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Atrial Fibrillation Ablation: Guidance by Newer Imaging Techniques

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Nowadays, image integration in electrophysiology comprises X-ray, angiography, intracardiac signals, impedance level and stability, 3D-mapping systems (e.g. Carto, NavX-Ensite), magnetic navigation, “off-line” systems (magnetic resonance imaging-MRI, computed tomography-CT) and “on-line” systems (transesophageal echo-TEE, intracardiac echo-ICE).

These “low-tech” and “high-tech” methodologies are used in various strategies for ablation of atrial fibrillation. In addition to the two main strategies, segmental ostial isolation of pulmonary veins (PV) initiated by Haissaguerre (“trigger approach”) and extra-ostial encircling of PV antra developed by Pappone (“trigger and substrate approach”), potential ablation targets include: regions of complex fractionated electrograms, the cardiac ganglionated plexes, the caval veins, and the coronary sinus musculature.

In 2006, the overall symptomatic effect of ablation in paroxysmal atrial fibrillation is more than 75%, less in persistent and permanent atrial fibrillation and with a complication rate below 2%. However, left atrial ablation has been associated with significant complications such as pericardial effusion/tamponade, pulmonary vein stenosis, stroke, atrioesophageal fistula, and death. Furthermore, new substrate for intra-atrial re-entry tachycardias can be created and be of significant clinical relevance post ablation.

So, due to three main reasons, safety, guidance and effect, in order to minimize complications, maximize efficiency and optimize cost/efficiency, additional imaging in mapping and ablation of atrial fibrillation may be of clinical importance.

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