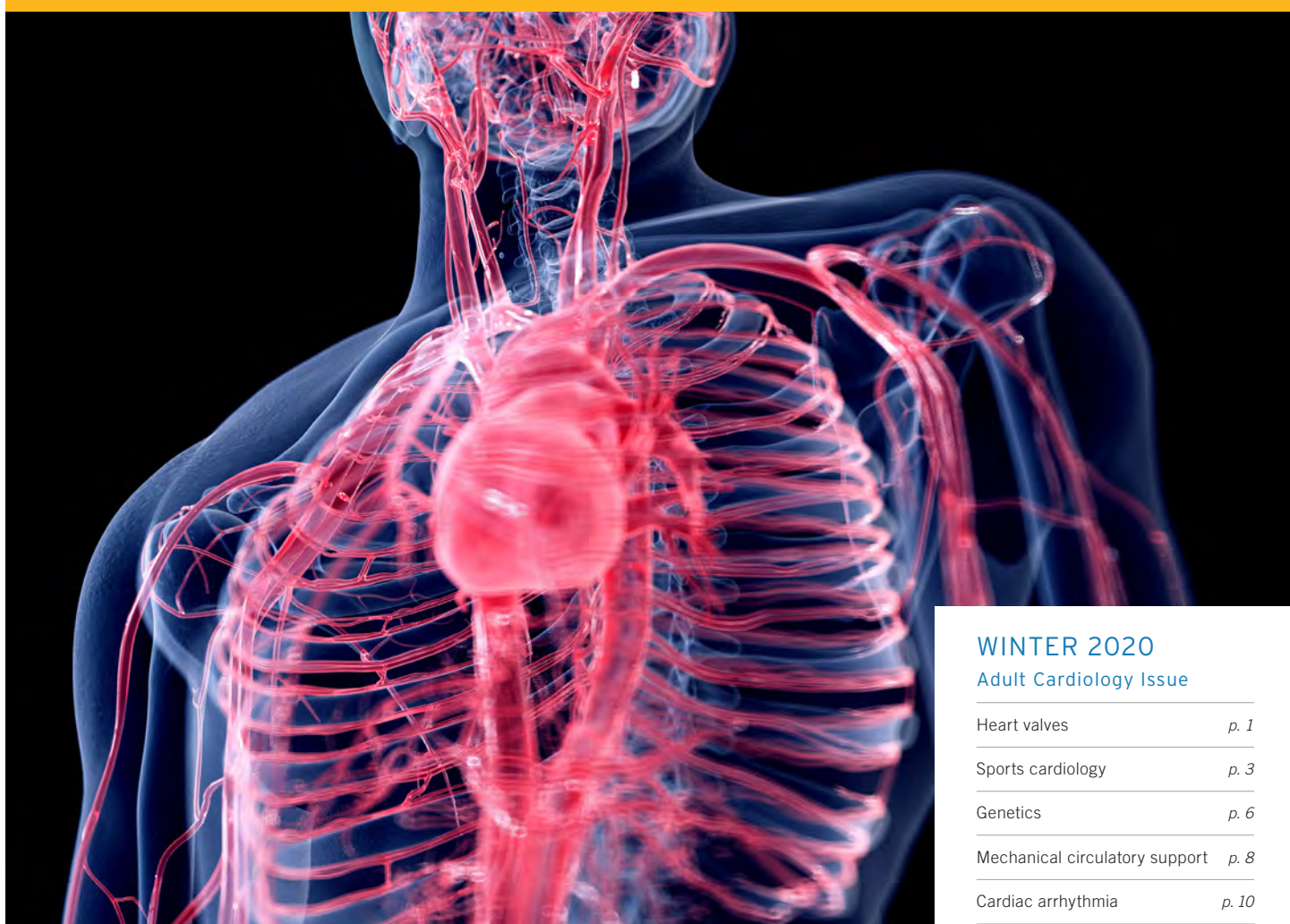


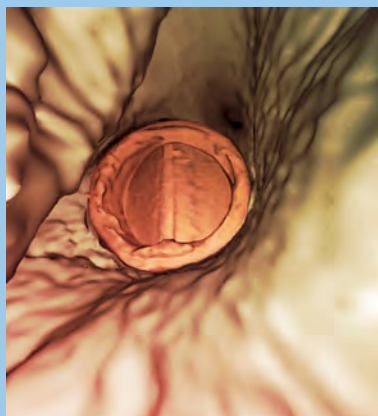
Physicians Update



WINTER 2020

Adult Cardiology Issue

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HEART VALVES

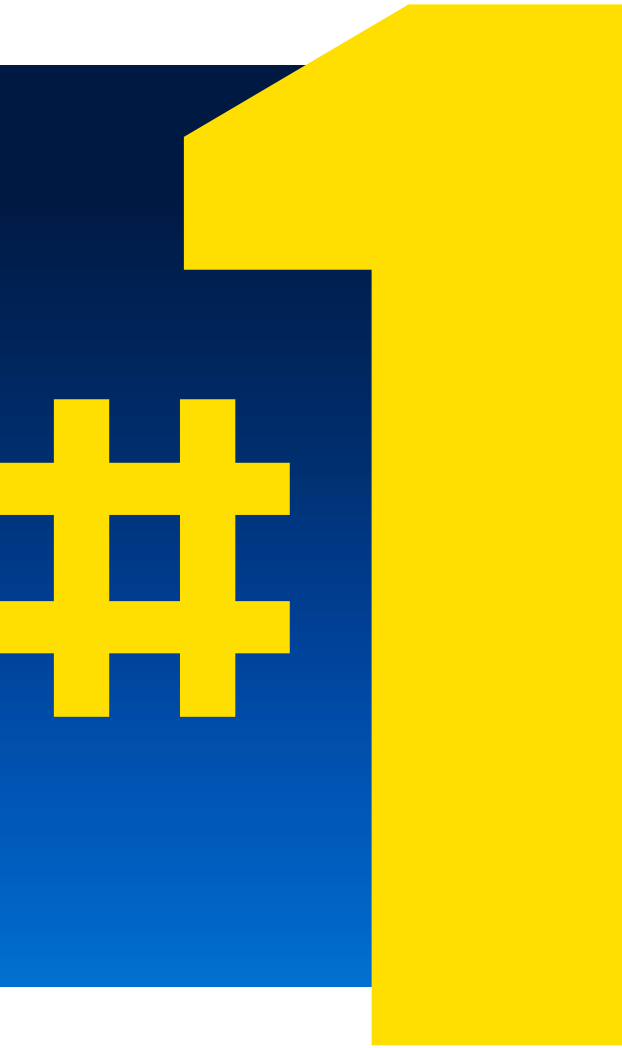
Less-invasive approaches to repairing and replacing heart valves expands scope of therapies for more patients

The development of less-invasive approaches to repairing and replacing heart valves over this past decade has been a boon for patients who are high-risk surgical candidates and offers the potential for less-invasive alternatives in the future for all patients with valve disease. These approaches already have transformed the treatment of individuals

with aortic and pulmonic valve disease, and they have begun to have a dramatic impact on patients with mitral valve disease, with similar advances likely on the horizon to treat tricuspid valve disease.

The advent of the heart-lung machine in the 1950s, which allowed cardiac surgeons to fix

continued on p. 4



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Sports cardiology program tailors care to competitive athletes

UCLA Health has launched the first sports cardiology program in Southern California, harnessing the wide-ranging expertise of UCLA sports cardiologists to provide individually tailored cardiovascular screening, guidance and care to competitive athletes as well as other highly active individuals.

“At most university and community settings, sports cardiology hasn’t been offered in an organized manner through a program in which patients are seen by a team of experts who are up to date on the most recent knowledge from this field,” says interventional cardiologist Ravi H. Dave, MD, codirector of UCLA Sports Cardiology. “Now that there is more data on how athletes need to be evaluated and treated, we felt it was important to establish a comprehensive program specifically for this unique set of patients.”

