A planted LAmbre device gets dislocated during the procedure :a case report with literature review

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Abstract

Abstract Introduction:LAmbre device was rarely reported to get dislocated during the procedure and it can be deliberately recaptured, completely retrieved and re-deployed.A LAmbre device trapped in the mitral valve is infrequent and which can hardly be recaptured by percutaneous retrieval. Methods:We reported a planted LAmbre device(Lifetech Scientific Corp.) that was dislocated during the procedure of Left Atrial Appendage Occlusion.The patient's hemodynamic parameters suddenly changed while we withdrew the delivery sheath.The fluoroscopy and TEE showed that the device was detached from the landing zone and closed to the mitral valve. Result:We attempted percutaneous retrieval but failed and the device was subsequently recapatured by a cardiovascular surgery. Conclusion:We should make sure the occluder in the optimal position and operate prudently to avoid device migration or detachment.If the device locates in the mitral valve or LV and causes hemodynamic changes,a surgery should be performed as quickly as possible to retrieve the implant.

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Methods :We reported a planted LAmbre device(Lifetech Scientific Corp.) that was dislocated during the procedure of Left Atrial Appendage Occlusion.The patient's hemodynamic parameters suddenly changed while we withdrew the delivery sheath.The fluoroscopy and TEE showed that the device was detached from the landing zone and closed to the mitral valve.

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Case report

An 82-year-old woman with a history of hypertension,third-degree atrioventricular block and artery embolization was admitted to hospital because of chest distress and palpitations.She was found to have atrial fibrillation(AF) on an ECG recorder.She didn't get pacemaker planted in her heart and never took oral anticoagulants(OAC) in the past.Due to the patient's desire to prevent the embolization and in view of the risk of hemorrhage to take OAC,she was referred for left atrial appendage occlusion(LAAO) with a CHA2DS2-VASc score of 5 and a HAS-BLED score of 3.The left atrial appendage(LAA) ostial diameter was 26mm measured by the pre-procedure cardiac computed tomography.No thrombus was found in the patient's left atrial(LA) or LAA by CT.The diameter of the landing zone was29.1±2.1mm measured by fluoroscopy and a 34-38mm LAmbre device was deployed ed to close the patient's LAA.After placing the implant in LAA, left atrial angiogram and TEE were performed to check device positioning,LAA sealing and impingement on surrounding cardiac structures.The fluoroscopy and TEE demonstrated that the device was placed in proper position with no residual leakage and then a tug test by exerting tension to the delivery cable was performed to ensure device stability.The COST(C-the umbrella must be flowered at the distal end of the origin of circumflex artery;O-open fully;S-sealing,peri-device leak[?]3 mm;T-tug test)criteria were confirmed before releasing the device completely.The LAAO was procedural successful.However,the patient's blood pressure suddenly dropped to 60/35mmHg while the operators withdrew the delivery sheath.We tried to elevated patient's blood pressure by speeding up fluid replacement and using noradrenaline promptly.The fluoroscopy and TEE showed that the device was detached from the landing zone and closed to the mitral valve.We decided to retrieve the device by using forceps(Mousetooth alligator forceps, Alton Medical Limited, China)through a 14F adjustable curved sheath(FlexCath, Medtronic, USA)via femoral access immediately but it didn't work.The device was trapped in the mitral valve.At once,we contacted the surgeons and the surgical retrieval was been performed subsequently to remove the implant in the heart.The patient's hemodynamic parameters ultimately got steady after the cardiovascular surgery.

