Late Apoptosis after Radiofrequency Ablation in the Heart Muscle

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Background: Radiofrequency (RF) catheter ablation has become routine treatment of most cardiac arrhythmias. During the last decade complex ablation involves massive ablation mass and previously negligible effect has become significant. Apoptosis contributes to wanted effect in oncologic radiofrequency ablation in different tissues. The purpose of this study was to evaluate the timing and the extent of apoptosis after catheter ablation in a rat-model. Methods: Epicardial RF ablation was performed in 35 rats, 3 moths old, 250-325 gram weight. The RF energy was delivered for 20 seconds on the epicardial surface of the left ventricle at 50-55 C° and 50 Watts power. The rats were scarified after 0, 0.5, 3, 12 and 24 hours and 7 and 14 days (5 rats in each group). Total caspase and activated caspase was determined with Western Blot and apoptosis was quantified with TUNEL staining.
Results: There was a significant increase in the 17k activated caspase level and the apoptotic bodies count increased gradually from 0.7±0.9 at 0 time to 47.6±42.6 after 14 days. The 17k caspase/actin increased from 0.09 at 0 time to 0.47 after 14 days. The figure shows TUNEL staining after 14 days.
Conclusions: Apoptosis develops gradually with maximal presentation after 14 days. This phenomenon may explain the late complications after extensive and complex RF ablation (atrial fibrillation and ventricular tachycardia ablation).