Dr. Dave says all athletes who are going to participate in a sport at any level — from middle school to professional — can benefit from a screening that includes a thorough family history and physical. He notes that any unexplained symptoms that occur at a high level of activity should be brought to the attention of a sports cardiologist and warrants further testing.

Ali Nsair, MD, a heart failure and interventional cardiologist and codirector of the program, explains that the program is particularly geared to assist anyone who engages in high levels of physical activity and has experienced any cardiovascular symptoms, or has risk factors that raise potential red flags. “We screen patients who might be at risk or have concerns about their level of activity, whether they are professional athletes or weekend warriors, as well as giving cardiac clearance to competitive and elite athletes,” Dr. Nsair says. “These can be complicated cases, so it requires a multidisciplinary team with special expertise in sports cardiology.”

Cardiologist Jeffrey Hsu, MD, PhD, notes that there is emerging evidence that certain cardiovascular conditions are more common among competitive and even some recreational athletes. “Overall, we know that exercise is absolutely a good thing for people,” Dr. Hsu says. “However, especially for

master’s-level and elite endurance athletes, there are conditions such as atrial fibrillation where we do see a higher incidence.”

For example, he explains, in elite athletes the heart tends to remodel itself to accommodate the high physical demands, and in doing so it increases the risk of atrial fibrillation. “Often, the elite athlete feels immune to cardiovascular disease, but in sports cardiology we now understand that no level of physical activity renders someone immune,” Dr. Hsu notes.

