

New technology advances catheterization treatments for congenital heart disease



The repair of congenital heart defects in children and adults has been transformed over the past decade by advances in cardiac catheterization. A minimally invasive approach to diagnosing and treating these anomalies is associated with less risk and easier recovery for patients of all ages. Catheter-based interventions are now considered the standard of care in treating newborns, children and adults with a variety of types of congenital heart disease (CHD).

Because Mattel Children's Hospital UCLA is part of a larger, comprehensive medical center, our physicians offer a unique blend of expertise in both pediatric and adult patients. A team approach to each case ensures that patients receive timely, individualized care. Specialists from pediatric cardiology, adult cardiology, cardiothoracic surgery, interventional radiology, obstetrics and gynecology, vascular surgery and electrophysiology collaborate to manage cases.

Numerous imaging modalities are used to define anatomy and guide interventions, including transthoracic, transesophageal and intracardiac echocardiography; traditional cardiac fluoroscopy and cineangiography and newer techniques such as rotational angiography and 3-D image overlay.

Patients benefit from a team approach

"Collaboration among numerous subspecialists in both pediatric and adult congenital heart disease has led not only to a highly successful CHD catheterization program, but to a successful research program both clinically and in the laboratory," says Daniel S. Levi, MD, an interventional pediatric cardiologist and director of the congenital cardiac catheterization program at UCLA.

"Because we all collaborate so closely, we are able to offer services that are otherwise difficult to provide," Dr. Levi says. "As a large medical center, we're used to taking care of pregnant women and adults and we can offer more types of services. It is important to have a center like ours in which pediatric and adult congenital heart disease experts work well together."

Patients also benefit from a rich research environment, Dr. Levi adds. "In the early 2000s, we were just starting to close holes in the heart using self-expanding plug-type devices. But the field of cardiac catheterization for patients with congenital heart disease is moving rapidly mainly due to technologies and innovation," he says.

Minimally invasive treatment of structural defects

UCLA's Congenital Cardiac Catheterization Program is a leading center for procedures used to treat congenital heart disease, such as stenting to open blockages (including coarctation of the aorta), balloons to open valves (aortic and pulmonary valvuloplasties) and devices to close holes in the heart, such as atrial septal defects (ASDs).

The program was an early adopter of the Amplatzer Septal Occlusion device, the first minimally invasive device of its kind approved by the Food and Drug Administration for treatment of ASDs. Since then, minimally invasive techniques have replaced open-heart surgery for other congenital defects including ventricular septal defects and patent ductus arteriosus.

Technological advances have permitted treatment of younger patients and larger structural defects. Transcatheter intervention can be performed in newborn infants and even in the fetus. To facilitate timely treatment, babies can be delivered in facilities adjacent to the catheterization laboratory at UCLA.

Advances in valve replacement

UCLA's Congenital Cardiac Catheterization Program continues to take advantage of new technologies to help patients with congenital heart disease. The UCLA team is among the most experienced in the nation in performing minimally invasive transcatheter valve replacement for congenital heart disease.

While the Melody valve was specifically designed to treat right ventricular outflow tract (RVOT) conduit dysfunction without the need for open-heart surgery, the Sapien valve was designed as a replacement of the aortic valve in elderly patients with calcific aortic stenosis. The team of doctors at UCLA is using both the Melody and Sapien valves in minimally invasive valve replacements for not only the pulmonary and aortic positions but also for the mitral and tricuspid valves in patients with congenital heart disease. Although many patients continue to require surgical valve replacements, the UCLA congenital team continues to pioneer new methods to treat patients using minimally invasive valve replacements.

Research and clinical trials lead to advances

Researchers collaborate within the Children's Discovery and Innovation Institute — Mattel Children's Hospital UCLA's research arm — to serve the needs of congenital heart disease patients. UCLA's Congenital Cardiac Catheterization Program participates in many multi-center and FDA clinical trials and has published a number of papers describing new devices and techniques. The catheter-based activity at Mattel Children's Hospital UCLA has also generated a large clinical and bioengineering research program.

Researchers are actively involved with the development of biodegradable stents that dissolve as the child grows and with the design of new closure devices for premature babies with PDAs using nano-synthesized smart materials such as thin-film nitinol titanium. In addition, UCLA participates in studies of unique uses of devices to support patients with only a single ventricle.

Participating Physicians

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