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Increased Myofibroblast densities are specific to Critical Isthmus sites in Post-Infarct Re-entrant Ventricular Tachycardia

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Abstract:

Introduction

The critical isthmus (CI) in post-MI re-entrant VT is a target for catheter ablation. There is compelling in vitro evidence that increased densities of myofibroblasts (MFBs) within the scar border zone (BZ) increases susceptibility to slow conduction and VT. However, the presence of MFBs within the CI *in vivo* remains unproven. Using an in vivo swine model of post-MI re-entrant VT we tested the hypothesis that there are significant differences in MFB distribution in the VT inducible heart compared to the post-MI VT non-inducible heart with the VT CI possessing a unique cellular profile driven by differences in MFB density.

Methods

Domestic pigs (n=15) underwent MI by catheter based LAD balloon occlusion (120 min). VT studies (n=12) were performed 6 weeks post-MI identifying dense scar, BZ and the CI. Electroanatomic histological overlay was achieved with epicardial points. Hearts were formalin fixed with histological analyses performed on paraffin embedded tissue.

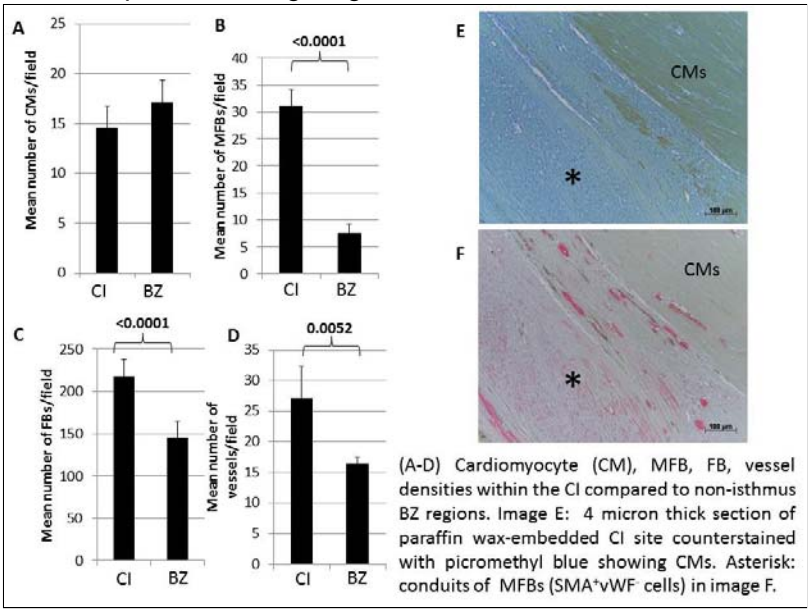
Results

VT was induced in 6 of 12 pigs: mean VT cycle length 353±89 ms. A total of 780 sections were analysed (867 x 687 microns per section). There was a striking 5 fold increase in MFBs at the CI compared to non-isthmus BZ sites (figure 1B). Significantly increased numbers of fibroblasts (FBs) and vessels were observed at the CI (figure 1C,D) with conduits of MFBs bridging islands of CMs (figure 1E,F).

Conclusion

We have shown that the CI *in vivo* is characterised by a unique abundance and

architectural organisation of MFBs. This study demonstrates novel insights in the cellular composition of the CI which forms the basis for further molecular investigation which may lead to improved CI targeting for catheter ablation.



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Author Disclosure Information:

T.S. Dhanjal: None. **N. Lellouche:** None. **C. von Ruhland:** None. **D. Edwards:** None. **C. George:** None. **A. Williams:** None.
Category (Complete): 08 Whole Animal Electrophysiology and Pharmacology (includes Neurohumoral Modulation)
Keywords (Complete): V -> Ventricular tachycardia ; A -> Arrhythmias - mechanism ; myofibroblasts; stromal cells
Additional Information (Complete):
Presentation Preference: Oral or Poster
I am interested in submitting an abstract for one of the Late-Breaking Trials sessions.
: No
At the conclusion of this presentation, attendees will be able to: (Maximum character limit 250)

***Learning Objective:** : appreciate the cellular complexity of critical isthmus sites and understand the importance of myofibroblasts as a target for cell based therapy.

Abstract Awards (Complete):
The Eric N. Prystowsky Early Career Researcher Award : True

Status: Complete

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