In addition to elite athletes and others involved in competitive sports who are seeking screening or clearance to participate, the UCLA Sports Cardiology program sees generally healthy patients who want to significantly increase their level of physical activity, often to train for an event such as a 10K or marathon, and are seeking an initial evaluation to ensure there are no risk factors that would make the transition a cause for concern. Other patients include those with established heart disease who want to return to a higher level of fitness after their recovery. The program provides guidance to athletes with new or known preexisting risk factors for heart disease or cardiac anomalies, including individuals with a family history of sudden death or heart attack, hypertension, diabetes, cardiomyopathy, and congenital or arrhythmic heart disease.

While the field of cardiology as a whole is highly evidence-based, Dr. Hsu notes that data specific to sports cardiology remains relatively limited. “Athletes aren’t like typical participants in large clinical trials, and so the recommendations we have for the general population don’t necessarily apply,” he says. “Managing these issues in athletes requires a team of experts, nuanced thinking and a shared decision-making approach that considers not just the risks, but also the ramifications of restricting a person from his or her chosen sport. The main thing we tell our patients is to know your body, and if there are any changes or new symptoms during the normal routine, seek an evaluation.”



For more information about the UCLA Sports Cardiology Program, go to: uclahealth.org/heart/sports-cardiology



Image: iStock

“Now that there is more data on how athletes need to be evaluated and treated, we felt it was important to establish a comprehensive program specifically for this unique set of patients.”

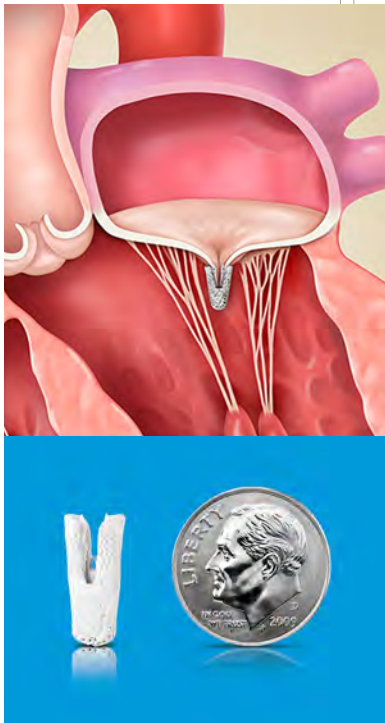
COVER STORY

Less-invasive approaches to repairing and replacing heart valves expands scope of therapies for more patients

STORY HIGHLIGHTS

The development of less-invasive approaches to repairing and replacing heart valves over this past decade has been a boon for patients who are high-risk surgical candidates.

The movement toward percutaneous approaches to valve replacement and repair began with transcatheter aortic valve replacement (TAVR) and pulmonary valve replacement.



MitraClip.

Image: Courtesy of abbot.com

(continued from cover)

the nonbeating heart, paved the way for surgery to become the gold standard for repairing and replacing a defective heart valve, notes UCLA congenital cardiologist Jamil Aboulhosn, MD. But by the 2000s, there was an impetus to find less-invasive alternatives that would enable treatment without the inevitable risks and longer recovery associated with cardiac surgery and cardiopulmonary bypass.

That has become a reality with the design of miniaturized tools — including clips, stents and wires — that facilitate percutaneous, catheter-based approaches to patients with valve disease. “We are now experiencing a tsunami of new devices and procedures that offer catheter-based ways of repairing and replacing mitral and tricuspid valves, and we are seeing the benefits of repairing these valves without stopping and potentially incurring damage to the heart,” Dr. Aboulhosn says. “It’s still early, but it is clear that this is the wave of the future.”

The movement toward percutaneous approaches to valve replacement and repair began with transcatheter aortic valve replacement (TAVR) and pulmonary valve replacement, which were first performed in the early 2000s. Originally designated only for inoperable or high-risk surgical candidates, TAVR has evolved to become the standard of care for most patients with severe aortic stenosis.

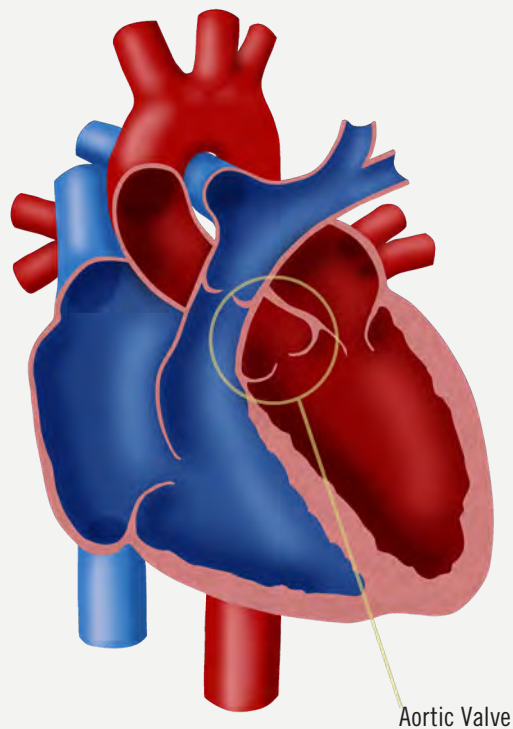
Mitral valve disease is about twice as common as aortic valve disease, and the mitral valve anatomy is much more complex, says UCLA interventional cardiologist Marcella Calfon Press, MD, PhD. But in recent years, treatment has moved along a similar path, from a purely surgical repair to the development of percutaneous treatment for patients with mitral

