

# Displacement of occluder after left atrial appendage closure(LAAC):A case report

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## Abstract

The efficacy and safety of left atrial appendage occlusion (LAAO) in preventing non valvular atrial fibrillation stroke have been confirmed by multiple randomized controlled and registered studies,and have been recommended by several guidelines for stroke prevention in patients with atrial fibrillation at high risk of stroke.We reported an 80-year- old male

Displacement of occluder after left atrial appendage closure(LAAC):A case report

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**Running title :** A case of occluder displacement and removal

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## Conflict of interest

There is no conflict to be declared.

## Contributors

YL writing this manuscript and collecting patient information and relevant references.XBM guiding the writing of articles.All authors contributed to editorial changes in the manuscript. All authors read and approved the final manuscript.

## Abstract:

The efficacy and safety of left atrial appendage occlusion (LAAO) in preventing non valvular atrial fibrillation stroke have been confirmed by multiple randomized controlled and registered studies, and have been recommended by several guidelines for stroke prevention in patients with atrial fibrillation at high risk of stroke. We reported an 80-year-old male patient with persistent atrial fibrillation who has undergone LAAO surgery after admission. The second day after surgery with cardiac ultrasound indicating occluder displacement. Performed left atrial appendage occluder removal and LAAO on the same day. The patient has no discomfort and discharged five days after surgery.

**Introduction** Atrial fibrillation (AF) is a common atrial arrhythmia, associated with increased incidence rate and

mortality of cardiovascular events(1). AF is associated with an increased risk of thromboembolism and stroke, requiring anticoagulation. Despite progress and development in anticoagulation strategies, the high risk of bleeding complications and strict medication adherence make treatment more

complex. In the past few decades, left atrial appendage has become a promising therapeutic target, which can prevent thromboembolic events while reducing the problem of bleeding complications(2,3). Research has shown that left atrial appendage occlusion (LAAO) surgery is associated with a reduced incidence of cardiovascular events during hospitalization, and can also improve patient prognosis in long-term follow-up(4,5). In the past 20 years, among non valvular atrial fibrillation patients with increased risk of stroke, LAAO has become a safe and effective alternative to oral anticoagulants for stroke prevention(6).

