VALIDATION OF INFARCT CHARACTERIZATION IN A PORCINE ISCHEMIA REPERFUSION INJURY MODEL

Poster Contributions
Poster Sessions, Expo North
Saturday, March 09, 2013, 10:00 a.m.-10:45 a.m.

Session Title: New Diagnostic and Imaging Strategies in Heart Failure
Abstract Category: 16. Heart Failure: Basic
Presentation Number: 1136-312

Authors: Kaori Nakagawa, Fumiaki Ikeno, Yuka Matsuura, Jennifer Lyons, Patricia Nguyen, Joseph Wu, Alan C. Yeung, Phillip C. Yang, Rajesh Dash, Stanford University, Palo Alto, CA, USA

Background: Myocardial infarction results in both core- & peri-infarct zones. Establishing a reproducible, chronic infarct model in a large animal is critical for pre-clinical studies that target these zones. We tested whether 1-hour porcine ischemia-reperfusion (IR) generates a reproducible ischemic cardiomyopathy, using MRI measures of infarct, injury, and area-at-risk (AAR) scores.

Methods: Adult Yorkshire (n=15) & Yucatan (n=7) pigs underwent 1-hour mid-left anterior descending coronary IR. Serial cardiac MRI was performed at baseline (n=22), week 1 (n=14), 4 (n=8), and 12 (n=6) post-IR, for ejection fraction (EF), left ventricular end-diastolic volume (EDV), delayed gadolinium enhancement MRI (DEMRI) scar (4-5 standard deviations (SDs) above mean, Osirix) and injury (2-3 SDs) volumes, and T2-weighted MRI for myocardial edema. TTC staining for AAR and scar volume was also performed.

Results: EFs were reduced at week 1, but stabilized from 4 to 12 weeks (Fig 1A). EDV increases showed a similar plateau, and a reduction in %scar and %injury occurred only between 1 and 4 weeks (Fig 1B). DEMRI-derived injury % correlated with TTC AAR (1C,D). Preliminary T2-weighted edema imaging at week 1 (n=3) matched regions of TTC AAR & MRI-derived injury (1E,F).

Conclusions: This 1-hour porcine IR injury model is a reproducible, chronic ischemic cardiomyopathy model for testing pre-clinical diagnostic and therapeutic strategies.