valve prolapse or functional regurgitation who require less-invasive therapy. “Many patients with mitral valve disease aren’t surgical candidates due to advanced age, frailty, advanced heart failure or other comorbidities,” Dr. Calfon Press explains. “Until 2013, if those patients were refractory to medical therapy, they had no good alternative, and did quite poorly.”

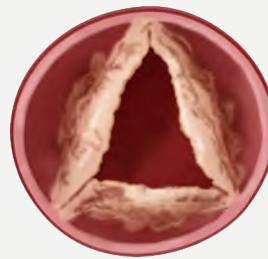
That changed with the approval by the U.S. Food and Drug Administration of the MitraClip in 2013. For the percutaneous procedure, the interventional cardiologist accesses the mitral valve via a catheter inserted through the groin, delivering a small clip that is attached to the mitral valve under transesophageal echocardiogram guidance. The device is used to grasp the valve’s leaflets, allowing it to close more completely to restore normal blood flow. The success rate is approximately 95 percent, “Dr. Calfon Press notes, and patients can usually go home the following day.

In 2018, a major study, the COAPT trial, expanded the potential indications for MitraClip from degenerative mitral valve disease to also include functional mitral valve disease. “This was one of the largest and most positive trials we have seen for a device; for patients who underwent MitraClip, there were substantial improvements in heart failure class, rehospitalization rate and mortality,” Dr. Calfon Press says. “This is having a dramatic effect on the lives of many who previously had no good options.” Although surgery continues to be the preferred treatment for patients who are not considered high risk, Dr. Calfon Press notes that future trials will look at whether the percutaneous approach would be appropriate “for intermediate- and low-risk patients.

Transcatheter Aortic Valve Replacement (TAVR)



Aortic Valve Stenosis Open



Closed



The tricuspid valve is significantly more challenging to repair percutaneously than the mitral valve because it involves three leaflets and its orifice can dilate to a greater diameter, but Drs. Aboulhosn and Press' team has been a leader in developing new strategies, including percutaneous tricuspid valve replacement in patients with prior surgical replacements. Recently, Dr. Aboulhosn and colleagues have also begun adapting the MitraClip approach to the tricuspid valve. "There is an increasing appreciation of the clip technology's potential utility in the more challenging tricuspid position," Dr. Aboulhosn says.

As the percutaneous approaches to valve repair and replacement continue to advance, Dr. Calfon Press notes, it will become increasingly important to identify candidates who can benefit. "These are very common diseases that are both underdiagnosed and undertreated," she says. "We need to ensure that at-risk patients are screened and, when diagnosed, referred to centers

with a multidisciplinary group of experts, including interventional cardiologists who can determine whether they are candidates for these percutaneous therapies."



For more information about TAVR and MitraClip at UCLA, go to:

uclahealth.org/heart/interventional-cardiology/tavr and uclahealth.org/heart/interventional-cardiology/mitraclip

The TAVR procedure resembles a balloon angioplasty, in which a catheter — a long, flexible tube — is threaded through an artery and a balloon device on the end inflates to help open up a narrowing in a valve in the heart.

Photo: Science Photo

"This was one of the largest and most positive trials we have seen for a device; for patients who underwent MitraClip, there were substantial improvements in heart failure class, rehospitalization rate and mortality. This is having a dramatic effect on the lives of many who previously had no good options."

STORY HIGHLIGHTS

In addition to clinical evaluation and diagnostic assessment, including genetic testing, the UCLA Cardiovascular Genetics Clinic provides genetic counseling and subspecialty care designed to meet the unique needs of patients and families.

The clinic sees patients with a clear-cut diagnosis as well as familial cases in which there is not yet a diagnosis.



Photo: Science Photo

New clinic provides personalized care for patients with inherited or genetic cardiovascular disease

UCLA Health’s recently established Cardiovascular Genetics Clinic provides personalized care to patients and families with inherited or genetic forms of cardiovascular disease. In addition to clinical evaluation and diagnostic assessment, including genetic testing, the program provides genetic counseling and subspecialty care designed to meet the unique needs of patients and families. Jessica Wang, MD, PhD, the clinic’s director, genetic counselor Judy Fan, MS, CGC, and Pritha Gupta, MD, PhD, a cardiologist on the team, talk about the program.

What was the impetus for starting this clinic?

