Correlation of Peri-Procedural Cardiac Enzyme Release with Atherosclerotic Plaque Burden using 3-D Fusion of Intravascular Ultrasound and Angiography

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Introduction

- Coronary atherosclerosis, a leading cause of death, is often treated with percutaneous coronary intervention (PCI) of stenotic vessels.
- Controversy exists regarding the mechanism of cardiac enzyme release during PCI, and its prognostic significance:
  - MB isoenzyme of Creatine Kinase (MB-CK)
  - Troponin I or T (TP)
- 3-D Fusion of x-ray coronary angiography and intravascular ultrasound (IVUS) data allows a geometrically correct representation of in-vivo coronary geometry.
- Morphologic 3-D parameters can be correlated with enzyme release to support or disprove the hypothesis of a correlation.

Patients

- 19 coronary vessel segments in 16 patients (6 LAD, 5 LCX, 8 RCA).
- Study was approved by both Institutional Review Boards, and all patients provided informed consent.
- Imaged in-vivo with single-plane angiography and IVUS pre and/or post intervention.
- Total CK, MB-CK, TP levels were recorded.

Results

- Rather than the expected positive correlation between plaque burden or vessel size with cardiac enzyme release, most correlations were negative and not significant (p<0.05 slope was considered statistically significant).
- Exclusion of outliers (TP<0.03, TP>2 ng/mL) improved correlations (Tables 1, 2; Figure 4).
- %area stenosis and plaque volume showed better correlations of measured morphologic parameters with enzyme release.

Conclusions

- No statistically significant positive correlation has been found to indicate that cardiac enzyme release increases with plaque burden.
- The negative correlations are unexpected and contrary to the initial hypothesis, but consistent throughout the study, despite a limited number of patients available.
- Cardiac enzyme release during complex PCI may not be a marker of atherosclerotic burden.
- Our results support previous concepts relating enzyme release to procedure complexity and unstable plaque.

Contact

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