

# Effects of Contact Force on Lesion Size During Pulsed Field Ablation

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## BACKGROUND

Effects of contact force (CF) on lesion formation during pulsed field ablation (PFA) have not been validated.

## OBJECTIVE

To determine the relationship between average CF and lesion size during PFA using a swine beating heart model.

## METHODS

A 7F catheter with a 3.5mm saline irrigated (2ml/min) ablation electrode and CF sensor (TactiCath SE, Abbott) was connected to a pulsed electric field (PEF) generator system (CENTAURI, Galaxy Medical). The catheter was positioned in RV and LV under EnSite guidance in 2 closed chest pigs (66kg). During atrial pacing at 90 bpm, biphasic PEF current was delivered between the ablation electrode and a skin patch at 13 separate sites in RV (28Amp, total pulse width of 1.4ms, 4 pulses synchronized with QRS) and 19 separate sites in LV (35Amp, 1.6ms, 7 pulses) at average CF: 1) low (4-12 g, median 8 g); 2) moderate (16-30 g, median 20 g); or 3) high (33-55 g, median 40 g). Ablation was also performed without electrode contact (2 mm away from the endocardium, confirmed by intracardiac echocardiography, n=5). Pigs were sacrificed at 2 hours after ablation and lesion size was measured using triphenyl tetrazolium chloride (TTC) staining.

## RESULTS

Fig. Ablation lesions were clearly identified with TTC staining, showing the dark central zone surrounded by pale boundaries. At constant PEF current and pulse duration, lesion depth increased significantly with increasing contact force. There were no detectable lesions resulting from ablation without electrode contact.

## CONCLUSION

At same PEF dose intensity, lesion depth increases significantly with increasing contact force. Electrode-tissue contact is required for effective lesion formation with PEF ablation.

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