

# SARVER HEART CENTER

A publication from The University of Arizona College of Medicine

Newsletter Issue 46 • Fall 2006

## ‘This is just the tip of the iceberg’

*Dr. Copeland and the cardiothoracic surgery team open a new chapter in heart-failure treatment*

**A**t first, Patricia Lopez thought her baby daughter had caught a cold. Two days later, Tiana had trouble breathing. Her parents rushed her to urgent care, where doctors diagnosed the 15-month-old with end-stage heart failure. Due to an unknown condition, Tiana’s heart was dilated to three times its normal size.



*Tiana Lopez became one of the youngest patients in North America to be put on the Berlin Heart assist device.*

“The consequences are deleterious,” explains Jack Copeland, MD, Co-Director of The University of Arizona Sarver Heart Center and Chief of Cardiothoracic Surgery at University Medical Center. “The heart becomes baggy and weak and can no longer pump enough blood to sustain adequate

circulation.” Dr. Copeland and his team determined that a Berlin Heart was Tiana’s only chance for survival until a donor heart became available.

### Help made in Germany

The Berlin Heart is a ventricular assist device that is attached to the ventricle of the heart and takes over as a pump, restoring blood flow through the body. While routinely used in Europe, no such device is readily available in the U.S., because it is not approved by the Food and Drug Administration (FDA). Before they could save Tiana’s life, Dr. Copeland and Richard Smith, Technical Director of the Artificial Heart Program, had to file an emergency compassionate use request with the FDA, currently the only way to obtain permission for a case-by-case use of the Berlin Heart in the U.S. Rushed from the manufacturer in Berlin, two of the devices arrived in Tucson five days later. To be on the safe side, Smith and Dr. Copeland had ordered two different sizes. On Feb. 7, Tiana became one of the youngest patients in North America with a failing heart connected to the life-saving pumping device.

Nearly 5 million Americans are living with heart failure, and 550,000 new cases are diagnosed each year. “Heart failure does not respect age,” says Dr. Copeland. “It affects children and adults and it’s equally fatal. Each group of patients requires a different

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How a courageous and visionary approach led to the unexpected recovery of two baby girls with heart failure

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Income for life by making a gift to the UA Sarver Heart Center? Mary Anne Fay shows how it works

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Continuous Chest Compression put to the test: The stories of two men who experienced a heart attack



## ...from the Director

**A**s you noticed, our newsletter has a new look! When we started the publication in 1991, one of our objectives was to present scientifically sound medical information that you can use to prevent disease. I was concerned about the shortcomings of much of the medical information in the popular press, especially with regard to prevention. For example, if someone takes a medicine, vitamin or natural substance thinking it prevents cardiovascular disease when in fact it does not – that’s a problem!

Often a reporter would interview me about a medication or a medical issue. When I offered to review the article for accuracy, the answer was usually, “our editorial policy does not allow that.” With the unfiltered plethora of information available on the internet the problem is even more acute. For the average user it can be impossible to separate the wheat from the chaff. Our newsletter was designed to help you see through the clutter and single out what’s relevant and accurate.

For some time now, we have considered giving our publication a fresher, easier-to-read look but cost has always been a major issue. With recent advances in technology we can now produce a newsletter with full color at the same cost as our previous purple mono-color! We are still committed to providing scientifically accurate information in an easy-to-understand format. We hope you like the all new, good old Sarver Heart Center Newsletter.



  
GORDON A. EWY, MD  
Director, UA Sarver Heart Center

## Heart Failure *continued from page 1*

set of medications, surgical techniques and devices. Our ambitious program is trying to address all these things at once and to help people of all ages.” Using the Total Artificial Heart (TAH), developed at The University of Arizona and manufactured by Tucson-based SynCardia Systems, Inc. as a bridge to transplant, Dr. Copeland and his team have been very successful in stabilizing end-stage heart failure patients while they wait for a donor organ. Unlike the Berlin Heart, the Total Artificial Heart replaces the patient’s heart and can only be used for adults.

### Keeping heart failure patients alive: The Big Blue

As a pneumatic (air-driven) device, the TAH depends on an external driver to pump the blood through the body. Named “Big Blue” for the color of its housing, this washing machine-sized behemoth keeps all TAH patients permanent company. With the help of a technician pushing Big Blue through the hallways, they can walk around or visit the cafeteria, but are confined to the hospital. With a newly developed portable driver approved for use in Europe in May, Smith expects a number of Big Blue drivers to be shipped back to the U.S. “We’ll probably have 30 of the 40 drivers that exist at our disposal. We are very excited about this, because those additional machines enable us to provide more transplant centers in this country with the artificial heart technology.”

