Adhesive epicardial corticosteroids prevent postoperative atrial fibrillation.

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Abstract:

BACKGROUND: Postoperative atrial fibrillation remains a common cause of morbidity. Although epicardial drug delivery can increase efficacy and reduce side effects, it is impractical for postoperative atrial fibrillation because pericardial bleeding/effusion and drainage cause rapid drug elimination. Fibrin glue sprayed on the epicardium is vigorously adherent, allowing an admixed drug to remain in contact with the heart. The purpose of the present study was to evaluate a novel corticosteroid-fibrin glue mixture applied to the atrial epicardium at the time of surgery for prevention of postoperative atrial tachyarrhythmias.

METHODS AND RESULTS: Talc was instilled into the pericardium in 15 dogs to simulate postoperative inflammation. Pacemakers were implanted to monitor arrhythmias. A mixture of triamcinolone and fibrin glue (Tisseel) was sprayed onto the atria of the treatment animals (n=9), whereas control animals (n=6) received Tisseel or nothing. After 1 week, pacemaker interrogation quantified postoperative atrial tachyarrhythmias (atrial rate >200 bpm) burden. Excised hearts underwent histological examination and tensile strength testing. postoperative atrial tachyarrhythmias occurred in 100% of control animals but only 33% of treatment animals (P=0.027). The median time (25th percentile, 75th percentile) in tachycardia was 5.5 hours (2.7, 12.6) per day in the control group, compared with 0 hours (0, 0.2) in the treatment group (P=0.001). Severe inflammation was present in 6 of 6 control animals and 1 of 9 treatment animals (P=0.001). The

tensile strength of a healing left atriotomy was not significantly different between groups. Steroid levels at the time the animals were killed were very low (median of 0.22 mug/dL [0.18, 0.23]).

CONCLUSIONS: A mixture of triamcinolone and fibrin glue sprayed onto the atria reduced postoperative atrial tachyarrhythmias and reduced inflammatory cell infiltration. There was no change in the tensile strength of a healing atriotomy and plasma steroid levels were low. Clinical trials of this approach are warranted.