Background

Meta-analyses confirmed that in cases of left atrial thrombus in nonrheumatic atrial fibrillation, approximately 90% of them are in the left atrial appendage (LAA).

Percutaneous seal of the LAA prevents thromboembolic stroke.

Adequate morphology assessment is essential to determine eligibility for percutaneous closure and determine the correct size of the device to implant.

The device is usually upsized considering the largest ostium diameter.

Objective

Compare transesophageal echo (TEE) with angiography (ANGIO) in terms of LAA dimension and morphology assessment, in the context of percutaneous LAA closure.

Methods

In patients selected for LAA closure using the WATCHMAN® percutaneous system.

TEE was performed days prior (TEE1), during the procedure (TEE2) and LAA ANGIO was performed during the procedure, before device implantation.

Measurements of the LAA were determined in 0º, 45º, 90º and 135º angles in TEE and at least two right-anterior oblique (RAO) views in ANGIO (RAO caudal and RAO cranial).

Number of lobes and existence of proximal bifurcation – distance between bifurcation and ostium inferior to ostium diameter – were determined in each modality.

Results

Six patients (five men) were selected and underwent device implantation. Mean age was 67 ± 10 years.

The maximum LAA ostium diameter was 26.2±5.0 mm by ANGIO; 25.9±5.7 mm by TEE1 and 24.0±5.0 mm by TEE2.

In a paired-t test analysis, ANGIO vs. TEE1 maximum ostial diameters were not significantly different (p=0.720), but ANGIO & TEE1 measurements were both significantly greater then by TEE2 (p=0.029 and p=0.009, respectively).

The number of lobes identified by ANGIO was significantly higher compared to TEE (2.6±0.5 vs. 1.6±0.5, p=0.032).

One patient presented a challenging anatomy with 3 lobes with proximal bifurcation, requiring several attempts with 3 different devices until adequate sealing was obtained. The proximal bifurcation was only identified by ANGIO.

The maximum ostial diameter was identified in 83% of cases (n=5) in the extreme angles (0º or 135º) by TEE and 83% of cases (n=5) in RAO caudal by ANGIO.

Conclusion

In patients submitted to percutaneous LAA closure, TEE during the procedure underestimates the maximum LAA ostial diameter – probably due to relative hypovolemia / lower blood pressure.

Pre-procedural TEE is adequate to choose the correct device size to implant in the majority of patients. However, it should be complemented by ANGIO to identify complex anatomy, such as multiple LAA lobes with proximal bifurcation.