STENT FRACTURE DETECTION USING INTRACORONARY OPTICAL COHERENCE TOMOGRAPHY: A PROOF OF CONCEPT AND COMPARISON OF THREE DIMENSIONAL IMAGING MODALITIES

Poster Contributions
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Authors: Sulaiman Aziz Rathore, Dexter Deleon, Jason Foerst, Virginia Tech Carilion School of Medicine and Research Institute, Roanoke, VA, USA

Background: Coronary stent fracture (SF) has been associated with late stent complications including restenosis and thrombosis. Detection of in-vivo SF may help with understanding the natural history of stent pathology. Two-dimensional intracoronary imaging has been reported as a tool to improve the accuracy of in-vivo SF detection.

Methods: A combination of seven normal and pre-fractured stents was deployed within the silicone tubes. Optical coherence tomography (OCT) was performed using the Ilumien Optis system (St. Jude Medical, MN) acquiring both 2D and 3D OCT data. In order to validate microCT for an autopsy protocol, 2D and 3D microCT images were also reviewed. Two experienced interventional cardiologists analyzed the data for the presence of SF using an off-line review station. The review procedure was limited to 5 minutes per stent/modality to simulate a realistic clinical decision time. The sensitivity and specificity of each modality was compared based on known fracture sites.

Results: The sensitivity and specificity for stent fracture detection was 79% and 95% for 3D OCT respectively. The sensitivity and specificity was 100% for 3D microCT.

Conclusion: Three dimensional OCT increases the sensitivity and specificity of in-vitro SF detection. This study suggests that 3D microCT is the gold standard for in-vitro SF imaging. As the highest resolution in-vivo coronary imaging technology, we can expect that future iterations of 3D OCT imaging to be on par with microCT for SF detection.