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Commentary

Tips for Simultaneous Leadless Pacemaker Implantation and Catheterization for Structural Heart Disease under Transesophageal Echocardiography Guidance

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DESCRIPTION

In recent years, the frequency of Leadless Pacemaker (Micra) Implantation (LPI) has increased with patient aging. The number of high-risk patients is also increasing, and it is important to prevent complications [1,2], especially cardiac tamponade. The tip of the Micra leadless pacemaker (Medtronic) tip should face the ventricular septum to prevent cardiac tamponade, which should be confirmed by right anterior oblique and left anterior oblique view fluoroscopy with sufficient amount of contrast agent. In patients with impaired renal function or contrast agent allergy, it is difficult to use a sufficient amount of contrast agent is difficult, so a leadless pacemaker must be placed by checking intracardiac echocardiography or Transesophageal Echocardiography (TEE) images [3,4].

Furthermore, with advances in catheterization technology, the number of catheterizations for structural heart disease, such as Transcatheter Mitral Valve repair (TMVr) and Left Atrial Appendage Closure (LAAC), has increased over the years [5,6]. Simultaneous performance of LPI and catheterization for structural heart disease may be useful because TMVr and LAAC are recommended to be performed under general anesthesia and TEE guidance using a transfemoral vein approach, and this condition is similar to that of LPI.

Procedure order

We have previously reported the simultaneous performance of TMVr and LPI [3]. TMVr was performed first strategy because the caliber of the MitraClip steerable guide catheter sheath (Abbot, 24 Fr) is smaller than that of the Micra introducer sheath (27 Fr) and the procedure in the left atrium required more intense anticoagulation (target activated clotting time: 250 seconds for MitraClip and 200 seconds for Micra). Regoli and colleagues reported four cases of simultaneous LAAC and LPI [7]; they performed LPI first strategy only one case with temporary pacing for atrioventricular block, which was considered a special situation. We also performed simultaneous LAAC and LPI, however performed LAAC first strategy because the caliber of the catheter sheath (Watchman access sheath; Boston Scientific) was 14 Fr and anticoagulation was more intense (target activated clotting time: 300 seconds for Watchman).

Imaging

In our previous report on TEE-guided LPI, the Micra had to be deployed four times due to residual lead artifacts [2]. This time, TEE guidance was also performed during simultaneous LAAC and LPI. Because there was no residual lead, the Micra was successfully placed in a single deployment (Figure 1). The procedure time was 99 minutes, and the patient was discharged home uneventfully on the second day after the procedure. In this case, contrast was used because the patient had normal renal function, however the procedure could have been performed without contrast. As previously reported, intracardiac echocardiography guidance is also being considered in order to reduce the amount of contrast medium [4]. However, it requires an additional 8-Fr access sheath puncture. In non general anesthesia strategy, intracardiac echocardiography guided LPI may also be useful in terms of less or no contrast.

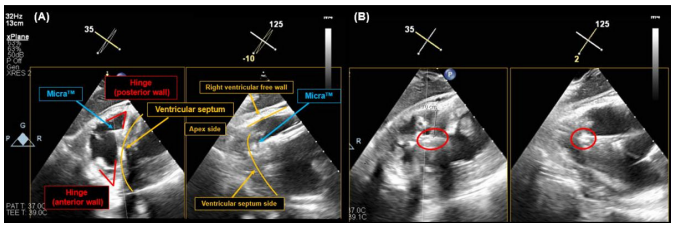

Figure 1: (A) Transesophageal echocardiography images of leadless pacemaker implantation in the transgastric right ventricular inflow view. (B) Transesophageal echocardiography images of the leadless pacemaker after release in the transgastric right ventricular inflow view. The distance between the Micra and the posterior wall hinge was 17.0 mm. The threshold was 1.0 V at 0.24 ms, R wave 3.6 mV, and impedance 510 Ω.

Simultaneous LPI and catheterization for structural heart disease, such as TMVr and LAAC, is a feasible and less invasive approach that may have the following advantages: Less or no

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contrast in TEE-guided procedures, shorter hospital stay, procedure time, and postprocedural bed rest time.

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