In the treatment of heart failure, implantation of an assist device or the artificial heart, and ultimately a heart transplant, are the last resort. And even though most critically ill patients experience a transplant as the ultimate gift and new lease on life, their ordeal is far from over. “Most importantly, it buys them time,” says Dr. Copeland. “But the quality of

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life is nowhere near to what it's like living with your own heart." On average, Dr. Copeland and his team beat the odds when it comes to buying their patients time: The survival rate 12 years post-transplant is higher than at most transplant centers.

### **"This changed our thinking"**

While on the Berlin Heart, little Tiana's heart suddenly began to revert to its normal size. "We could not believe it," remembers Dr. Copeland. "We had not expected there was a chance her heart would ever recover. That's why we had put her on the waiting list for a heart transplant." In a miraculous recovery, Tiana's heart regained its strength until it was able to support the girl's body on its own. After careful testing, Dr. Copeland took Tiana off the transplant list and removed the Berlin Heart assist device. With every day, the little girl regained more strength and is now as happy and apparently healthy as in the days before her heart gave up.

Encouraged by the unexpected recovery the Berlin Heart had brought about, Dr. Copeland implanted the smaller of the two devices shipped earlier into an even younger girl, Itxair Rodriguez, who was only eight months at the time. Itxair also recovered on her own and is now in good health.

"We no longer see this device only as a bridge to transplant," says Dr. Copeland, "but as a possible new route, a bridge to recovery. We hope that a more frequent use of the devices supports that trend."

"It really changed our way of thinking," says Smith, "It caused us to revisit our strategy for dealing with

heart failure in kids. If the device was available on a routine basis, possibly many more children could have this outcome."

### **Dr. Ewy: "Heart failure a major priority"**

"Patients with end-stage heart failure are only the tip of the iceberg," says Gordon A. Ewy, MD, director of the UA Sarver Heart Center. "There is a whole population of people developing heart failure as we speak and they are not even aware of the danger they're in. Our goal is to have the medical capacities in place to prevent those people from progressing to the tip of the iceberg. We need to intensify our research

to better understand the causes of heart failure and to develop new approaches to treat it. For that reason, we at the Sarver Heart Center have made heart failure a major priority."

The Sarver Heart Center, Dr. Copeland's Cardiothoracic Transplant Program at University Medical Center and SynCardia form a worldwide

unique constellation. It is hard to imagine a place more conducive to breakthroughs in the fight against heart disease. "We are in the process of becoming a global hub in heart failure management and care," says Smith, "covering all aspects – medications, pacemakers, assist devices, transplants, rehabilitation, diet."

In the meantime, Dr. Copeland and Smith are training hospitals from all over the world in the use of the Total Artificial Heart. In addition to making more drivers available for use with the TAH, they are working closely with manufacturers to build an all-new, portable driver for the TAH. Another priority is to obtain

*continued on back page*



*Jack G. Copeland, MD, watches as Tiana and her parents are presented with a special souvenir – the Berlin Heart that saved the toddler's life.*



## Welcome Back!

Mark Friedman, MD, has rejoined the Sarver Heart Center team as a clinical cardiologist. Dr. Friedman received his medical degree from New York Medical College in New York City but came to Tucson for his cardiology fellowship training. He was on the faculty at The



University of Arizona for a few years before going to Tulsa, Okla. to do private practice. He recently rejoined our cardiology section as Chief of Cardiology at University Physi-

cians Healthcare Hospital at Kino Campus with major clinical responsibilities at both Kino and UMC. Dr. Friedman specializes in invasive and non-invasive cardiology, including stress-testing and echocardiography. ♥



## Distinguished Alumni Award

Marvin J. Slepian, MD, (center), Director of Interventional Cardiology Research and Director of the Tissue Engineering Laboratory at the Sarver Heart Center, was recognized by his alma mater, the University of Cincinnati College of Medicine, for his research and development of novel therapeutics. These include the use of polymeric biomaterials as tissue supports, barriers or means of local drug delivery in tubular organs or organ components, biodegradable stents, drug-eluting stents and the Total Artificial Heart (TAH). Dr. Slepian is chairman of SynCardia Systems, Inc., manufacturer of the TAH. ♥

## Join us at Skyline Country Club for a seminar about heart disease in women

### "The Heart of the Matter"

October 14, 2006 • 11:30 am

Skyline Country Club, 5200 E. Saint Andrews Drive, Tucson

### Learn what you need to know to prevent heart disease and stroke with a special emphasis on cardiovascular health for women.

