PERCUTANEOUS CLOSURE OF A WHALE TAIL LEFT ATRIAL APPENDAGE WITH A WATCHMAN FLX DEVICE AND PRE-PROCEDURAL FEOPS HEARTGUIDE PATIENT-SPECIFIC COMPUTATIONAL SIMULATION

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Background:

Percutaneous left atrial appendage closure (LAAC) is an emerging alternative to oral anticoagulation (OAC) for stroke prevention in atrial fibrillation (AF) in patients with a contraindication for standard OAC. Optimal preprocedural planning is essential to ensure optimal procedural results.

Case summary:

A 62-year-old male with permanent atrial fibrillation (CHA2DS2-VASc = 2) was referred for LAA closure due to right cerebellar hematoma on Warfarin in December 2020. He had a previous history of urothelial low-grade adenocarcinoma treated with TURBT (Transurethral Resection of Bladder Tumor).

The pre-procedural CT showed a very unfavorable LAA anatomy with a short neck and two proximal symmetric lobes opposite one another. The landing zone measurements were 16 x 22 mm with an available depth of implant of 12mm.

Considering this rare and challenging anatomy, also known as “Whale Tail” LAA, we obtained a prediction of implantation with a Watchman FLX device with the simulation support of FEops HEARTguide. According to Watchman sizing chart, this appendage was fit for a 24mm FLX device, aiming at a very proximal deployment. The main question we asked to the software was if the 24 mm size was suitable for this anatomy, achieving a good closure with no final significant leaks or excessive protrusion into the left atrium (LA). FEops analysis confirmed the suitability of the 24mm device suggesting a proximal implant to avoid any leaks, with a predicted final compression of approximately 10%, good apposition degree and not excessive buldge into the LA. We also tried a simulation with a 27 mm FLX device with a deeper deployment but it was expected to extremely protrude into the left atrium (Figure 1).

By using a 14-F delivery system, the 24-mm Watchman Flex device (Boston Scientific, Marlborough, MA, USA) was definitely selected and implanted, as intended, in the proximal LAA.

After two attempts of proximal deployment, the device was sitting tilted towards the inferior lobe, leaving a wide leak around the opposite one. Then we pulled it into the LAA ostial part with gentle retraction, obtaining a perfect sealing with adequate compression and stability at push and pull test. The device final position and deformation confirmed both at TEE and angiography resulted quite similar to FEops prediction (Figure 2). The patient was discharged at home on postprocedural day 2, the in-hospital course was uneventful. At 45-day follow-up TEE control, the device was in its correct position with no residual leak and no evidence of embolization or thrombi.

Discussion: Percutaneous left atrial appendage (LAA) closure is feasible in the majority of patients. However, certain LAA anatomies may pose substantial technical challenges. This case shows the crucial role of a pre-procedural assessment based on patient-specific computational simulations for LAA closure in difficult scenarios resulting in a more efficient procedure with optimal result and good clinical outcomes.

Figure 1

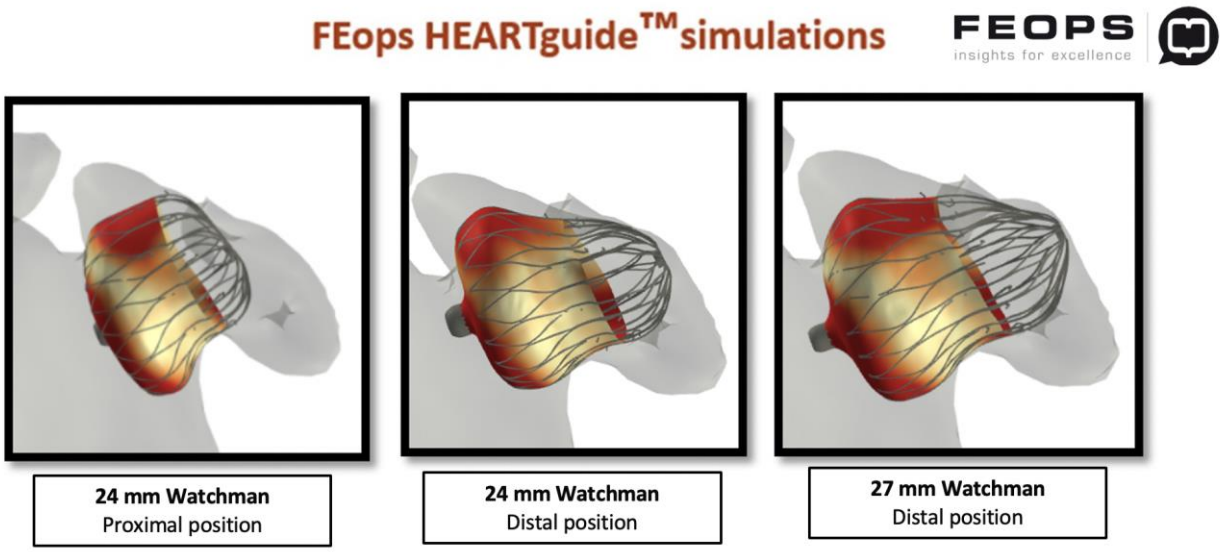

Figure 2