FIRST-IN-MAN NOVEL HYBRID PEDIATRIC CARDIAC CATHETERIZATION & MAGNETIC RESONANCE IMAGING SYSTEM

i2 Poster Contributions
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Background: The concerns over radiation exposure during pediatric cardiac catheterization (PCC) have driven the development of hybrid systems using cardiac magnetic resonance imaging (CMR).

Methods: We report the development of a novel hybrid system utilizing PCC and CMR (iMRIS, Winnipeg, MB) and first-in-man case series. Development was undertaken combining both ceiling mounted 1.5T CMR and angiographic systems (Siemens, Erlagen, DE) for pediatric cardiac catheterization with the intent of markedly decreasing patient radiation exposure. To facilitate image registration between the different imaging modalities, patient position was maintained, and both the angiographic and CMR equipment were placed on orthogonal ceiling mounted rails. Existing image registration software (Siemens iPilot, Erlagen, DE) was utilized to fuse MRI and fluoroscopy.

Results: The First-in-Man case was performed for diagnosis in a 5 year old male with a ventricular septal defect and coarctation, and concern for pulmonary hypertension. Imaging by CMR and low dose fluoroscopy, combined with hemodynamic assessment was diagnostic. Total radiation dose was < 1 mGy. Subsequent case series, including reduction in procedure times and radiation exposures, and development of safety protocols will be reported.

Conclusion: Development of this novel hybrid PCC & CMR system is a significant step forward in radiation exposure reduction for pediatric cardiac patients.