The UA Sarver Heart Center Women's Heart Health Education Committee will host a luncheon with Sarver Heart Center physicians discussing women and cardiovascular disease. Admission is \$25 and includes lunch. Space is limited. For reservations or more information, please email [stolte@email.arizona.edu](mailto:stolte@email.arizona.edu) or call (520) 626-4083.

## University Medical Center Among *Best Hospitals* for Heart Surgery and Heart Care

University Medical Center is one of three top institutions in the country when it comes to low mortality rates in the category "Heart and Heart Surgery," according to the annual *America's Best Hospitals* list by *U.S. News & World Report*. UMC is the best ranked heart center in the western United States, closely following Stanford Hospital and UCLA Medical Center. UMC's ranking and exceptionally low mortality rates are the result of the combined excellence offered through UMC's comprehensive cardiovascular care, ranging from routine bypass and valve surgery to general cardiovascular medicine, including management of acute heart attacks and heart failure, to the highly acclaimed cardiothoracic surgery program, which since 1985 has performed more than 800 heart transplants and over 300 device implants including over 90 Total Artificial Hearts. ♥

## A Sharper Image:

### Zooming in on Coronary Artery Disease

Echo, CT, NI, MRI – Is your head spinning already? It's easy to get confused with all the different techniques doctors use to picture the inside of the human body. For example, using echo cardiac imaging, cardiologists can "look" inside the beating heart and check for malfunctions, such as a defective valve. Vincent Sorrell, MD, who holds the Allan C. Hudson and Helen Lovaas Endowed Chair of Cardiovascular Imaging at the Sarver Heart Center, has gained international recognition for his teaching and clinical research toward improvements in cardiac imaging. "Only when physicians know the advantages and limitations of different techniques can they choose the right tool for a given patient," he says. To further the understanding of modern imaging tools and to discuss new research that could lead to even more accurate and powerful diagnostic tools, Dr. Sorrell brought together world-leading experts from diverse areas in cardiovascular imaging for a special symposium preceding this year's international scientific conference of the American Cardiology College (ACC), held in March in Atlanta, Ga. ♥



# A Heart Attack in Disguise

Mary Anne Fay knows first-hand the false sense of security many women find in the wide-spread notion “Women don’t have heart attacks.” In 1999 her life changed when she visited her primary care physician after six episodes of severe pain. An ENT specialist had attributed the painful bouts to an ear infection. During a visit at her physician’s office, Mary Anne experienced another pain attack. Her doctor realized the pain had nothing to do with her ear infection. “You need to go to the hospital immediately,” he told her. “You’re having a heart attack!” She was admitted to University Medical Center, where she received angioplasty and treatment for her condition.

It was shortly after her stay at UMC that Mary Anne joined her husband, Mark, as a patient of the Sarver Heart Center. Grateful for the care she and Mark had received, Mary Anne was more than happy to accept a position alongside Mark on the Advisory Board in 2003.

Not ones to sit idle, Mark and Mary Anne were actively involved in chairing the campaign to help complete the Gordon A. Ewy, MD, Distinguished Endowed Chair in Cardiovascular Medicine, in honor of Dr. Ewy. “Being part of that campaign was supremely gratifying. We are so glad to have been a part of Sarver Heart Center history.”

As the UA Sarver Heart Center began to focus on the under-recognized problem of heart disease in women,

it was important to find a champion for the education of women and to assist in the completion of an endowed chair for heart disease in women. “Dr. Ewy had just concluded the Advisory Board meeting when he asked for a volunteer to lead a committee on heart disease in women. It was almost as if he had said ‘Mary Anne, I have a favor to ask’... how could I say no?” In August 2004 the Women’s Heart Health Education Endowment (WHEE) Committee was formed with Mary Anne as chairwoman. She organized a core group of volunteers who initiated monthly meetings to



*Excited about the gift annuity:  
Mary Anne and Mark Fay*

could not have been in more capable hands.”

Under Mary Anne’s leadership, the WHEE committee has been very successful in the education of hundreds of women. Over the course of 18 months, the committee has participated in four conferences and hosted two lectures in Tucson and

one in Phoenix. Currently in the works is a luncheon titled “The Heart of the Matter.” (see facing page). Perhaps the most exciting achievement the committee witnessed was the creation of the Allan and Alfie Norville Endowed Chair for Research of Heart Disease in Women.

