore, atrial fibrillation, the most important etiologic factor responsible for the development of this pathology, may have been effectively treated by surgical ablation.

Anticoagulation and thrombolytic therapy do not have a role in the acute management of the left atrial ball thrombus because of the risk of embolization; nevertheless the role of anticoagulation in prevention of recurrence is obvious [Chidambaram 2013]. One successful case of free-floating left atrial thrombus treated with aggressive anticoagulation has been reported [Tanoue 2009]. However, due to uncertain effectiveness and high risk of embolization it should be considered as a treatment option for only high-risk patients.

In summary, presence of free-floating ball thrombus has the potential for its embolic and catastrophic hemodynamic consequences. Prompt surgical removal is recommended in most cases. Unfortunately, there is no current consensus available for the selection of the most appropriate treatment for these patients. Therefore, we conclude that individual reported cases of this rare and challenging clinical scenario would guide us to select the optimal treatment strategy.

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