Abstract: P342

Visualisation of myocardial lesion formation in the first 60 minutes after epicardial electroporation ablation.

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Topic(s):
Basic Science - Cardiac Diseases: Arrhythmias

Citation:
Introduction: Irreversible electroporation creates deep and wide myocardial ablation lesions, consisting of fibrosis after several weeks. There are no data on acute myocardial lesion development.

Purpose: We investigated early myocardial ablation lesion development (first 60 minutes) created by irreversible electroporation.

Methods: In 7 pigs (±70 kg), with a custom linear suction device 4 single, 6-millisecond, cathodal, 200-Joules applications were randomly delivered at different epicardial right ventricular sites, at 4 different 10-minute time intervals. A total of 7 sets of 4 myocardial lesions each (with lesion ages: 0; 10; 20; 30; 40; 50 and 60 minutes) were obtained during the first 60 minutes after electroporation ablation. Euthanasia was performed 60 minutes after the first electroporation ablation. Lesion characteristics were analyzed histologically.

Results: Myocardial lesions resembled a necrosis pattern with interstitial edema and contraction band formation, immediately present after electroporation ablation. Hematoxylin-Eosin staining displayed interstitial edema (recognizable as empty space between cardiomyocytes, §) and contraction band formation (eosinophilic staining crossbands reflecting myocyte hypercontraction, #) (Figure). Lesion demarcation could not be estimated histologically, because the main features of myocardial necrosis were not contiguously visible due to a variable muscular fiber direction in the cross-sections and irregular lesion margins with extensions. There was no further histological lesion development in the next hour. Adverse mechanical effects were not observed.

Conclusion: Immediately after electroporation ablation, myocardial lesions were visible and histologically observable. They did not show further histological development in the next hour.
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