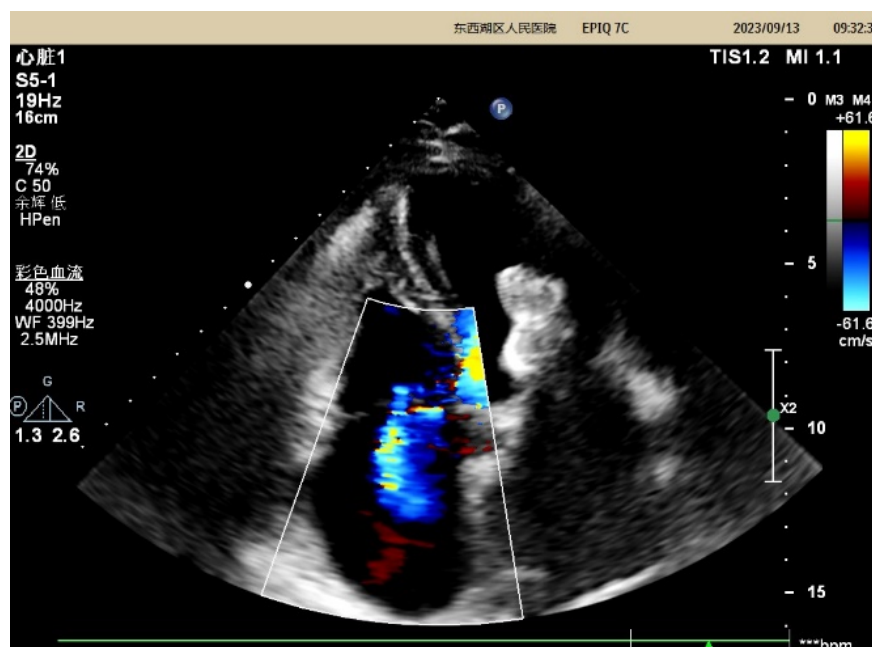
## Case Report

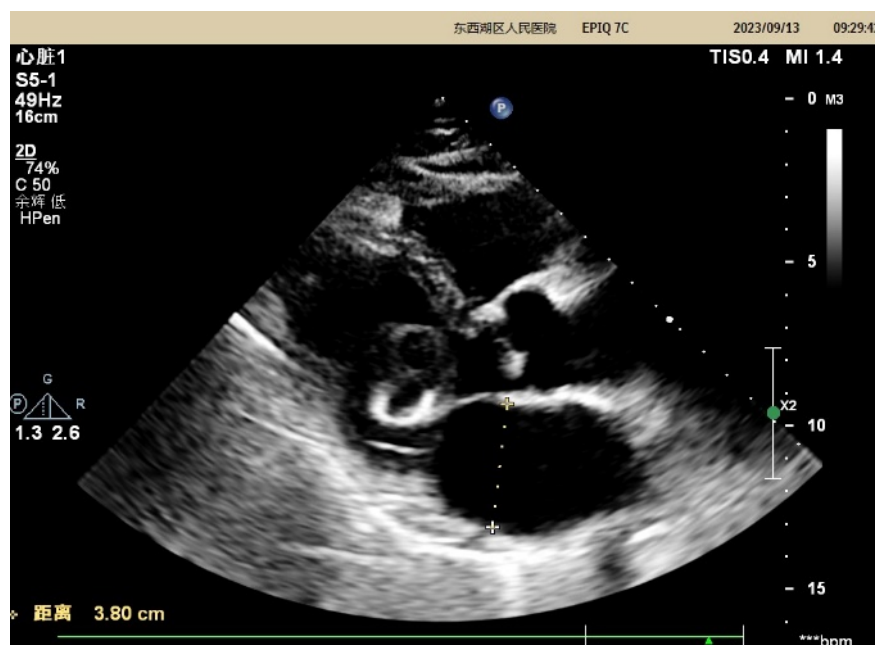
An 80-year-old male patient was admitted 2 days after sudden syncope. The duration of atrial fibrillation is unknown (CHA2DS2-VASc: 6 points, HAS-BLED: 4 points) and continues to receive oral anticoagulant therapy with rivaroxaban. Previous history of gastric bleeding, has a long history of drinking alcohol. The patient refused to continue long-term oral anticoagulants. After

admission, esophageal echocardiography ruled out intraluminal thrombus. Dynamic electrocardiogram: The average heart rate is 66bpm, the slowest heart rate is 30bpm, the fastest heart rate is 139bpm. A total of 92033 cardiac beats were analyzed, Long RR intervals greater than 2000 ms were 67, and the longest is 2562 ms. Total atrial fibrillation, 124 ventricular premature beats, Cardiac ultrasound showed widening of the ascending aorta (3.5cm), enlargement of the left atrium (4.4cm), enlargement of the right atrium (5.4cm), and enlargement of the right ventricle (4.3cm). LVEF: 58%. Widening of ascending aorta, degenerative degeneration of aortic valve, enlargement of atriums, mild mitral regurgitation, moderate tricuspid regurgitation, and arrhythmia. Diagnosis: (1). Persistent atrial fibrillation, (2). Transient ischemic attack, (3). coronary atherosclerosis, myocardial bridging, (4). Grade 1 hypertension (high risk group). The patient underwent LAAO surgery, and there were no significant abnormalities after the surgery. On the first day after surgery, cardiac ultrasound revealed abnormal echogenicity in the left ventricular cavity, which is considered occluder displacement (Figure 1). Perform left atrial appendage occluder removal and LAAO on the same day. Puncture through the right femoral vein, insert a blood vessel sheath, send a long sheath tube, atrial septal puncture needle to the superior vena cava, and retract to the atrial septum, after successful RAO45 ° atrial septal puncture, Medtronic 4FC12 adjustable bending sheath was inserted, insert the 7F AL1 catheter along the flexible sheath to the left ventricle and perform occluder grasping (Figure 2), after successfully grasping the occluder, push and inject ice salt water along the sheath to soften the occluder. after fully softening the occluder, smoothly grasp the occluder into the adjustable bending sheath and successfully remove the occlude. The patient's vital signs are stable and there are no special discomfort, continue with LAAO surgery. Send the pigtail catheter along the outer sheath to left atrial appendage angiography for examination, and

