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Biodegradable stents in congenital heart disease

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Abstract

Background: Much research has been accomplished on biodegradable stents for adult coronary artery disease. The recent impetus for renewed interest is due to late complications arising from permanent scaffolds in the circulation. Another clinical group that would derive substantial benefit from biodegradable stent technology is growing children.

Methods: PLLA stents have been designed to larger diameters suitable for infants and young children with congenital heart disease. The design incorporates a novel coil straightening mechanism enabling larger diameters. Bench and pre-clinical testing has been performed.

Results: Characteristics of the PLLA fiber are improved with annealing. A dual helical stent design has consistent stent mechanics over a wide range of diameters in bench testing. Preclinical testing of diameters 3 to 8mm has been performed with promising results in regards to deliverability and inflammatory profile.

Conclusion: Initial bench and pre-clinical testing of a biodegradable stent suitable for congenital heart disease applications is promising. Further studies are planned.

Biography

Alan Nugent completed medical school at the University of Melbourne in Australia and pediatric training at the Royal Children's Hospital. He moved to Children's Hospital Boston to complete training in Pediatric Cardiology and commenced his faculty career as interventional cardiologist in Boston. In 2008 he was recruited by theUniversity of Texas Southwestern (UTSW) Medical Center as an Associate Professor of Pediatrics and Children's Medical Center Dallasas Director of Cardiac Catheterization. Research interests in the past have included trans-catheter valve replacement and present research is focusedon biodegradable stents applicable to congenital heart disease. This effort involves collaboration withthe Department ofCardiovascular and Thoracic Surgery at UTSW Medical Center and the Biomedical Engineering Program at UTSW Graduate School of Biomedical Science.