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Minimally invasive procedure gives new hope to inoperable, high-risk aortic-valve patients

Until recently, up to 40 percent of patients with aortic stenosis (AS) — a progressive narrowing of the heart's aortic valve — were considered untreatable because they were too high-risk for open-heart surgery

The introduction of the minimally invasive transcatheter aortic valve replacement (TAVR) procedure enabled doctors to replace the damaged heart valves of these patients without making an incision in the chest wall. Somewhat similar to placing a stent in an artery, TAVR delivers a fully collapsible bioprosthetic valve to the base of the aorta, usually percutaneously.

UCLA was among the select, high-performing heart-surgery centers to offer TAVR using the SAPIEN transcatheter heart valve (THV) in 2012 as a first-of-its-kind treatment option for patients with inoperable AS. As TAVR technology continues to advance, UCLA remains at the forefront of its evolution.

The changing face of cardiac care at UCLA

Third-generation transcatheter aortic valve replacement (TAVR) continues to prove itself as an alternative to conventional surgery.

"The combination of new design features and procedural improvements to the SAPIEN 3 heart valve have contributed to the current, strikingly low TAVR mortality rates," says William Suh, MD, clinical assistant professor of interventional cardiology. "In fact, with the expertise of our medical and support teams we now have the ability to better manage risk and complications. UCLA is the only center in the region to routinely offer conscious sedation to select TAVR patients.

"The most exciting aspect of this procedure is that it provides hope where there were no previous options. The next step forward will be to offer transcatheter aortic valve replacement to moderate-risk patients as a less-invasive alternative to traditional surgery," says Dr. Suh.

"TAVR has transformed the treatment of aortic stenosis worldwide. The clinical reality of a 'heart team' composed of a cardiologist and cardiac surgeon provides the patient with a robust consultation and opinion regarding the best procedure," says Richard Shemin, MD, professor and chief, Division of Cardiac Surgery.

Critical aortic valve patients no longer out of options

The most common cause of aortic stenosis is age-related calcium deposits. While these deposits may never cause problems for some patients, the narrowing of the valve can lead to reduced blood flow and increased strain on the heart, increasing risk of chest pain, irregular heart rhythms (arrhythmias), cardiac arrest, heart failure and fainting episodes.

In addition to a diminished quality of life, more than half of critical AS patients receiving only medical therapy do not survive two years from the onset of their symptoms. An estimated 100,000 AS patients — many in their 70s and 80s — are identified as inoperable or too high-risk for conventional surgery.

An influential U.S. Food and Drug Administration (FDA) randomized study in late 2011 demonstrated that first-generation TAVR increased the two-year survival rate from 50 percent to 70 percent. A subsequent clinical trial found that three years after implantation, patients who received the second-generation TAVR had a mortality rate nearly identical to that of patients with standard open-heart surgery.

Dramatic design improvements in third-generation heart valve

In June 2015, the FDA approved the third and latest replacement valve. Clinical outcomes based on a rigorous trial analysis of 583 high-risk AS patients showed steady improvement in TAVR technology, including significantly lower paravalvular leakage, stroke and mortality rates.

A key design adjustment over previous iterations was the addition of an outer skirt or cuff of fabric at the base of the valve to minimize leakage (paravalvular regurgitation) associated with increased mortality. The study found that the average rate of regurgitation at 30 days for the third–generation THV was reduced to just 3 percent compared to 14 percent for earlier devices.

Among other results, disabling stroke declined from 3 percent to 0.8 percent with the latest version and mortality rates fell from 6 percent to about 1 percent. Another major advantage of the new device is a smaller delivery system through the femoral artery, leading to less vascular injury.

The only TAVR center in the region to offer conscious sedation

The UCLA team of nationally recognized TAVR specialists includes interventional cardiologists, cardiothoracic surgeons, anesthesiologists, echocardiographers and heart-lung machine technologists, all working together to address the needs of each patient. In most cases, patients are seen at the Cardiovascular Center within one week of referral by the cardiologist and cardiac surgeon to determine suitability of a TAVR procedure.

UCLA is currently the only hospital in Los Angeles County with the expertise and resources to offer qualified individuals the option to be lightly sedated but fully awake during the procedure, eliminating the need for general anesthesia and reducing hospital recovery time.

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For more information about the TAVR procedure at UCLA and to view a video, go to: **uclahealth.org/TAVR**