Dr. Wang: Genetic or inherited cardiovascular diseases can run in families or occur in isolation. Although family screening is recommended to prevent adverse outcomes and sudden death, it is not often emphasized in a routine visit. Moreover, recent advances in technologies and the dramatic reduction in the cost of genetic testing have made genetic evaluation both possible and feasible. We built our program to provide care to patients and their family

members with these very specialized needs, to better assess and manage risks for sudden death, heart failure and related complications based on their genetic profile.

What types of cases do you see?

Dr. Gupta: Some of the patients referred here come with a clear-cut diagnosis based on their clinical signs and symptoms. These tend to fall into one of four categories: cardiomyopathies, arrhythmias, aortopathies and familial



Jessica Wang, MD, PhD



Pritha Gupta, MD, PhD



Judy Fan, MS, CGC

Photos: UCLA Health

hypercholesterolemias. We also see familial cases in which there is no diagnosis yet. For example, if there's a sudden cardiac death in the family and a cardiac condition such as arrhythmia could be the cause, first-degree family members might be advised to come for a cardiac workup. Perhaps a diagnosis of hypertrophic cardiomyopathy is made upon autopsy, in which case we would screen first-degree relatives. Importantly, we provide genetic counseling to asymptomatic family members who do not yet have a diagnosis, so that they understand the pros and cons, i.e. the full implication of genetic testing, before they make an informed choice about whether to proceed with genetic testing.

What do you tell patients as part of their genetic counseling?

Fan: We want them to make an informed decision, so we discuss both benefits and limitations of genetic testing and how that might impact themselves and their family members. Because many genetic heart conditions have guidelines for family screening, we want patients to be aware that a genetic diagnosis could have an impact on the medical management of their relatives. The results of genetic testing are not necessarily clear cut and a negative result doesn't mean their condition isn't genetic. Part of pretest counseling is helping patients understand the possible test results and how that may impact their care and the care of their relatives. Patients sometimes have questions about the impact of genetic testing on insurability, so we address these concerns as well.

How might patients' management be affected by the genetic testing result?

Dr. Wang: Whether tested positive or negative on genetic testing, patients and their family members may still require longitudinal clinical follow-up, which includes periodic clinical screening. For example, patients with hypertrophic cardiomyopathy may require an echocardiogram and ambulatory cardiac monitoring every year. Not-yet-affected family members may require such screening every one-to-five years, depending on their age and other risk factors. Here are some examples of how positive genetic test results may impact clinical management:

