

# Antitachycardia Pacing at the His Bundle is Safer than Conventional Right Ventricular Antitachycardia Pacing in a Canine Myocardial Ischemic Injury Model

Annie Hirahara M<sup>1</sup>, Muhammad Khan S<sup>2</sup>, Omar Gharbia<sup>2</sup>, Matthias Lange<sup>2</sup>, Yuki Ishidoya<sup>2</sup>, Douglas Smego<sup>3</sup>, Ravi Ranjan<sup>1</sup>, Gregory Stoddard J<sup>4</sup>, Craig Selzman<sup>3</sup>, and Derek Dossdall<sup>1</sup>

<sup>1</sup>The University Of Utah Department of Biomedical Engineering

<sup>2</sup>The University of Utah

<sup>3</sup>The University of Utah Department of Surgery

<sup>4</sup>The University of Utah School of Medicine Center for Clinical and Translational Science

January 30, 2023

## Abstract

**Introduction:** Antitachycardia pacing (ATP) is used to terminate ventricular tachycardia (VT) by delivering rapid, low energy pacing to the right ventricle (RV). Unfortunately, ATP is not effective against all VT episodes and can result in adverse outcomes, such as VT acceleration and degeneration into ventricular fibrillation (VF). Improving ATP is therefore desirable. Our objective was to compare the efficacy and safety of ATP delivered at the His bundle to traditional ATP. **Methods:** Six dogs were anesthetized and pacing leads were implanted in the RV and His bundle. The lateral anterior descending artery (LAD) was occluded for 2 hours to create an ischemic injury. In a study 4-7 days later, a 128-electrode sock was placed snugly around the ventricles and VT was induced using rapid pacing. ATP was delivered from either the His bundle or RV lead, then attempted at the other location if unsuccessful. Success rates and instances of VT acceleration and degeneration into VF were calculated. **Results:** We induced 83 runs of VT and attempted ATP 128 times. RV ATP was successful in 36% of attempts; His ATP was successful in 38% of attempts. RV ATP resulted in significantly more adverse outcomes. RV and His ATP induced VT acceleration in 9% and 3% of trains respectively, and induced degeneration into VF in 5% and 1% of trains, respectively. **Conclusion:** His bundle ATP is safer, but not significantly more effective, than RV ATP.

## Hosted file

Antitachycardia Pacing at the His Bundle - JCE.docx available at <https://authorea.com/users/580943/articles/621790-antitachycardia-pacing-at-the-his-bundle-is-safer-than-conventional-right-ventricular-antitachycardia-pacing-in-a-canine-myocardial-ischemic-injury-model>