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Address for Correspondence: Dr. Nermin Bayar, Öğretmenevleri Mah. 19. Cadde, Fetih Konakları B Blok Daire: 5, Konyaaltı, Antalya-*Türkiye*
Phone: +90 505 400 75 09
E-mail: dr.nermin@mynet.com
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Misleading aspect of left atrial appendage membrane: an incidental echocardiographic finding

Fardideh Roshanali, Bahieh Moradi, Mehrnoosh Minooei
Department of Echocardiography, Day General Hospital; Tehran-*Iran*

Introduction

The left atrial appendage (LAA) is a blind-ending, muscular extension of the left atrium and is of clinical importance in as much as the LAA is a place where a thrombus could be formed when the left atrial (LA) function decreases (1). However, it should routinely be analyzed as part of a transesophageal echocardiographic (TEE) examination (2). The LAA cavity might very rarely have membranes. Indeed, only less than ten cases of a membrane involving the LAA have been described in the literature. The origin of membranes involving the LAA is not clear. The most likely explanation for the origin of these membranes would appear to be a congenital anatomic variation (3).

We report a case of a non-obstructive membrane at the orifice of the LAA on TEE, mimicking a mobile thrombus attached to it.

Case Report

A 42-year-old woman, with no history of cardiovascular disease, presented with palpitations and dyspnea. A 12-lead electrocardiogram showed atrial flutter with an acceptable ventricular rate, and a two-dimensional echocardiogram was normal except for a mildly dilated LA. A pre-cardioversion TEE examination illustrated a linear, membrane-like structure traversing the orifice of the LAA (Fig. 1, Video 1. See correspondening video/movie images at www.anakarder.com). Color Doppler did not demonstrate flow acceleration across this membrane (Fig. 2, Video 2. See correspondening video/movie images at www.anakarder.com). Pulsed-wave Doppler confirmed low-flow velocities across the membrane, indicating no obstruction (Fig. 3) but a mobile linear particle (4 mm) mimicking a thrombus attached to the LAA. Accordingly, the mobile particle structure was considered thrombosis and anticoagulation therapy before cardioversion was recommended.

After six weeks with the patient on good anticoagulation, a second 2D and 3D-TEE examination yielded similar images and configurations (Fig. 4, Video 3, 4). The moving particle attached to the LAA membrane was, therefore, deemed a structural variant, and electrical cardioversion was performed successfully. After electrical cardioversion, the patient recovered sinus rhythm and was discharged on standard therapy.

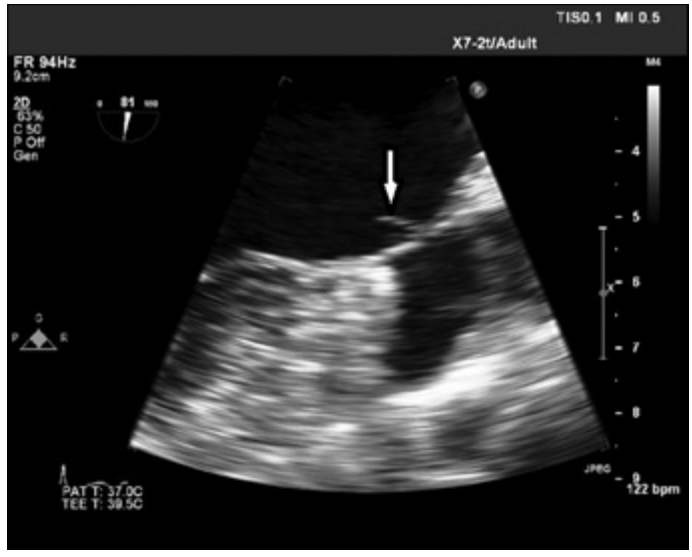

Figure 1. A membrane-like structure traversing the orifice of the LAA with a mobile linear particle mimicking a thrombus attached to the membrane (white arrow)

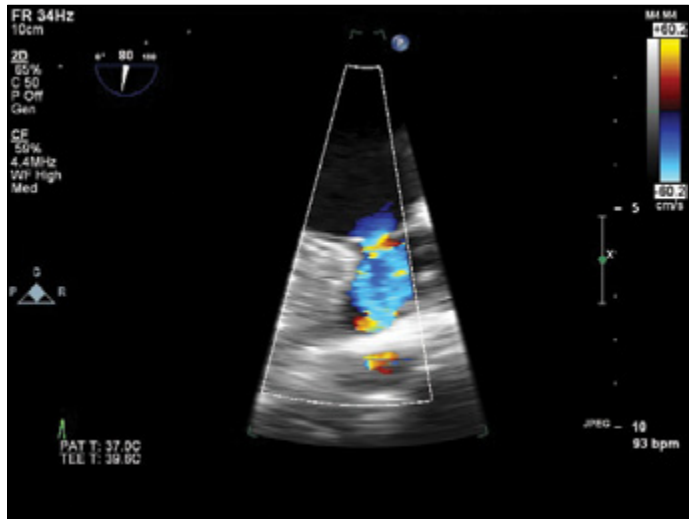

Figure 2. Color Doppler study demonstrates no flow acceleration across the LAA membrane

