

## Radiofrequency Ablation Catheter With Contact Force Sensor Predicts Lesion Size and Incidence of Steam Pop in the Beating Canine Heart

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**Introduction:** RF ablation catheter has been developed to measure real time contact force. Three optical fibers measure micro-deformation of the catheter tip. Contact force is calculated every 100 ms from the strain on the 3 fibers (sensitivity <1 g). The purpose of this study was to determine the relationship between average contact force, lesion size and incidence of steam pop in the beating canine heart.

**Methods:** 6 dogs were studied closed chest. A 7F catheter with 3.5mm saline irrigated electrode and contact force sensor (Endosense SA) was positioned in right ventricle (RV) and left ventricle (LV) under fluoroscopy. RF applications were delivered to 3 separate sites in RV (30 W, 60 sec, 17 ml/min irrigation in 6 dogs) and 3 sites in LV (40 W, 60 sec, 30 ml/min irrigation in 5 dogs and 50 W, 60 sec, 30 ml/min irrigation in 1 dog) with: 1) low average contact force (5-10, median 8 g); 2) moderate contact force (20-30, median 22 g); and 3) high contact force (50-100, median 60 g). Dogs were sacrificed at 2 hrs and lesion size was measured using triphenyl tetrazolium chloride staining.

**Results:** At constant RF power and time, lesion size increased significantly with increasing contact force (Fig). Steam pop occurred only with high contact force at 30 W in RV and moderate and high contact force at 40W and 50 W in LV.

**Conclusions:** At same RF power, lesion size and incidence of steam pop increase strikingly with increasing contact force. The ability to measure real-time contact force may prove effective in predicting RF lesion size and risk of steam pop in clinical application.

