Is transesophageal echocardiography the “Gold Standard” to guide LAAO? The feasibility and benefits of LAAO workflow with CartoSound versus TEE: a pilot study

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Introduction: Transesophageal echocardiography (TEE) plays an important role in left atrial appendage occlusion (LAAO) procedure which is considered as the “gold standard” to assess the implant device position and peri-device flow currently. In recent years, the efficacy and safety has been demonstrated in clinical trials that LAAO can be performed under local anesthesia guided by intracardiac echocardiography (ICE). However, there's no standard workflow for comprehensive measurement and assessment using ICE technology. This study is intended to develop an optimized manipulation workflow for ICE use in LAAO procedure, compared with TEE.

Methods: This was a single-center, cohort study. 80 patients undergoing LAAO with LAmbre device in the First Affiliated Hospital of Wenzhou Medical University from January 2018 to July 2019 were enrolled. CartoSound (CS) guided LAAO (CS group) were performed under the local anesthesia (n=40 including 23 cases with combined catheter ablation and LAAO). TEE guided LAAO (TEE group) were also performed under the local anesthesia (n=40, including 23 cases with combined catheter ablation and LAAO). Another 10 more procedures were guided by CS and TEE simultaneously. CS guided LAAO from left atrium applied “FLAVOR” approach (Four Long Axis Views Surround Orifice) under Carto3 navigation system.

Result: Clinical characteristics were comparable between the 2 groups. In TEE group, 40% of the cases could not show satisfactory long axis view of device at 135°, while in CS group, the long axis views with four angles of device were successfully gained in all the cases. Of the other 10 cases, simultaneously evaluated by both CS and TEE during procedure, 2-dimensional TEE failed to identify the leak due to inability to display the long axis view at 135° in 2 cases, however, the leak was clearly showed by CS at 45°. All procedures were successfully completed. There were no statistically significant differences in device exchange rate and periprocedural complications. The fluoroscopic time, radiation dose and contrast usage in CS group were significantly reduced compared with TEE group (P<0.01). There was no statistical difference in procedure time between the two groups. There was no significant difference in peri-device flow ratio between the two groups in 45 days follow-up with TEE examination.

Conclusion: Compared with TEE, ICE guided LAAO appears to be effective and safe and without increased procedure-related complications. ICE with “FLAVOR” approach can be more accurately to evaluate the location of implant device and peri-device flow. It also significantly reduces radiation dose, fluoroscopic time, contrast usage. ICE may be a promising imaging tool to guide LAAO under local anesthesia.