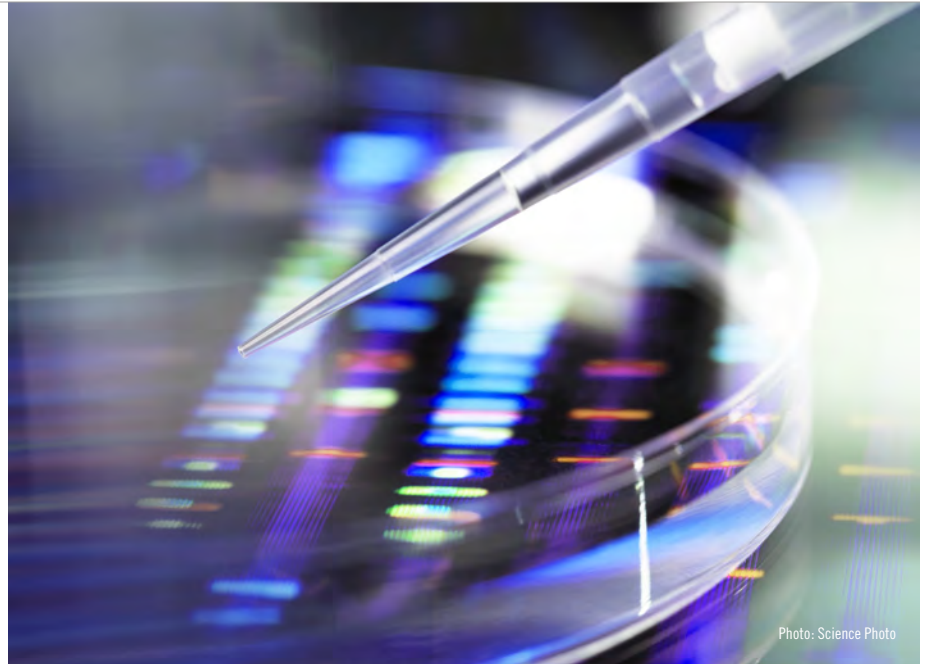


Photo: Science Photo

Hypertrophic cardiomyopathy patients harboring sarcomeric gene mutations have an increased risk of progression to heart failure, atrial fibrillation and ventricular arrhythmia as compared to those without sarcomeric gene mutations. Carriers of lamin gene mutations may be at risk for arrhythmia and sudden death, even before their heart function deteriorates based on imaging tests. Therefore, a positive genetic test result in the gene lamin plays an important role in the decision to implant an automatic implantable cardioverter-defibrillator, or AICD. Moreover, a positive genetic test serves as a major diagnostic criteria for the diagnosis of arrhythmogenic cardiomyopathy. It has been shown that high-intensity exercise may increase the rate of disease progression for arrhythmogenic cardiomyopathy patients. In this case, a genetic test finding supportive of arrhythmogenic cardiomyopathy would lead to recommendations regarding exercise restriction in those who are very athletic or participate in competitive sports. Finally, Loeys-Dietz syndrome is a connective tissue disorder that causes premature aortic aneurysm and aortic rupture at aortic dimensions that normally do not lead to rupture. The diagnosis of Loeys-Dietz will lower the surgical cut-off for aortic intervention from five-to-four centimeters.



For more information about the UCLA Cardiovascular Genetics Clinic, go to: uclahealth.org/heart/genetics

The results of genetic testing are not necessarily clear cut and a negative result doesn't mean their condition isn't genetic. Part of pretest counseling is helping patients understand the possible test results and how that may impact their care and the care of their relatives.

STORY HIGHLIGHTS

A multidisciplinary team assesses patients' need for mechanical circulatory support and what device would be most suitable for each case, along with a determination of how the device will be used: as a bridge to recovery or a bridge to more advanced therapy, such as a ventricular assist device (VAD) or heart transplantation.

Mechanical circulatory support has extended life-sustaining options for advanced heart failure patients

As temporary and permanent mechanical circulatory support devices have advanced, they now are being employed on a wider range of advanced heart failure patients who need the support to remain alive, whether it's during a procedure or to stabilize them when they are in shock.

"Because these devices have become more robust and reliable, we can use them to escalate the therapy and perform high-risk interventions, such as opening up coronary arteries in very sick patients who might be elderly or have multiple comorbidities," says interventional cardiologist Ali Nsair, MD, director of the UCLA Heart Transplantation and Mechanical Circulatory Support Program. "Five years ago, without devices to help us support patients during these high-risk interventions, many of them would not have survived."

Within the program Dr. Nsair leads, a multidisciplinary team assesses patients' need for mechanical circulatory support and what device would be most suitable for each case, along with a determination of how the device will be used: as a bridge to recovery or a bridge

to more advanced therapy such as a ventricular assist device (VAD) or heart transplantation.

"We can put the device in, support the patient's heart and do the high-risk intervention; then if the patient does well, we can take the device out the same day or the next day until he or she recovers," Dr. Nsair says. "In addition, for advanced heart failure patients who are very sick and require transport to UCLA, we can use a mechanical circulatory support device to support them until they get here and we are able to treat them."

Dr. Nsair explains that mechanical circulatory support patients tend to fall into one of two categories. Some patients simply need a temporary device, such as the Impella heart pump, to keep them alive when they undergo high-risk interventions in the catheter lab. UCLA is currently part of a large national study on the use of the Impella device for the treatment of cardiogenic shock.

For the most seriously ill patients, including those who are in cardiac arrest, the mechanical circulatory support typically comes through extracorporeal membrane oxygenation (ECMO, also referred to as extracorporeal life support) — the cardiopulmonary bypass machine that pumps oxygenated blood into the veins and arteries, allowing the lungs and heart a chance to heal. UCLA has been a leader in the development and implementation of ECMO technologies over the past two decades, and now uses ECMO in more than 100 patients per year, says Peyman Benharash, MD, UCLA's director of adult ECMO services.

"In the last 10 years, ECMO has become much safer, with lower risks of stroke and bleeding

"Because these devices have become more robust and reliable, we can use them to escalate the therapy and perform high-risk interventions, such as opening up coronary arteries in very sick patients who might be elderly or have multiple comorbidities"

Within the last two years, UCLA has established a mobile ECMO team that can safely transport patients to Ronald Reagan UCLA Medical Center who might need ECMO, are already on ECMO or require initiation at outside facilities.

complications,” Dr. Benharash says. “During that time, the use of ECMO nationally has increased five-fold.” He notes that the device is temporary — only effective with patients whose heart or lung disease is reversible or who can transition to a VAD or transplantation. Mortality, as defined by whether the ECMO patient survives to hospital discharge, has declined from approximately 70 percent to below 50 percent nationally, Dr. Benharash says.

Within the last two years, UCLA has established a mobile ECMO team that can safely transport patients to Ronald Reagan UCLA Medical Center who might need ECMO, are already on ECMO or require initiation at outside facilities. “We know that ECMO-capable centers can deliver better outcomes, in which these patients not only survive, but have a good quality of life,” Dr. Benharash says. “Based on that, we have expanded this service to go to hospitals and put patients on the machine who would otherwise be too sick to be transported, then bring them to UCLA for management and recovery.”

