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IMAGING VIGNETTE

Percutaneous Left Atrial Appendage Obliteration

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THE LEFT ATRIAL APPENDAGE (LAA) is responsible for about 90% of cardioembolic events (1) and LAA obliteration is often performed during cardiac surgery to minimize this risk. The LAA obliteration is now feasible via a percutaneous approach. Patients are often poorly compliant with anticoagulation (2), and anticoagulants are contraindicated in selected subsets of patients. A device or method to reduce the risk of embolization from LAA thrombi, especially when associated anticoagulation is not needed, would be a desired option in such patients. Studies comparing percutaneous LAA obliteration with traditional anticoagulation are ongoing. The following figures offer some images of the procedural details by standard angiographic and transesophageal echocardiographic (TEE) imaging. The histopathologic consequence of the LAA obliteration is also shown.

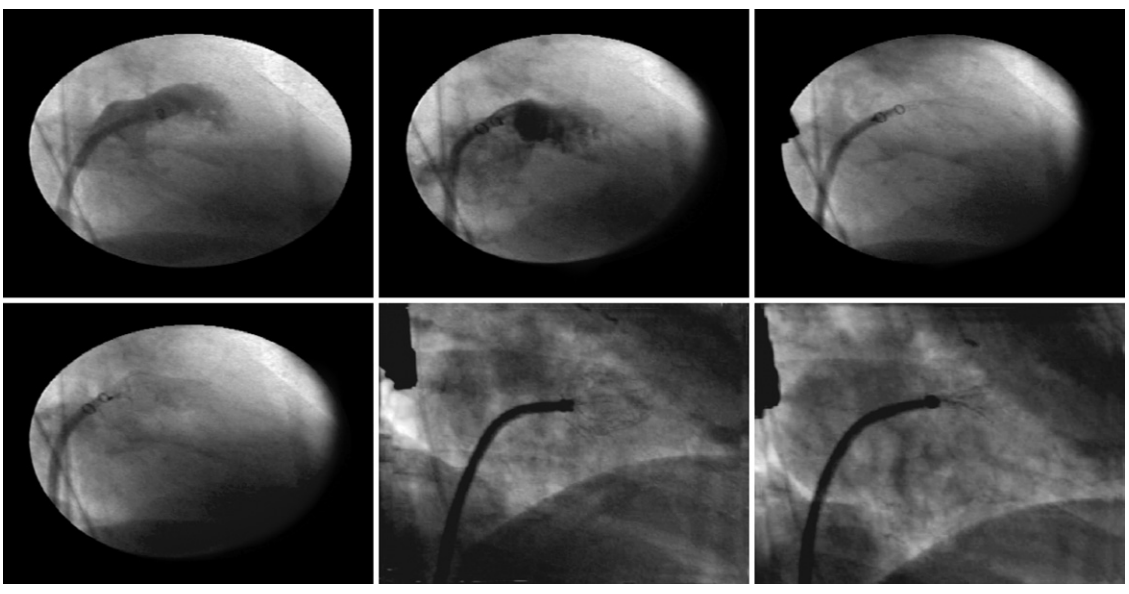

Figure 1. Selected Angiographic Images of the LAA Ablation Procedure

The **top left panel** shows a catheter in the LAA. Injected contrast outlines the LAA and shows no filling defects (previously confirmed by pre-procedure TEE). The **next panel** shows contrast being injected through the device protruding out of the catheter tip. The **remaining panel** shows deployment and subsequent withdrawal of the device delivery system.