Mary Anne decided to continue to make a difference by having a lasting impact on the cardiovascular education of women through a life-income gift called a charitable gift annuity. She created the Mary Anne Fay Endowment Fund for Women’s Cardiovascular Education. “The work of the committee over the past year and a half has made a difference for a good number of women and it is important to me to see that this work continues,” says Mary Anne. Dr. Ewy adds: “We are so grateful to Mary Anne and Mark for all they have done and are doing in the fight against heart disease in women. The Mary Anne Fay Endowment will provide funding into perpetuity, a fitting tribute to this wonderful woman.” ♥

## How does a charitable gift annuity work?

With a charitable gift annuity, you make a gift to The University of Arizona Foundation to support, for example, the work of the Sarver Heart Center. The University of Arizona Foundation agrees to pay you a fixed amount of income every year for the rest of your life. Another beneficiary can also receive income from your charitable gift annuity. In addition, you have the option to defer receiving income for a period of time.

For more information on this or other ways to support the Sarver Heart Center, please contact Clint McCall at (520) 626-4146.

discuss topics related to the cardiovascular needs of women and how to fund an endowed chair in research. “I was delighted to know that Mary Anne was willing to once again become an advocate for an important cardiovascular issue.” Dr. Ewy says: “The committee

# Paramedics Save More Lives When They Don't Follow the Rules

**S**ky Harbor Airport, Phoenix, May 10, 11 p.m.: Joseph Horbaczewski, 54, is waiting for his luggage. Suddenly he clenches his chest, gasps and falls down on the carpet floor.

Hillenbrand Swimming Pool, The University of Arizona, Tucson, May 23, 7 a.m.: Brian Duffield, 40, has completed his early morning training. He climbs out of the pool, grabs his towel on his way to the locker rooms. Turning on the shower, Brian suddenly feels dizzy and collapses.

James Dahle, MD, an emergency medicine resident at The University of Arizona College of Medicine who has just returned from a vacation in Hawaii, was walking through the baggage claim area at Sky Harbor when he saw a man collapse 30 feet away. "I told two bystanders to call 911 and sent someone else for a defibrillator," he recalls. Then he felt for a pulse. Nothing. "I started chest compressions, and after I had pumped on the chest fifty times or so, someone showed up with the defibrillator." Dr. Dahle asked people to stand back and pushed the button. Shock. "Still no pulse," Dr. Dahle remembers, "so I resumed chest compressions."

## **A by-stander made a comment**

about how he needed to give mouth-to-mouth breaths, but Dr. Dahle knew better. "I informed him that wasn't necessary in the first five minutes of arrest," he says, referring to research at the Sarver Heart Center, whose members pioneered a new approach to CPR called Cardiocerebral Resuscitation. Cardiocerebral Resuscitation is all about continuous chest compressions – it eliminates mouth-to-mouth ventilation for cases of

sudden unexpected collapse in adults. After compressions and another shock from the automated external defibrillator (AED), Horbaczewski took a deep breath and struggled to get up from the floor. Paramedics arrived on the scene shortly after and took him to a Valley hospital.

Dianne Wygal-Springer, a paramedic with Tucson Fire Department, was off-duty the morning of May 23, plowing the lanes at Hillenbrand Pool when a boy came running out of the men's locker room, shouting for help. Wygal-Springer rushed inside and found Brian Duffield in the shower, seizing, his eyes glazed over. Soon thereafter she lost his pulse.



*UA resident James Dahle, MD, uses a dummy to explain how he helped save a cardiac arrest victim at the airport in Phoenix.*

## **The paramedic shouted**

for someone to get the AED from the wall at the pool and called 911. Soon after the AED delivered the first shock, Wygal-Springer's colleagues from Tucson Fire arrived. Still no pulse. One of the

paramedics performed continuous chest compression CPR and after one round of about 200 compressions, the paramedics got a pulse. "Certainly the combination of Sarver CPR and the AED saved Brian's life," says Wygal-Springer.

As a cause of death, out-of-hospital cardiac arrest is second only to all cancer deaths combined, taking the lives of 490,000 Americans every year. "It's not what you see on *E.R.*," says Sarver Heart Center Director Gordon A. Ewy. "For the most part, no more than 3 percent survive when their heart suddenly stops while they're not in a hospital setting." In spite of periodic updates of standardized international guidelines, those rates have remained more or less unchanged over the last couple of decades. Surveys have shown



that four out of five individuals will not initiate bystander CPR, mostly because of the aversion to mouth-to-mouth contact or fear of doing something wrong. The current CPR guidelines set forth by the American Heart Association (AHA) call for two mouth-to-mouth breaths after every 30 chest compressions. According to the CPR experts at the Sarver Heart Center, the guidelines fall short because they advocate the same approach for different medical conditions – cardiac arrest and respiratory arrest.

