Photo Clinic

Thrombus-in-Transit Entrapped in a Partially Ligated Left Atrial Appendage

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A 54-year-old man referred to our center with Barlow's disease and severe mitral regurgitation. He had atrial fibrillation (AF) rhythm, with a mildly enlarged left atrium (LA). Transesophageal echocardiography (TEE) showed no clot in the LA and LA appendage; there was only mild spontaneous echo contrast in the LA appendage. The patient underwent mitral valve repair and the Maze operation, during which the LA appendage was ligated with the double suture technique. He was discharged from the hospital in good condition and in sinus rhythm. He was recommended Warfarin and PT control.

One month later, he returned with the complaint of vision loss twice in the left eye each time for a few seconds. The AF rhythm had returned.TEE demonstrated a fresh and mobile thrombus entrapped in the LA appendage with a small portion in the LA (Figures 1 and 2). Laboratory tests showed therapeutic international normalized ratio (INR). The patient refused re-operation. Plavix was added to his medication, and he was discharged.

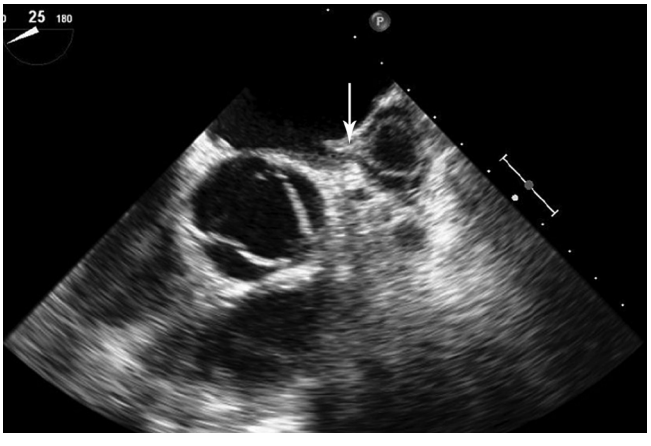

Figure 1. Two-dimensional transesophageal echocardiographic view of the left atrial appendage. A fresh thrombus is entrapped in the left atrial appendage, with a small portion in the left atrium (white arrow)

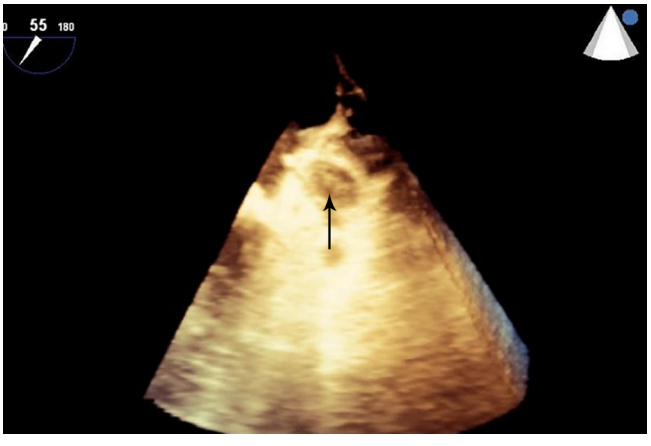

Figure 2. Three-dimensional transesophageal echocardiographic view of the thrombus (black arrow)

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One month later, repeat TEE revealed that the clot had become denser with no communication to the LA and the LA appendage cavity had become smaller.

There are several techniques for the surgical closure of the LA appendage. They consist of either excision or exclusion with scissors or an amputating stapling device. The exclusion of the LA appendage is performed by closing the orifice into the LA appendage cavity, with the appendage left attached. This technique is performed via various methods of suturing (e.g. running suture, purse string, and external ligation) or via stapling.

There is a high occurrence rate of unsuccessful surgical LA appendage closure.[1] In the Katz et al.[2] study, TEE detected incomplete LA appendage ligation in 18 of 50 (36%) patients who underwent mitral valve surgery and LA appendage ligation by running suture technique. In their study, the incidence of incomplete ligation was not significantly different between the patients studied immediately postoperatively and those studied at various times after surgery. Type of mitral surgery (repair vs. replacement), operative approach, LA size, or degree of mitral regurgitation did not significantly correlate with the incidence of incomplete appendage ligation. Spontaneous echo contrast or thrombus was identified within the appendages in 9 of 18 (50%) patients with incomplete ligation, while 4 of these 18 (22%) patients had thromboembolic events.[2] The LA appendage is more prone to thrombosis when it is partially closed because blood is more stagnant. The prevalence of the LA appendage thrombus in appendages with a persistent flow is high.[3] Kanderian et al.[1] reported that successful LA appendage closure occurred more often with excision than suture exclusion and stapler exclusion. They found that the LA appendage thrombus was present in 28 of 68 patients (41%), with unsuccessful LA appendage exclusion versus none with excision.

Unfortunately, the excision of the LA appendage is difficult, if not impossible, during minimally-invasive mitral valve surgery, which is usually performed through right thoracotomy. It also requires cardiopulmonary bypass. For the procedures of a less invasive nature in which the majority of surgeons currently tend to either suture exclude or staple the appendage, there is clear evidence of the inadequacy of these techniques.[4]

We conclude that removal and supervision constitute the most advisable option. Most importantly, surgeons should consider performing TEE prior to this decision to ensure successful LA appendage closure. Unsuccessful LA appendage closure can predispose the patient to stroke and transient ischemic attack even if anticoagulation is continued. These results are a clarion call to surgeons and cardiologists to develop easier and more effective means of less-invasive LA appendage exclusion. Percutaneous devices are promising, with safe and effective devices likely to be available in the very near future.

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