**CLINICAL FEASIBILITY OF A FULLY AUTOMATED 3D RECONSTRUCTION OF ROTATIONAL CORONARY X-RAY ANGIOGRAMS**
**J.A. Garcia Fernandez**

Cardiovascular Fellowship Program Director, Orlando Health, Orlando, FL, USA

**Objective:** While fixed view X-ray angiography remains the primary technique for anatomical imaging of coronary artery disease, the known shortcomings of two-dimensional (2D) projection imaging may limit accurate three-dimensional (3D) vessel and/or lesion definition and characterization. A recently developed method to create 3D images of the coronary arteries utilizes X-ray projection images acquired during a 180° C-arm rotation and continuous contrast injection, followed by ECG gated iterative reconstruction. This method shows promise for providing high quality 3D reconstructions of the coronary arteries with no user interaction but requires clinical evaluation.
**Method:** The reconstruction strategy was evaluated by comparing the reconstructed 3D volumetric images with the 2D angiographic projection images from the same 23 patients to ascertain overall image quality, lesion visibility, and a comparison of 3D quantitative coronary analysis (QCA) with 2D QCA.

**Results:** The majority of the resulting 3D volume images were rated as having high image quality (66%) and provided the physician with additional clinical information such as complete visualization of bifurcations and unobtainable views of the coronary tree. True positive lesion detection rates were high (90-100%), while false positive detection rates were low (0-8.1%). Finally, 3D QCA showed significant similarity with 2D QCA in terms of lumen diameters and provided vessel segment length free from the errors of foreshortening.
**Conclusion:** Fully automated reconstruction of rotational coronary X-ray angiograms is feasible, produces 3D volumetric images that overcome some of the limitations of standard 2D angiography, and is ready for further implementation and study in the clinical environment.