“They advocate a single approach because supposedly laypeople can’t tell the difference between the two,” Dr. Ewy says. “We think they can. If you’re dealing with respiratory arrest, for example in a drowning accident, you have to give mouth-to-mouth breaths. But if an adult collapses for no apparent reason, you can be pretty certain you’re dealing with cardiac arrest, most likely due to a heart attack.” He adds, “The chance of survival is a lot better with bystander-initiated CPR. If you call 911 and do nothing until the paramedics arrive, the patient has almost no chance of leaving the hospital alive. We expect Cardiocerebral Resuscitation to increase the willingness to perform CPR, as it eliminates the need for mouth-to-mouth ventilation.”

### **Dr. Ewy encourages bystanders**

to use AEDs wherever available. “In addition to performing CPR, you can dramatically increase the chance of survival by attaching the AED to the victim and following the simple voice prompts. You can hardly do anything wrong.”

The most important factor, the CPR Research Group found, is to keep the blood moving through the body by continuous chest compressions. Stopping com-

pressions for ventilations does more harm than good. In addition to the simple CPR approach for bystanders, the group has developed a modified protocol for professional emergency first responders. To test the new approach, Michael Kellum, MD, an emergency physician in Wisconsin, implemented the new protocol in two Wisconsin counties. During a one-year study period, emergency responders followed the new approach, which is dramatically different from the guideline-directed CPR procedures most paramedics use on a daily basis. With the new CPR, they skipped the first steps of the standard protocol: intubating the patient for ventilation and delivering a shock using a defibrillator. While still attaching the victim to a defibrillator, they did not wait for the device to analyze the patient’s heart rhythm, but started fast, forceful chest compressions. “Intubating the patient and waiting for the defibrillator to do its analysis takes time,” says Dr. Ewy, “time a cardiac arrest victim doesn’t have.”

When Dr. Kellum and his colleagues at the Sarver Heart Center compared the number of patients resus-

citated with the new protocol to the three years before, they were thunderstruck. “If we had seen only a 10 percent increase in survival rates with the new CPR protocol, that would have been exciting enough,” Dr. Ewy says. “But it turned out that the increase in survival was 300 percent! In other words, the paramedics in Wisconsin

were able to resuscitate three times more people compared to the times when they were following the AHA guidelines.”

More information is available online at [www.heart.arizona.edu](http://www.heart.arizona.edu) and [www.azshare.gov](http://www.azshare.gov). ♥



*The CPR Research Group at the Sarver Heart Center (from left): Ronald Hilwig, DVM, PhD, Mohamed Gaballa, PhD, Arthur Sanders, MD, Karl Kern, MD, Gordon Ewy, MD, Charles Otto, MD, Robert Berg, MD, Melinda Hayes and Lani Clark.*

## Heart Failure *continued from page 3*

FDA approval for the routine use of the Berlin Heart in children. “Our goal is to have a variety of devices available on the shelf so we can use the most appropriate one without further delay,” says Smith.

“Under the present circumstances, we can request the use of the Berlin Heart only after the fact,” says Dr. Copeland. “These are very sick children, and we can save them only if they stay alive long enough for us to rush the device over here, which can take up to a week. Many kids do not survive because they can’t wait that long.” ♥

## Best Doctors in America – at Sarver

Of the Tucson cardiovascular specialists listed in the prestigious *Best Doctors in America* compilation, the majority are with the UA Sarver Heart Center. Published each year, *Best Doctors* identifies doctors who other physicians consider the best in their specialties. The following are members of the Sarver Heart Center:

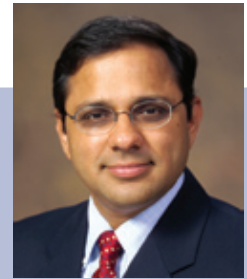
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Gary Becker, MD



Raj Bose, MD

### A First in Southern Arizona Trauma Care: SHC Doctors Repair Torn Aorta with Stent

An 81-year-old Tucson man whose aorta was torn in a car accident was saved by an alternative procedure sparing him open-chest surgery. Most patients with a torn aorta – the main blood vessel leading from the heart to the body – bleed to death, but fortunately for this patient, bleeding from his aorta was contained in the tissues. The traditional treatment for aorta repair is to open the chest, put the heart on a heart-lung machine and sew up the tear in the blood vessel. Instead, interventional radiologist Gary J. Becker, MD, and cardiac surgeon Raj K. Bose, MD, both members of the Sarver Heart Center, inserted a catheter into the patient’s femoral artery and snaked it to the aorta, where they expanded a stent to cover the hole in the aorta. The technique has been used to treat thoracic and abdominal aortic aneurysms, abnormal bulges in the aorta wall that can rupture and cause life-threatening internal bleeding. ♥



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