Dr. Benharash notes that when ECMO is initiated before a patient goes into organ failure, the likelihood of survival is significantly higher. “The sooner ECMO is deployed, the better,” he says. “It’s important to identify patients with inadequate circulation or oxygenation for an evaluation by an ECMO-capable center.”



For more information about advanced heart failure programs at UCLA, go to:
uclahealth.org/heart/advanced-heart-failure-overview



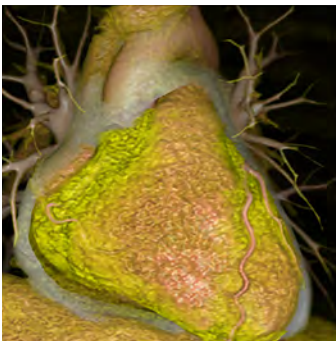
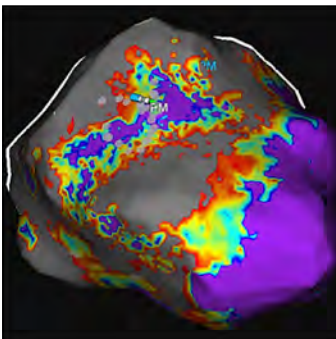
ECMO (extracorporeal membrane oxygenation) machine.

Photo: Medical Images

STORY HIGHLIGHTS

For patients in whom antiarrhythmic drugs are ineffective or cause unacceptable side effects, complex catheter ablation techniques offer an increasingly effective option.

At UCLA, the success rate among patients with severe cardiomyopathy treated for refractory ventricular arrhythmias is 70-to-80 percent.



Electroanatomic map of the heart (top, scar tissue in gray and normal tissue in purple) utilized to determine sites of ablation for ventricular tachycardia that correlates with anatomic region shown on CT scan (bottom).

Images: Courtesy of UCLA Cardiac Arrhythmia Center

UCLA Cardiac Arrhythmia Center on the forefront of care for patients with most challenging conditions

Advances in the treatment of refractory ventricular arrhythmias, including catheter ablation and neuromodulation approaches, have dramatically improved the outlook for people with the potentially deadly disorder. UCLA's Cardiac Arrhythmia Center has been a leader in developing these techniques and is a major referral center for the sickest and most challenging arrhythmia cases.

Ventricular arrhythmias are the leading cause of sudden cardiac death in the United States, which accounts for hundreds of thousands of deaths each year. They are most common in patients with structural heart disease; in those individuals, the recurrent ventricular arrhythmias often are managed with an implantable cardioverter-defibrillator — a specialized pacemaker that sends an electrical shock when the heart goes out of rhythm. Although these shocks can be acutely lifesaving, they impose a significant quality of life burden and can portend a poor cardiovascular outcome over time, necessitating additional treatment — initially, in most cases, with medication.

For patients in whom antiarrhythmic drugs are ineffective or cause unacceptable side effects, complex catheter ablation techniques, pioneered at UCLA, offer an increasingly effective option. The UCLA Cardiac Arrhythmia Center maps and ablates arrhythmias with the assistance of state-of-the-art imaging — a procedure known as ventricular tachycardia (VT) ablation. “We can find where these abnormal rhythms originate, thread wires into the heart and send a small amount of current through the catheter to create an electrical burn that cauterizes heart tissue in the desired location,” explains Kalyanam Shivkumar, MD, PhD, the center’s director.

Dr. Shivkumar’s group has led the way in advancing the VT ablation approach over the last decade-plus, including the use of epicardial ablation — performing the procedure from the outside of the heart — to successfully manage patients who don’t benefit from endocardial ablation. “With newer technologies we are able to take on sicker patients and complete the ablation procedures in a much shorter time than in the past,” Dr. Shivkumar notes. “And with the expansion of our team, we are serving a much larger population.”

As recently as the early 2000s, it was rare for refractory ventricular arrhythmia patients to be referred for a catheter ablation procedure, both because of the perceived risk of putting extremely sick patients through long procedures and because few groups had the experience to perform them, says Jason Bradfield, MD, director of the Specialized Program for Ventricular Tachycardia at UCLA.

“Over time, data from centers like ours has shown that the success rates have gone up and complication rates have gone down, and it’s become clear that outcomes for these patients are better when they’re referred earlier — in some cases even before going the drug route,” Dr. Bradfield says. He notes that among the patients with severe cardiomyopathy treated

at UCLA, the success rate for catheter ablation procedures to treat refractory ventricular arrhythmias is as high as 70-to-80 percent.

