

## Accepted Manuscript

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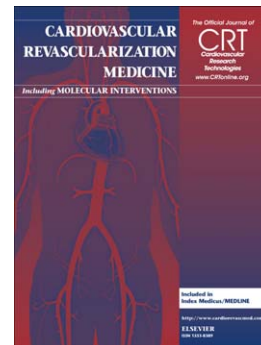
PII: S1553-8389(15)00343-7  
DOI: doi: [10.1016/j.carrev.2015.12.006](https://doi.org/10.1016/j.carrev.2015.12.006)  
Reference: CARREV 813

To appear in: *Cardiovascular Revascularization Medicine*

Received date: 28 October 2015  
Revised date: 12 December 2015  
Accepted date: 22 December 2015

Please cite this article as: Teijeiro-Mestre Rodrigo, Alegría-Barrero Eduardo, Ruiz-García Juan, Oyanguren Beatriz, Eimil Miriam, Martín Miguel Ángel San, García Eulogio, Complex Anatomy Difficulting Left Atrial Appendage Closure, *Cardiovascular Revascularization Medicine* (2015), doi: [10.1016/j.carrev.2015.12.006](https://doi.org/10.1016/j.carrev.2015.12.006)

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**COMPLEX ANATOMY DIFFICULTING LEFT ATRIAL APPENDAGE CLOSURE**

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Word count: 782 words (manuscript), 9 references, 1 figure

A 65 year-old man was referred for progressive neurological impairment. He had severe obesity, hypertension, type-2 diabetes and was a former smoker. Computed tomography showed a 11 x 10 mm basilar artery aneurysm. ECG revealed a persistent atrial fibrillation. Transthoracic echocardiogram showed mild left atrial enlargement and no structural heart disease was noted. An estimated CHA<sub>2</sub>DS<sub>2</sub>-VASc score of 3 indicated a 3.2%/year stroke risk and oral anticoagulation was considered. However, cerebral aneurysm rupture rate was elevated (estimated at 14.5% risk/5 years)(1,2) and thus oral anticoagulation was contraindicated. The patient was referred for left atrial appendage closure. Transesophageal echocardiogram (TEE) revealed a single-lobe, windsack type, left atrial appendage (LAA). General anesthesia and TEE guidance during the procedure were used. After uneventful transeptal puncture, contrast injection showed a challenging upward uptake of the LAA. The complexity of the case lies on the acute angle of the sheath towards the roof of the LAA with little help from TEE (Figure 1). In addition, LAA followed an upward course (opposite to “conventional” downward course). Fortunately, after several rotation manoeuvres a 20-mm Amplatz occluder (St Jude Medical Inc., St. Paul, MN, USA) was advanced distally into the LAA and the distal disc was released. Further deployment was performed under gentle traction of the catheter, achieving a complete expansion of the device with complete exclusion of the LAA.

Patient was discharged 24 hours after the procedure without complications. 3 months dual antiplatelet therapy with clopidogrel 75 mg and aspirin 100 mg daily, followed by lifelong aspirin 100 mg was prescribed. 4-weeks after intervention patient came to the outpatients' clinic referring an uneventful recovery and no bleeding complications. Repeated echocardiogram revealed the persistence of the device on the LAA and no evidence of pericardial effusion.

Left atrial appendage closure is a safe and potential treatment for patients with elevated risk of thromboembolic stroke (3,4). LAA closure is tailored for reducing the incidence of ischemic stroke when oral anticoagulation therapy is contraindicated (1,2,5-7).

LAA closure can be potentially challenging when anatomical difficulties are encountered. Thus, transesophageal echocardiogram is essential to adequately assess morphology, neck diameter and depth of the LAA (6-9). However, despite anatomical landmarks, intraprocedural troubles cannot be anticipated. We tried several fluoroscopic views, different TEE angles and, after an inspiring rotational maneuver, we were able to release the device.

We present the unique case of LAA complex anatomy and arduous horizontal uptake, with limited guidance from TEE. Complex anatomical variants may need a sum of information from TEE and fluoroscopy to achieve a good final position of the closure device. We believe that sharing knowledge will help our colleagues face challenging anatomies.

## **CONCLUSION**

Challenging left atrial appendage anatomies require expertise and skilful manoeuvres to overcome intraprocedural difficulties.

## **CONFLICTS OF INTEREST**

Authors declared no conflicts of interest.

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## FIGURE LEGENDS

**Figure 1.** The 14-Frech sheath was placed into the left atrium with great difficulty. Several angiographic views were needed (**A**) to locate the left atrial appendage origin and catheterize selectively in cranial view (**B**) (uncommon view). The complexity of the case lies on the acute angle of the sheath towards the roof of the LAA with little help from transesophageal echocardiogram (TEE) (**C**). After selective LAA catheterization, the Amplatzer device is released, under fluoroscopic control and angiographic confirmation of a correct deployment. (**D**, **E**). We performed final confirmation injections with the Amplatzer deployed but attached to the system before a complete deployment (**F**). Panel **G** shows the correct positioning of the device by TEE.

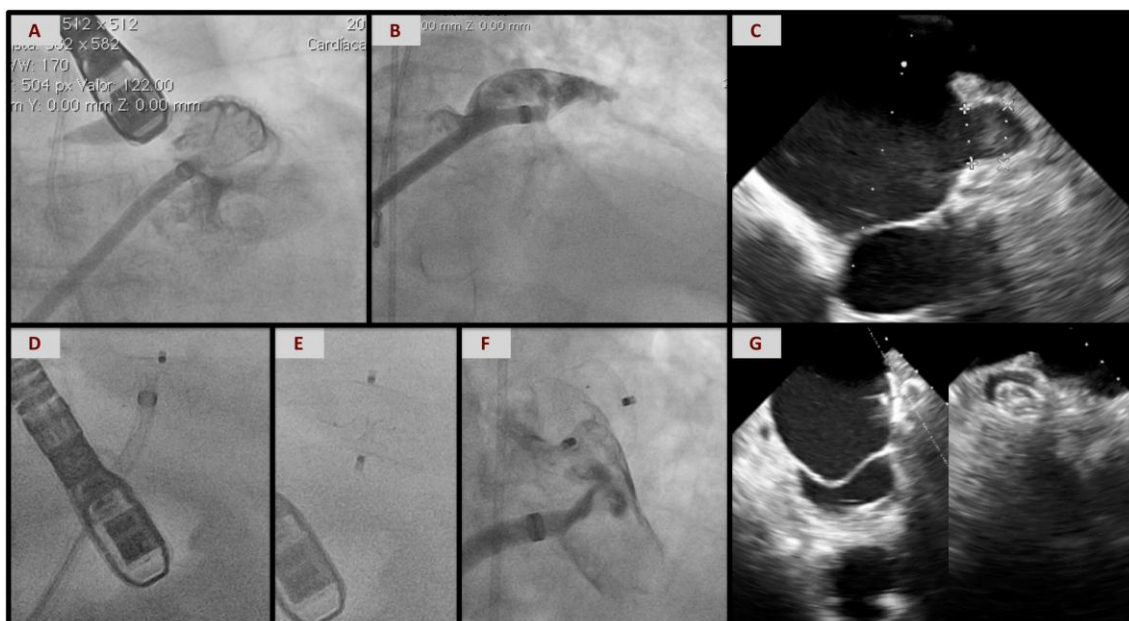


Fig. 1

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**HIGHLIGHTS**

- Different anatomic features of the left atrial appendage require original and strategic solutions to achieve procedural success.
- Accumulative experience with challenging cases will help interventionalists overcome similar complex anatomies.

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