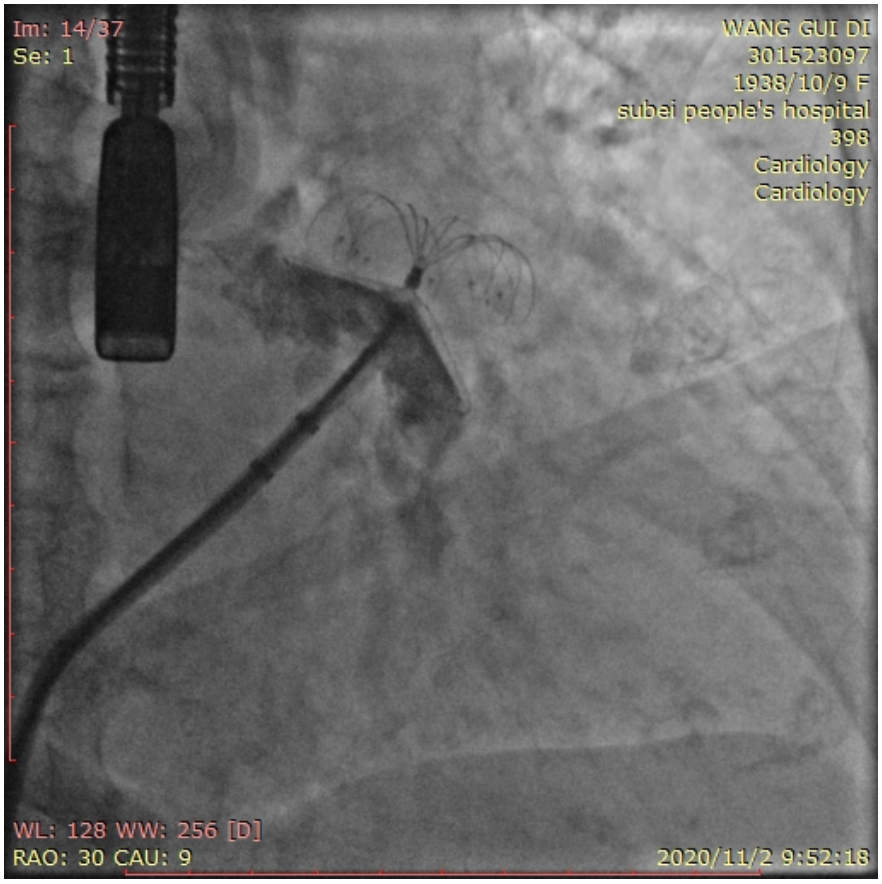
discussion

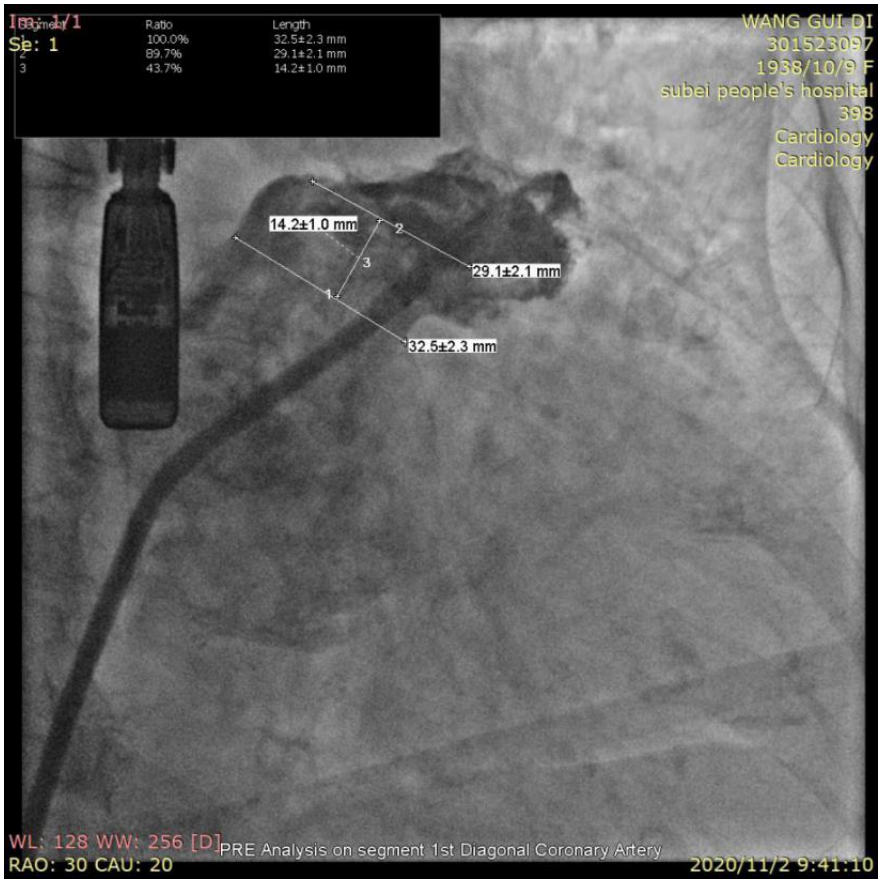
To our knowledge,it has rarely been reported that a planted LAmbre device gets dislocated during the procedure of Left Atrial Appendage Occlusion before and the procure was meeting COST criteria.A LAmbre device (Lifetech Scientific Corp., Shenzhen, China)is one of the "anchor and seal"devices and it consists of an umbrella and a cover connected by a short central waist[1].The distal umbrella comprises 8 claws with individual stabilizing hooks attaching to them to facilitate anchoring to LAA wall[1].Once some of the hooks fail to anchor to the LAA wall steadily,the occluder may become mobilizable in horizontal direction while the tug test proves it is stable in the vertical direction.In this situation,the device could detach from the landing position once losing the traction from the delivery sheath and that may account for the present case.The size of the LAmbre device should be 4-6 mm larger than the measured LAA orifice, specifically based on the structure of the LAA and the compression degree of the implant. The choice of a 34-38mm LAmbre device was reasonable in this case but this patient's LAA was in a chicken-wing shape and the landing disc was not deployed coaxially with the LAA.Both of the umbrella and the cover are circular, the eccentricity and irregularity of the LAA orifice have been verified implicated in residual leak[2] and they may have potential influence on the stability of the device. To ensure the device solid,we should confirm the following points to make sure the occluder is in the optimal position before releasing it completely:the umbrella is rectangular or inverted trapezoid, the 8 mark points are located in the same horizontal plane with the center point,the upper edge is smooth and fixed, and the cover is in the shape of concave.

