Air emboli during the procedure of transcatheter left atrial appendage closure

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Figure 1 Air thrombi formed in the bottle of left atrial appendage (LAA) during the procedure of transcatheter LAA closure. A: A preprocedural transesophageal echocardiogram indicated a windsock-like LAA (white arrow) with no thrombi, sludge, or spontaneous echocardiographic contrast. B: The first fluoroscopy of the LAA showed no thrombus in the LAA. C: Thick air thrombi (black arrow) formed in the bottom of the LAA during the transcatheter LAA closure. D: The subsequent LAA radiogram also showed the presence of a large filling defect in the bottom of the LAA. LA = left atrium.

**KEYWORDS** Atrial fibrillation; Left atrial appendage; Air emboli; Transcatheter closure (Heart Rhythm Case Reports 2016;2:456–458)  

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**Introduction**  
Left atrial appendage (LAA) closure is an alternative therapy for the patients with non-valvular atrial fibrillation. However, several complications were reported in the procedure. We reported a classic image of air emboli formed unexpectedly during the procedure of transcatheter LAA closure, which was closed using a LAmbre occcluder.
Case report

An 80-year-old Chinese woman with permanent atrial fibrillation was referred for transcatheater left atrial appendage (LAA) closure using LAmbre (Lifetech Scientific Co, Shenzhen, China), a new-generation double-disc closure device. The patient had a history of hypertension and 1 event of ischemic stroke, with a CHADS\textsubscript{2} score of 4. She was reluctant to receive warfarin because of the inconvenience of medical surveillance. Before the procedure, a transesophageal echocardiogram (TEE) revealed a windsock-like LAA with no presence of thrombi or sludge (Figure 1A; Video 1, available online). The procedure was conducted under general anesthesia. LAA was measured through multiview fluoroscopy (Figure 1B; Video 2, available online) and monitoring TEE to select the appropriate size of the closure, which would be used to seal the orifice of the LAA subsequently. Unexpectedly, a tube of air was accidentally injected into the LAA from the delivery sheath because it was not noticed that the empty 500-mm bag of saline was wrapped by the pressure infusion bag (Supplementary Figure 1). Very quickly, thick air thrombi formed in the bottom of the LAA (Figure 1C and D; Videos 3 and 4, available online). Then, a quick implantation of LAmbre was conducted. The fixed disc was anchored in the landing zone (Figure 2A and B; Videos 5 and 6, available online) prior to the deployment of the sealing disc (Video 7, available online). After the unsheathing of the LAmbre implanter with the delivery sheath, a fluoroscopy showed good location and sealing effect (Figure 2C; Video 8, available online). TEE showed no residual shunt around the device (Figure 2D; Video 9, available online). There were no electrocardiogram changes or symptoms or signs of stroke during the procedure. The patient underwent an uneventful recovery and was discharged 3 days after the procedure. Three-month routine TEE showed complete sealing of the LAA (Figure 2E; Video 10, available online).
At present, there has been no recurrence of stroke or any severe adverse event in this patient after 7-month follow-up.

Appendix

Supplementary data
Supplementary data associated with this article can be found in the online version at http://dx.doi.org/10.1016/j.hrcr.2015.03.015.

Figure 2  Transcatheter left atrial appendage (LAA) closure with LAmbre was conducted to seal the LAA and the thrombi. A: The fixed disc (white arrow) of the LAmbre device was quickly released and anchored in the landing zone. B: The monitoring transesophageal echocardiogram (TEE) revealed good location of the fixed disc. C: A transcatheter angiogram showed no obvious residual flow around the device after the total deployment of the LAmbre implanter. D: The monitoring TEE revealed good performance of the LAmbre device (white arrow). E: Three-month follow-up TEE showed good sealing of LAA closure and no residual shunt around the device. LA = left atrium.

References
1. Lam YY. A new left atrial appendage occluder (Lifetech LAmbre Device) for stroke prevention in atrial fibrillation. Cardiovasc Revasc Med 2013;14:134–136.
2. Lam YY, Yan BP, Doshi SK, et al. Preclinical evaluation of a new left atrial appendage occluder (Lifetech LAmbre device) in a canine model. Int J Cardiol 2013;168:3996–4001.
3. Beigel R, Wunderlich NC, Ho SY, Arsanjani R, Siegel RJ. The left atrial appendage: anatomy, function, and noninvasive evaluation. JACC Cardiovasc Imaging 2014;7:1251–1265.
4. Saw J, Lempereur M. Percutaneous left atrial appendage closure: procedural techniques and outcomes. JACC Cardiovasc Interv 2014;7:1205–1220.