

Creating an optimal ablation lesion in equine myocardial tissue: an in vitro study

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Background: Arrhythmias are an important problem in horses, but current treatments have a high recurrence rate. Radiofrequency ablation is a promising technique to reduce recurrence. Due to the thicker myocardial wall and higher blood flow of horses, it is unknown if settings used in human medicine can be extrapolated to horses. **Objectives:** To determine optimal and safe ablation settings for the equine heart. **Study Design:** In vitro study. **Methods:** Strips of atrial and ventricular myocardial tissue from equine hearts were suspended in a bath with isotonic saline at 37°C. Flow was created by a pump with flow velocity at the level of the myocardial tissue set at 0.35 m/s, based on vena cava caudalis flow measurements in horses. The ablation catheter was mounted in a holder with a dynamometer to maintain the catheter tip perpendicular to the tissue at a constant contact force of 20g. Different ablation settings (power, duration) were evaluated by measuring the lesion depth and width after 2,3,5-triphenyl tetrazolium chloride staining. **Results:** A total of 78, 118 and 202 ablation lesions were analyzed in the left and right atrium and right ventricle, respectively. Higher power and longer duration of radiofrequency energy delivery increased lesion depth, diameter and volume significantly ($P < 0.001$). Ablation at 30W during 30s induced a mean lesion depth of 3.7 ± 1.1 mm in ventricular tissue, while 50W 60s led to a mean depth of 5.7 ± 1.2 mm ($P < 0.001$). No steam pops were noticed. **Main Limitations:** Using an in vitro model does not take into account factors such as tissue perfusion, catheter stability, cardiac and respiratory motion. **Conclusion:** This is the first study describing the effect of ablation settings on lesion dimensions in equine myocardial tissue. This information is needed to safely create transmural lesions in patients to minimize arrhythmia recurrence after radiofrequency ablation.

Ethical Animal Research: Approved by the Institute's Ethical Committee.

Informed Consent: Owner consent was obtained.

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