Watchman device differs from LAmbre in structure and it is a self-expanding nitinol framed structure with

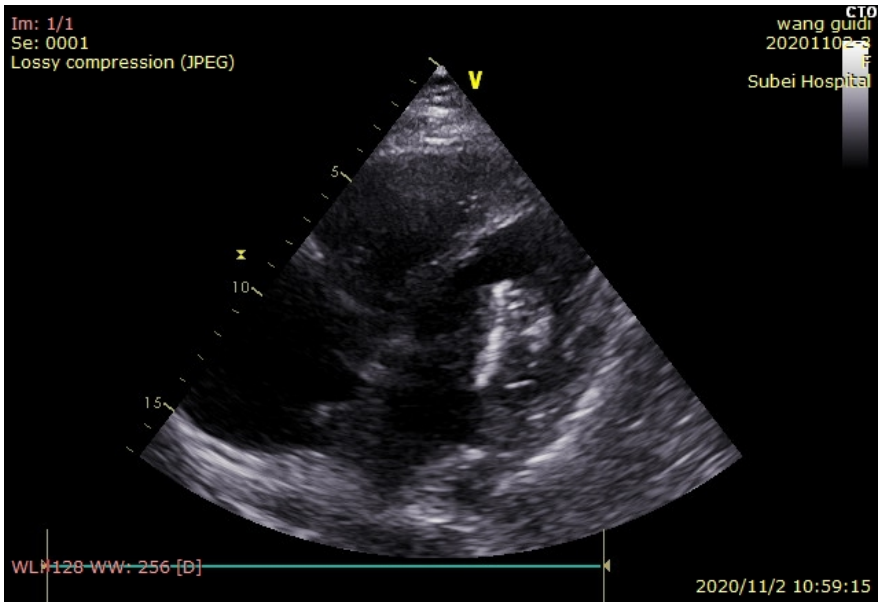
fixation barbs and a permeable polyester fabric to cover the orifice of the LAA[3].Watchman device has limitations like limited recapture and repositioning capabilities[3].Li et al[4].reported a case of successful percutaneous retrieval of a detached watchman device by clipping device hub via a 12-F transseptal sheath after two failed attempts.One of the advantages of the LAmbre device is that it can be deliberately recaptured, completely retrieved and redeployed.Qiu et al .and Sanhoury et al.reported two cases of successful retrieval of LAmbre device with the devices respectively located in the aortic arch and the abdominal aorta.Both of their patients were asymptomatic during the procedure.Unfortunately,the the device was trapped in our patient's mitral valve and caused hemodynamic changes rapidly.We immediately put the patient on life support and tried percutaneous recapture but that didn't work .The device was subsequently removed by a cardiovascular surgery.As Wang et al.reported,the occluder can hardly be retrieved through a percutaneous sheath and usually lead to device-related injury when it is trapped in left ventricle(LV)[5].As far as we know,a successful percutaneous recapture of a LAmbre device trapped in the mitral valve has never been reported till now.For the LAmbre device,when we rotate the sheath counterclockwise repeatedly,the unloading of the occluder may occur.To avoid this situation,we must keep an eye on the occluder and operate prudently especially when we rotate the sheath with the occluder in the state of half release. If the device unexpectedly falls in the LA or the aorta and the patient's hemodynamic parameters are stable,we can still attempt to retrieve the device by using forceps or snares through a adjustable curved sheath.A catheter should be used to fix the implant via femoral access and then we need to advance a pigtail to the mitral valve orifice through the septum to prevent the occluder from falling into the LV further.During this procedure, ACT should be frequently tested to avoid thrombosis.If the device locates in the mitral valve or LV and causes hemodynamic changes,percutaneous retrieval can hardly work and a surgery should be performed as quickly as possible to retrieve the implant.