For those who don't benefit from catheter-based techniques, the UCLA Arrhythmia Center has been a leader in utilizing emerging neuromodulatory approaches such as cardiac sympathetic denervation, which involves surgically cutting the nerves to the heart that are contributing to the arrhythmia, or performing ablation in the renal arteries, to minimize effects on the autonomic nervous system. The heart's nervous system plays an important role in the genesis of arrhythmias. Marmar Vaseghi, MD, PhD, a cardiac electrophysiologist and director of clinical and translational research for the UCLA Cardiac Arrhythmia Center, notes that the center's patients who have undergone the cardiac sympathetic denervation procedure have experienced a greater than 70 percent reduction in their defibrillator shocks at one year of follow-up. "These are patients who have had refractory arrhythmias that didn't respond to medications or VT ablation, and a large number of them have benefited from this procedure," Dr. Vaseghi says.

In the absence of randomized clinical trial data, neuromodulatory therapies are typically still reserved for patients who continue to have recurrent ventricular arrhythmias after the more established VT ablation treatment, Dr. Vaseghi adds. "But now that we at least have retrospective studies from UCLA and other centers showing that neuromodulation is effective, rather than putting patients through repeat VT ablation procedures, we can offer this additional option to control their arrhythmias," she explains. "Between neuromodulation therapies, the advancement of catheter ablation techniques, and medications, these patients are much better off today than they were a decade ago."

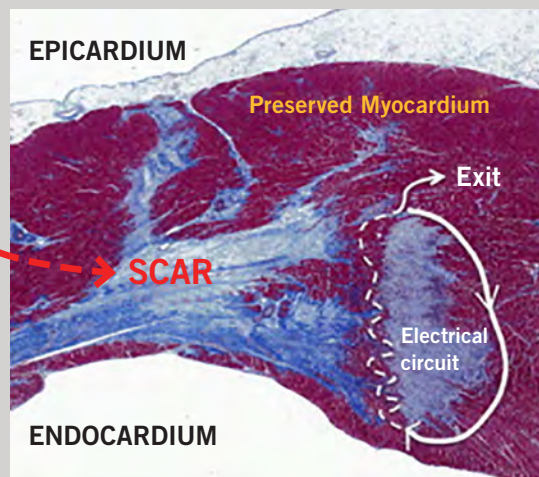


For more information about the UCLA Cardiac Arrhythmia Center, go to: uclahealth.org/heart/arrhythmia

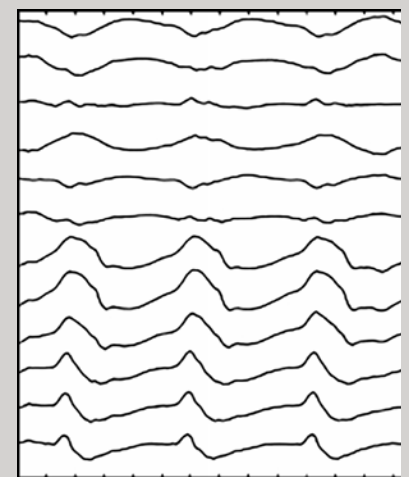
"With newer technologies we are able to take on sicker patients and complete the ablation procedures in a much shorter time than in the past. And with the expansion of our team, we are serving a much larger population."



Left ventricle



Myocardial scar



Ventricular tachycardia

Images show how a region of the left ventricle can become scarred from a heart attack or other insults. This scar allows electrical circuits to form that cause life-threatening ventricular tachycardia (right).

Images: Courtesy of UCLA Cardiac Arrhythmia Center

405 Hilgard Avenue
Box 956923
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David Geffen School of Medicine at UCLA ranks #6 in Research and #5 in Primary Care nationwide.



UCLA Heart Failure Symposium 2020: State-of-the-Art Updates & Therapies for Advanced Heart Failure

Over the next decade, we will see a dramatic increase in the number of patients with advanced heart failure who can benefit from advanced therapies for complex cardiac disease. The symposium is geared toward family practitioners, internists,

cardiologists, pediatricians, nurses and all other health care professionals taking care of heart failure patients.

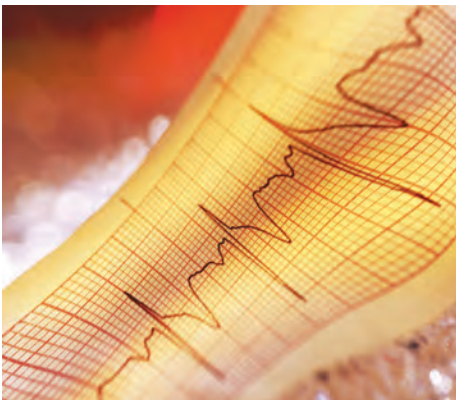


Photo: Super Stock

May 2, 2020

The Ritz Carlton Marina del Rey



For more information and to register, click on the link to this CME at: cme.ucla.edu/courses

Physicians Update

WINTER 2020

CHIEF OF COMMUNICATIONS
Rhonda Curry

CHIEF OF MARKETING
Tanya Andreadis

EDITOR
David Greenwald

CONTRIBUTOR
Dan Gordon

MEDICAL EDITORS
Eve Glazier, MD
Johnese Spisso, MPA

DESIGN
Donenfeld & Associates



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