Monitoring of Catheter Thrombus and Char Formation Using Phased Array Intracardiac Echo During Pulmonary Vein Isolation in Patients With Atrial Fibrillation

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Background: Cerebrovascular accidents (CVA) due to embolic events represent a major procedural risk in patients undergoing left atrial or left ventricular radiofrequency ablation procedures. These embolic events are mainly due to thrombus or char formation on the ablation and/or mapping catheters. We report the importance of intracardiac echo (ICE) in the early detection of catheters related char and thrombus during PV isolation procedures.

Methods and Results: Two hundred patients presented for circular mapping guided PV isolation (165 men; mean age 54±11 years) for treatment of symptomatic AF. Activated clotting time (ACT) was maintained above 300 sec using intravenous heparin. Radiofrequency energy was delivered using a cooled tip ablation catheter. Energy delivery was titrated watching for micro-bubbles formation using the ICE; in all study patients. In 4% of patients (8/200) an echo-dense mobile structure on the circular mapping catheter (Lasso) was detected by the ICE during the ablation procedure. The mapping catheter was immediately removed from the left atrium. The mobile structure appeared to be associated with char and thrombus in all patients. LA size, procedure time, number of lesions delivered, and RF power did not predict char formation. Conclusion: The use of phased array intracardiac echo seems facilitates the detection of intra-procedural char and thrombus formation. These preliminary findings should encourage the use of ICE during left atrial and/or left ventricular ablation procedures. This could minimize the risk of CVA in such population.

Wavelet Versus JPEG Compression of Echocardiograms

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Background: Image compression of echocardiograms is important because it allows fast data transmission across slow lines in telemedicine and limits the expense for storage media. Although wavelet compression becomes increasingly important, there is limited data about its value in echo, whereas JPEG compression is well established.

Methods: Nonselected clinical echo were subjected to JPEG compression, to wavelet compression (using biorthogonal wavelet filters and a zero-tree compression strategy) and compared to noncompressed loops. Compression quality was quantitatively compared by using the signal-to-noise ratio of compressed vs noncompressed data, as well as subjectively by expert review of the loops (10 best, 0 worst). Compression rate was titrated watching for micro-bubbles formation using the ICE in all study patients. In 4% of patients (8/200) an echo-dense mobile structure on the circular mapping catheter (Lasso) was detected by the ICE during the ablation procedure. The mapping catheter was immediately removed from the left atrium. The mobile structure appeared to be associated with char and thrombus in all patients. LA size, procedure time, number of lesions delivered, and RF power did not predict char formation. Conclusion: The use of phased array intracardiac echo seems facilitates the detection of intra-procedural char and thrombus formation. These preliminary findings should encourage the use of ICE during left atrial and/or left ventricular ablation procedures. This could minimize the risk of CVA in such population.