



Letter to the editor

## Figure-of-eight artifact after successful percutaneous closure of left atrial appendage



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An 80-year-old man with non-rheumatic atrial fibrillation underwent transcatheter occlusion of left atrial appendage (LAA) with the Amplatzer™ Cardiac Plug (ACP) device due to warfarin contraindications. A 28 mm ACP device was chosen based on LAA morphology, transesophageal echocardiography (TEE) measurements, and operator experience. After device deployment, sufficient anchoring was confirmed by pulling and releasing the delivery catheter under fluoroscopic and TEE surveillance. The final result was excellent without significant residual leak or pericardial effusion. The patient was discharged without any complication. Follow-up transthoracic echocardiography (TTE) performed 6 weeks after implantation with Mindray M9system with a SP5-1S transducer (Mindray Bio-Medical Electronics, Shenzhen, China) showed an intriguing image with the shape of the number eight in the left atrium, in the apical five-chamber and three-chamber views (Fig. 1, panels A and B, Movies 1 and 2). Consequently, TEE was performed to rule out ACP device malposition. Transesophageal 2D and 3D images demonstrated adequate ACP device positioning in the LAA (Fig. 1, panels B and C, Movies 3 and 4).

Percutaneous device closure of the LAA has been introduced in the last decade as a minimally invasive alternative treatment to long-term anticoagulation to reduce the risk of thrombo-embolism in patients with atrial fibrillation. ACP is one of the most commonly

used devices for this purpose. The ACP is a transcatheter, self-expanding device constructed from nitinol wire mesh and Dacron patches sewn inside the device and consists of a lobe designed to conform to the inner lumen of the LAA and a disc connected by a central waist. The waist acts as an articulating, compliant connection between the disc and lobe allowing the disc to self-orient to the cardiac wall; the disc is designed to close the mouth of the LAA. Echocardiography is increasingly important in the pre-procedural anatomic assessment of the LAA, the real-time guidance of device deployment, and the long-term follow-up of device position and function [1]. In the follow-up, TTE is the most commonly used imaging modality. Correct interpretation of TTE findings with respect to the implanted device is therefore of particular importance. A curious image in the shape of the number eight (“figure-of-eight”) can be observed on echocardiography after successful percutaneous closure of LAA with the ACP device. This phenomenon is an image artifact that results from the specific “epitrochoidal” mesh configuration of the device and its interaction with ultrasound waves [2]. It is most frequently seen in the apical five-chamber view, when the device is imaged from a coronal imaging position. The morphology of the artifact depends on the imaging depth, with a more asymmetric figure-of-eight for a smaller probe-to-device distance. In a previous study it was demonstrated that this specific artifact can also be observed in other types of disc occluders with comparable epitrochoidal geometry when imaged from a coronal imaging position [3]. It is important to recognize the figure-of-eight as being a normal imaging artifact of a correctly deployed device, and this finding should not be interpreted as a sign of incorrect ACP implantation. The use of real-time 3D TEE provides additional anatomical information and improves demonstration of the spatial relationship of atrial structures compared with conventional 2D echocardiography [4].

The authors of this manuscript have certified that they comply with the Principles of Ethical Publishing in the International Journal of Cardiology.

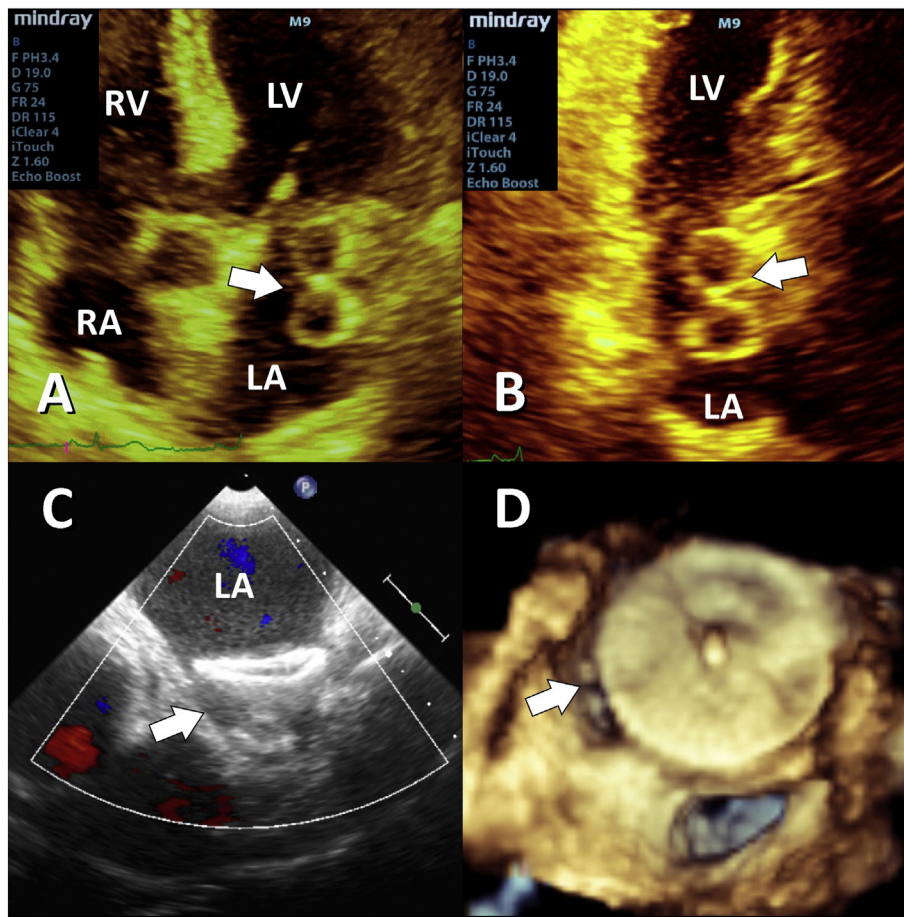
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### Conflict of interest

There is no conflict of interest concerning this manuscript.

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**Fig. 1.** Panel A: Two-dimensional transthoracic echocardiography using the five-chamber view showing an image with the shape of the number eight in the left atrium (arrow). Panel B: Two-dimensional transthoracic echocardiography using the three chamber view showing the figure-of-eight artifact in the left atrium (arrow). Panel C: Two-dimensional Color Doppler transesophageal echocardiography demonstrating adequate ACP device positioning in the LAA (arrow). Panel D: Live three-dimensional echocardiography with en face visualization of the ACP device from the left atrium showing adequate ACP device positioning (arrow). LA indicates left atrium; LV, left ventricle; RA, right atrium; and RV, right ventricle.

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