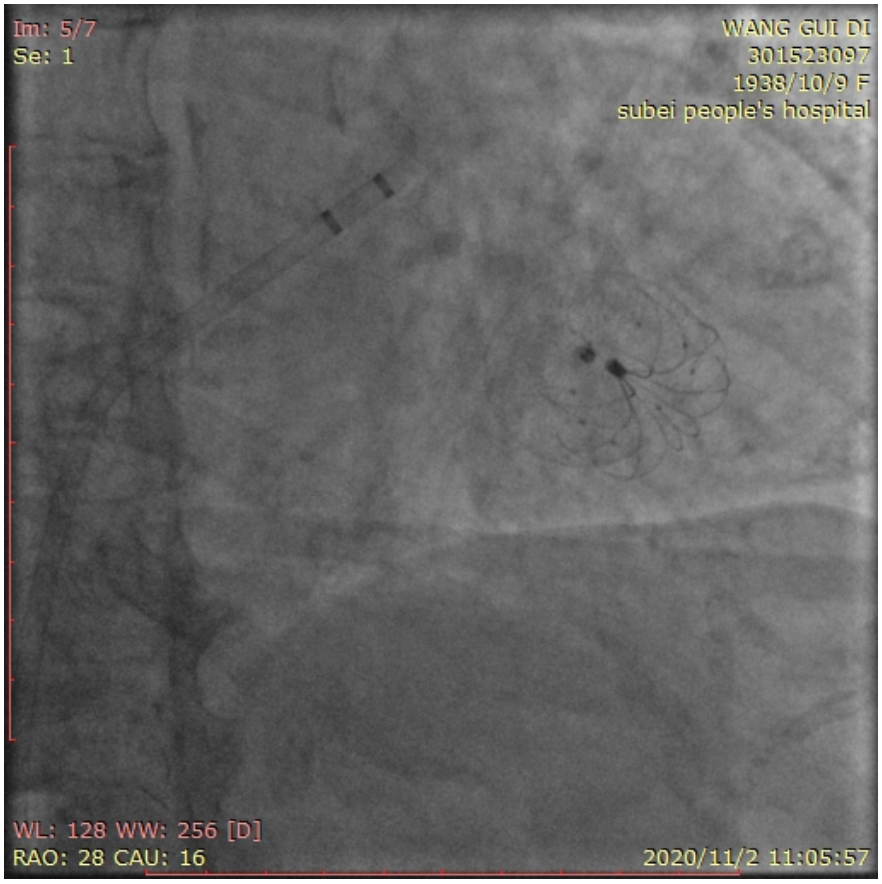
Kang-zheng YUAN and Jian WANG contributed equally to this work.





Figure





a:The diameter of the landing zone was29.1±2.1mm measured by fluoroscopy;b:The fluoroscopy demonstrated that the device was placed in LAA with no residual leakage.c,d:The fluoroscopy and TEE showed that the device was detached from the landing zone and closed to the mitral valve.

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