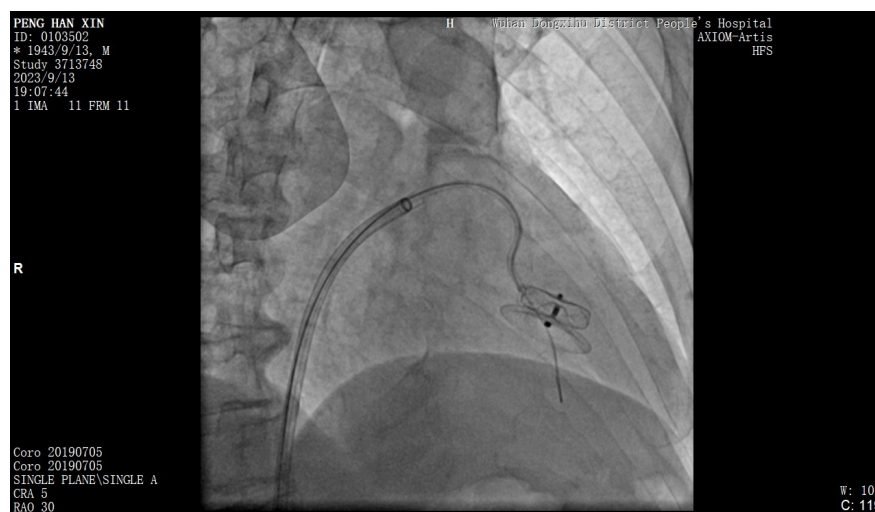
measure the inner diameter and opening diameter of the left atrial appendage, Extracorporeal configuration of LACbes26mm according to the patient's left atrial appendage size 32mm left atrial appendage occlusion umbrella. Release of occlusive umbrella under RAO30+CAU20 imaging, Under X-ray, the occlusive umbrella is stable at the opening of the left atrial appendage, and angiography shows isolation of blood flow between the left atrial appendage and the left atrium.perform another traction test for 1 minute, RAO30+CAU20 confirmed that the sealing umbrella was firmly fixed, and there was no obvious leakage of contrast agent around the umbrella, indicating satisfactory sealing, Cardiac ultrasound examination showed that the occlusive umbrella was stably fixed at the opening of the left atrial appendage, and there was no signal from the left atrial appendage or left atrial septum around the umbrella, indicating a successful closure of the left atrial appendage.

**Figure 1 Cardiac ultrasound indicates occlusion device displacement**





**Figure 2** Adjustable bending sheath insert the left ventricle and perform occluder grasping



## Discussion:

The detachment of occluder is one of the most serious complications of LAAC surgery, often occurring during the perioperative period. The main reasons for the detachment of the occluder include: (1) The size of the occluder is too small relative to the diameter of the auricle, (2) The occluder is placed too far out and not firmly fixed, (3) The pre installation of the occluder is not firm, or the screw at the connection between the push rod and the occluder occurs after the occluder is fully recovered. When the intervention method for removing the occluder is expected to be difficult or

carries significant risks, it is recommended to perform cardiac surgery for removal.

In early LAAO surgical experience, The incidence of complications such as pericardial tamponade, occluder displacement, and thromboembolism is relatively high. In the past decade, improved operational experience, meticulous techniques, and improved equipment iteration have greatly reduced the incidence of major complications(6). Although the current indications of LAAO mainly focus on non valvular atrial fibrillation patients and contraindications for oral anticoagulation, it is almost certain that the future will expand the indications, applicability, and scope of use of these devices(7).Moreover, different designs of the left atrial appendage occluder may affect prognosis (such as detachment or embolism). The advantage of devices without an external disc is that it has less interference with surrounding structures and a smaller surface that interacts with blood (8). At present, research has discussed the use of virtual reality (VR)derived from cardiac computed angiography data to predict the size of LAAO devices. VR visualization of the left atrial appendage opening from different perspectives can better understand its funnel-shaped structure. The VR measurement of the maximum opening diameter has the strongest correlation with the diameter of the insertion device. Therefore, VR may provide new imaging possibilities for evaluating complex preoperative structures such as the left atrial appendage. To prepare suitable occluder before LAAO surgery and reduce the occurrence of occluder detachment(9).

## Conclusions

The detachment of the occluder after LAAO surgery is a serious complication. This article describes a successful occluder removal case after LAAO surgery. Our clinical cases indicate that strict preoperative evaluation of the patient's required instruments and equipment is necessary to prevent complications.

## Supplementary material

Consent: The authors confirm that written consent for submission and publication of this case report including images and associated text has been obtained from the patient.

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