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Impact of pre-procedural simulation and planning using 3D resin (solid) and photopolymer (flexible) models on interventional cardiac procedures

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Pre-surgical planning using imaging in pediatric congenital and acquired heart disease has played a vital role in patient outcomes for many decades. With advances in 3D printing technology we are now able to take patient specific imaging data and create 3D patient specific physical models. These models can be used to for pre-procedural patient specific simulations of cardiac procedures. We have successfully performed pre-procedure simulated procedures on physical modelsina patient with aortic stenosis undergoing percutaneous aortic valve placement where the size of the valve was in question, two patients with VSD from myocardial infarction that needed a device closure and to predict compatibility of donors and recipients for heart transplants. In all cases the simulated procedure had a significant impact on the actual procedure resulting in decreased time of procedure compared to standards, influenced the choice of the device chosen and was key in predicting correct sizing of implant. All though the numbers are small the impact seems to be significant.

Biography

Randy Richardson is the Chairman of Radiology at St. Joseph's Hospital and Medical Center and the Associate Dean for Creighton University School of Medicine Phoenix Campus. He is Professor of Radiology for the Creighton Schools of Medicine and Adjunct Professor at Arizona State University School of Biological and Health Systems Engineering. He is the author of a textbook, 31 book chapters, 11 syllabi, 44 scientific exhibits, 24 scientific papers, 22 peer reviewed journal articles, 3 websites and 14 multimedia presentations. His area of expertise and research has been in the field of cardiac MRI and CT imaging in children.

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