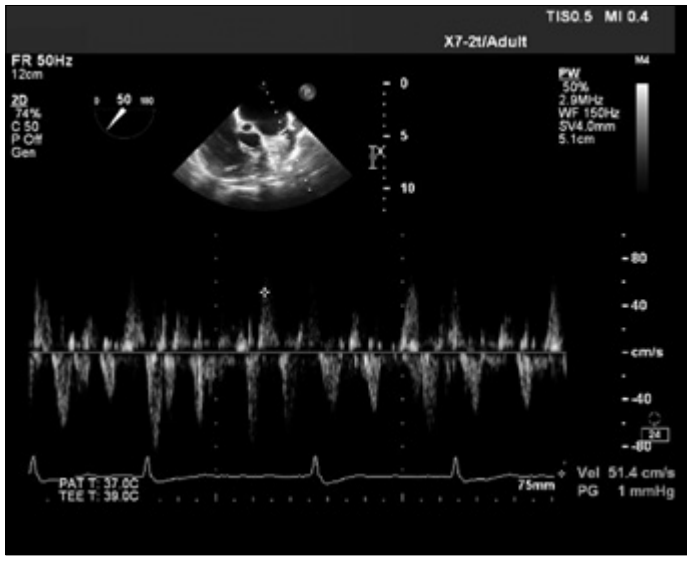

Figure 3. Low-flow velocities across the membrane in pulsed-wave Doppler study

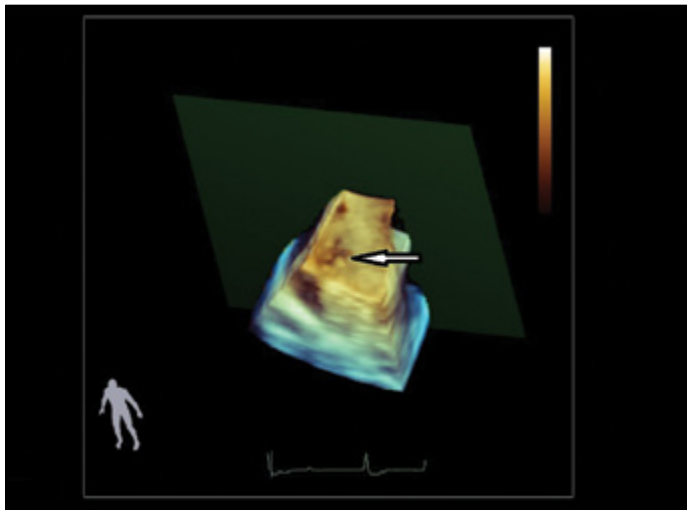

Figure 4. 3D-TEE after anticoagulation therapy (the arrow shows the membrane-like structure with mobile thrombus like structure)

Discussion

The increasing use of cardioversion and percutaneous catheter-based interventions such as radiofrequency ablation and occlusion of the LAA have helped better identify the LAA structure. LAA membranes are discovered incidentally most of the time, and a consensus has yet to emerge as to their clinical significance (3, 4).

The case presented in this report has unique features in comparison with those reported previously. First, in our patient, the membrane was in the orifice of the LAA, whereas Correale (3), Bordonali (2), and Postacı (5) reported cases with a thin, linear, mobile membrane traversing the body of the LAA. Second, the LAA membrane in our patient had an additional mobile particle; this confusing feature led to the misinterpretation of it as a thrombus in the first study.

Our literature review and perusal of previously reported cases shows that almost all the cases presented with palpitation and dyspnea and atrial fibrillation/ flutter. This incidental finding has been reported in both males and females. Except for two cases with a hypertrophic left ventricle and a reduced ejection fraction, there are no reports of congenital or structural abnormalities. Stenosis and flow acceleration were found in only two patients with an ostial membrane (ostium less than 5 mm); one of these patients had a history of cardiac surgery sixteen years previously and it was not clear whether the narrowed orifice of the LAA was idiopathic ostial stenosis or a postoperative complication (1). The differential diagnosis of long, thin structures in the LAA may include prominent pectinate muscles, side lobe artefacts and partial resolution of thrombi (2). It is unlikely that the membrane-like structure represented echo artifact because it was imaged thoroughly in multiple planes. Prominent pectinate muscles are also an unlikely explanation, because their imaging characteristics were absent.

Limitation of our case includes the lack of detailed pathologic analysis of the excised membrane and the lack of surgical excision and confirmation, also, the evaluation of cardiac masses with cardiac MRI may be more reasonable.

Conclusion

We described in one case, the incidental TEE findings of a thin, linear, and non-obstructive membrane in the orifice of the LAA cavity mimicking a mobile thrombus attached to the LAA. The clinical implications (e.g. risk of thromboembolic events) and origins of these membranes are not clear; however, such membranes may represent an anatomic variant of which the echocardiographer should be aware, and clinically, like incomplete surgical ligation or recanalization of the LAA may have potential for stagnant blood flow within the LAA and possible thrombus formation with systemic embolization.

Video 1. A membrane-like structure traversing the orifice of the LAA with a mobile, linear and thrombus-like particle attached to the membrane

Video 2. Color Doppler study demonstrates no flow acceleration across the LAA membrane

Video 3, 4. 3D-TEE after anticoagulation therapy (is similar with pretreatment study)

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Address for Correspondence: Dr. Bahieh Moradi
Day General Hospital, Valie Asr Ave., Tehran-*Iran*
Phone:+98 21-84942785
Fax: +98 21- 66005214
E-mail: faraviolet@yahoo.com
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