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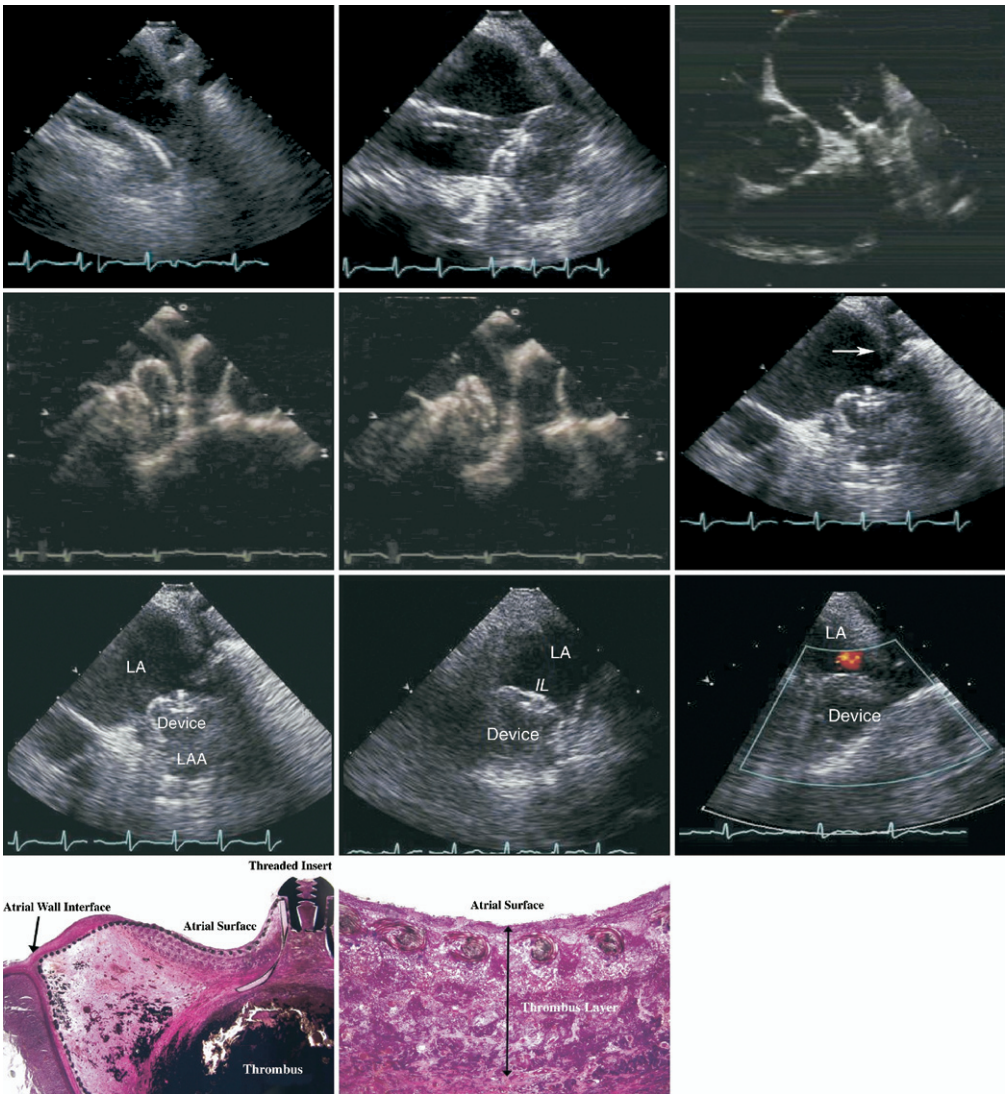

Figure 2. Selected Echocardiographic Images of the LAA Ablation Procedure and the Histologic Process of Healing

The **top left image** of a representative TEE image shows a catheter properly seated in the LAA. The LAA shows no filling defects. The **next 2 images** show the device still attached to its delivery system and well seated in the ostium of the LAA. These **images** also show the extent of deployment and the device's anatomic fit. The **next 3 images** show intermediate steps of deployment and withdrawal of the device delivery system. A few injected bubbles can be seen as a thin jet **(arrow)** along the wall of the LAA and the adjacent wall of the left atrium (LA). The **next image**, taken immediately after deployment, shows a well-seated, fully deployed LAA occlusion device. The subsequent TEE images are taken 45 days post-implantation as part of a protocol-mandated evaluation of the Watchman device (Atritech Inc., Plymouth, Minnesota) from another patient, an 88-year-old woman with chronic atrial fibrillation and history of a previous cerebrovascular accident. The device surface is a porous 160-μm polyester membrane mounted on a self-expanding Nitinol frame that filters LAA blood entering and leaving the appendage. Pre-clinical studies have demonstrated intimal coverage and endothelialization by 3 months. These images show adequate device seating, and an echogenic shadow consistent with thin tissue lining. Color Doppler shows a mild amount of flow (which is seen as a to-and-fro motion in Online Videos 1, 2, 3, 4). The histopathologic sections have been obtained from this 88-year-old patient who died of renal failure, unrelated to the device or cardiac causes, 4 months after implantation of the device. The **left** histomicrograph shows healing of the atrial obliteration process. The device is completely attached to the atrial wall, and there is a healed fibrous intimal tissue layer on the atrial surface. A partially organized thrombus is present deep within the atrial appendage (25×). This thrombus represents static blood, and it is believed that this will become a fibrous scar as it heals. The **right** photomicrograph shows a close-up of the occluder device fibers. There is excellent healing of the atrial chamber contact surface. An organizing thrombus is seen deep in this device and membrane layer (10×).