A 14F Flexible Sheath and Forceps for Safe Retrieval of a Dislodged Left Atrial Appendage Occluder

Libin Qiu[1], Bing Rong[1], Kai Zhang[1], and Jingquan Zhong[1]

[1]Shandong University Qilu Hospital

April 28, 2020

Abstract

Introduction:LAmbre occluder (Lifetech Scientific, Shenzhen, China), a new device for left atrial appendage (LAA) occlusion, is increasingly used, but the procedure for retrieval after dislodgement has rarely reported in human. Methods and Results:An 80-year-old male patient with permanent atrial fibrillation underwent the implantation of LAA occlusion device. The occluder dislodged to left atrium (LA) at the end of procedure. We failed to retrieve device in LA with a LASSO catheter and forceps with the 8.5F sheath. After it suddenly flowing into aortic arch, we successfully retrieved with a 14F flexible sheath and forceps. We also discussed reasons for the device dislodgment and reported experiences for device retrieval. Conclusion: Combination of the 14F flexible sheath and forceps could be used to retrieve the dislocation of LAA occlusion device.

Introduction

LAmbre (Lifetech Scientific, Shenzhen, China), a new self-expanding left atrial appendage (LAA) occluder, is specifically designed for LAA occlusion (LAAO)[1]. So far, only one case about LAmbre device migration has been published by Mohamed Sanhoury et al in 2017[2]. We herein describe a case of acute dislodgment of LAmbre and the complex procedure for percutaneous retrieval.

Case presentation

An 80-year-old male patient, had history of coronary atherosclerotic heart disease, hypertension, and implantation of permanent double chamber cardiac pacemaker, AF, CHA_2DS_2-VASc score of 4, HAS-BLED score of 3. The patient was referred to transcatheter LAAO because of reluctant long-term oral anticoagulants. Transesophageal echocardiography (TEE) excluded the thrombus formation and measured the diameter of inlet and waist of LAA. The patient refused to use intracardiac echocardiography due to financial constraint. Implantation of LAA device was guided by X-ray fluoroscopy and angiography without general anesthesia with only perioperative use of TEE[3]. During LAAO procedure, the shape and size of LAA was determined by angiogram. We chose the occluder with diameter of 26mm lobe/38mm disc (LAmbre 2638, Lifetech Scientific, China). Under continuous fluoroscopy monitoring, the occluder was in position with no obvious residual flow in a correct tug test, and then it was fully released. The method referred the COST principle (umbrella deployed beyond Circumflex artery; umbrella fully Open; peri-device optimal Sealing; device stability confirmed by Tug test)[2]. The occluder, however, unexpectedly dislodged to left atrium (LA) at the end of procedure. Instantly, a LASSO catheter (Nav, Biosense Webster, America) was introduced to entrap the tumbling device to prevent it from falling into left ventricle (Figure 1A, online Video 1). And the department of cardiovascular surgery was ready for unexpected needs. The normal head foreign body removal forceps (Mousetooth alligator forceps, Alton Medical Limited, China) was sent to LA through another 8.5F transseptal sheath (L1, Synaptic Medical, China). We tried many times, but still failed to grasp the device. After that, we adjusted LASSO to access the center of occluder, while it suddenly migrated to left ventricle, and instantly flowed into aorta arch (Figure 1B). The patient was asymptomatic and with stable

heart rhythm and blood pressure. A 14F flexible sheath (FlexCath, Medtronic, America) was delivered via right femoral artery approach to adjust and access the center of sealing disc, thereafter the aforementioned forceps were sent out, and finally after several attempts the sealed disc center was caught (Figure 1C-D, online Video 2); the LAA occluder was smoothly retrieved into the sheath (Figure 1E, online Video 3). The device was completely destroyed due to the pulling and squeezing inside the sheath (Figure 1F). Repeat aorta arch angiography showed no vascular complications. The patient refuted further implantation of other devices, and returned to ward with stable hemodynamic parameters, without pericardial effusion and injury of valves.

Discussion

Percutaneous retrieval of the dislodged LAmbre occluder has been depicted in a canine model with a 14F adjustable curved sheath and forceps[4]. We herein reported a human case using this strategy to safely retrieve the LAmbre device. The reasons for dislodgement may associate with: improper size, incorrect apposition, a shallow landing zone, vigorous tug test, passive or active movement before complete endothelialization[4]. In the present case, dislocation may be on account of the complex structure–a cauliflower shape with a wide ostium and a short distance from each lobe to the common ostium, and the over sizing of device. We however could not totally exclude the influence of intraoperative imaging, though previous study reported the potential feasibility of simplified procedure using fluoroscopy only[5]. Unlike the other two types of devices, i.e. Watchman and Amplatzer Cardiac Plug, referring to use snare to retrieve, the retrieving tool of LAmbre was referred to use the disposable grasping forceps (JIUHONG, Changzhou, China). The fixed disc of LAmbre is too fragile to be caught, but the sealed disc, woven with nickel titanium alloy wire, could be hauled and contracted into the sheath integrally by catching the wire of center area of the metal disc. Therefore, as recently reported in a canine model[4], for successful retrieval, it is important to get close to the center of disc (using a hard guided wire and a pig tail duct) and grasp device with the forceps. In present case, when in LA, it is probable that the used sheath was not as flexible and large as to access the effective seizing position. We should introduce a 14F adjustable curved sheath[4]. Fortunately, after fleeing from LA, the device was not trapped in left ventricle and quickly embolized in aorta arch, giving us another chance to retrieve. The 14F flexible sheath is able to adjust satisfactory angles and get close to the right position so as to catch the occluder smoothly by forceps. Therefore, a 14F flexible sheath and forceps can be used to safe percutaneous retrieval of LAmbre in aorta.

Competing interests

There is no conflict interest to be declared.

References

1. Ali M, Rigopoulos AG, Mammadov M, et al. Systematic review on left atrial appendage closure with the LAmbre device in patients with non-valvular atrial fibrillation.*BMC Cardiovasc Disord.* 2020;20(1):78.

2. Sanhoury M, Fassini G, Dello Russo A, Lumia G, Bartorelli A. Early Dislodgment and Migration of a Left Atrial Appendage Closure Device. *Am J Cardiol.*2017;120(10):1905-1907.

3. 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(4):3996-4001.

4. Wang G, Kong B, Liu Y, Huang H. Percutaneous retrieval of a dislocated LAmbre left atrial appendage occluder in a canine model. *J Cardiovasc Electrophysiol.*2020;31(2):529-535.

5. So CY, Lam YY, Cheung GS, et al. Minimalistic Approach to Left Atrial Appendage Occlusion Using the LAmbre Device. *JACC Cardiovasc Interv.* 2018;11(11):1113-1114.

Figure Legends

Figure 1: A: The occluder was entrapped in LA by LASSO; B: The occluder embolized in aorta arch; C: The sheath was bent to get close to the center of sealing lobe; D: The forceps caught the wire of center area

of the sealing disc; E: The migrated occluder was smoothly taken back into the sheath; F: The damaged device in vitro.