



MATTERS OF THE

UNION ALUMNUS DAVID MELVIN IS A LEADER IN THE SURGICAL SUITE AND THE RESEARCH LAB

BY MARK KAHLER

A stunned husband gathered his two teenaged sons alongside their mother's hospital bed. They wondered how something like this could happen so quickly.

By every medical indication, 40 year old Mary Ann Deck was dying.

She had been living with a heart ailment known as cardiomyopathy. It's a medical term defined in layman's terms as disease of the heart muscle. It first showed up after a pregnancy, and Deck had followed her doctor's orders. But a new job brought higher stress levels. Her uneasy coexistence with cardiomyopathy ended abruptly.

Within three months, her chances for survival spiraled downward.

"It had been 16 years after the time I was first diagnosed, and then all of a sudden (my heart) just failed," says Deck. "We knew it was going to happen sooner or later."

HEART

Twenty years ago this spring, Mary Ann Deck was given the gift of seeing her two sons through high school, marriage and fatherhood. She became the first woman to receive a heart transplant at the University of Cincinnati.

At the time of her critical need, Dr. David Melvin ('64) had already performed 10 heart transplants at Cincinnati's University Hospital. His surgical suite was about a two-hour drive from Deck's home in Liberty, Ind.

After discharge, Deck says walking the streets of Liberty was a slow process – and only partially because she was recovering from major surgery.

"It would take me three hours to walk a block downtown. Everybody would stop me and want to talk to me. I had celebrity status."

The Union University alumnus who performed that ground-breaking surgery also received some public attention, but Deck says he'll never get the credit he deserves.

"I would not be alive if it weren't for Dr. Melvin," says Deck. "I do not know of any finer person on earth."

"I was pretty much solo"

Deck's happy story is one of many that unfolded from 1985-1990, when Melvin ran the heart transplant program at University Hospital.

"You're taking people from a bed-to-chair existence. Their blood pressures are so low they couldn't really think or do much of anything," says Melvin. "We were able to see those same people getting around, playing with their kids or grandkids. Some of them went back to work or began traveling.

"It was great. It was gratifying. It makes you feel very humble and very thankful that you can be a part of that."

About 2000 heart transplants are performed in the United States each year. But the procedure started amid very limited success and much skepticism. Melvin himself did a lot of soul-searching. "I really had mixed feelings. I was fascinated with transplants. But I had real doubts."

In 1967, Dr. Christiaan Barnard performed the first heart transplant. By the early 1970s, transplants were being done regularly at Stanford University. Survival rates were poor, because the internal workings of the human body tend to reject all foreign matter, even when the object is a human heart.

Many in the medical community advocated abandoning heart transplants to invest time and research in more promising pursuits. But 1983 brought approval of the anti-rejection drug cyclosporine, and success stories became more common. Achievement back then was measured in modest increments.

"I thought if I made it five years, I would be doing well, says Deck. "That's all I was looking for. I never dreamed I'd live this long."

In all but a few hospitals, the procedure was well outside the medical mainstream in 1984. That is when the University of Cincinnati asked Melvin to start a transplant program from scratch. Only a few years earlier, he and several colleagues had been recruited from private practice to start performing cardiac surgeries at University Hospital.

Melvin spent months observing heart transplant programs at Stanford and the University of Pittsburgh. He appears uncomfortable with the title "pioneer," because others had been in the field long before his first transplant surgery in December 1985. Still, Melvin was blazing trails in Cincinnati, a city known nationally for the quality of its health care and the extent of its medical resources.

"The program continues very successfully after 20 years due to the efforts of a large number of people, the most essential being Dr. Melvin," says Dr. John Flege, professor of surgery at the University of Cincinnati Medical Center and someone many consider the "father" of cardiac surgery in that region. "[Melvin] designed, organized and led the effort in its formative years."

"I was pretty much solo," says Melvin. "I

found out there were a lot of very good internal medicine people around, but with something this new, most of them didn't want to have anything to do with it."

"Who gets one, and who doesn't?"

The first heart transplant at University Hospital came together in a blur of developments. As is often the case, a donor heart became available quickly in another part of the country. With almost no notice, Melvin found himself on a plane bound for Mobile, Ala. to supervise the preparations. At the same time, Charlie Ashcraft of nearby Alexandria, Ky. was prepared for surgery at University Hospital.

Melvin returned and performed the transplant, then stayed with Ashcraft in the intensive care unit to be certain his patient was stable. It meant going 36 consecutive

But Melvin says the greatest challenge of all comes down to one not-so-simple question. "The most difficult part of it is deciding who gets one, and who doesn't."

Melvin says some patients initially appear to be good transplant candidates, but as they wait for a donor heart, their conditions worsen to the point that their survival is unlikely. Others have to be told they're too old or lack strength. "Playing God' is a completely inappropriate term, but you sure need to hope that you're being guided, because there are things you just cannot know," says Melvin. "It becomes a very fine line."

"I've done this for long enough"

By 1990, Melvin and his team at University Hospital had performed 100 heart transplant surgeries. Almost anyone would bask in the financial rewards and the job satisfaction

in someone else's hands, took a 90 percent pay cut, and moved to a smaller house. The man associated with heart transplantation in the region was now taking freshman engineering classes.

He says he started out simply wanting to be able to speak intelligently with engineers as he pursued his research goal: Making human heart walls move without touching the interior of the organ. The concept had been explored in many laboratories during the 1950s and 1960s, but then was largely abandoned.

"It was a half-baked idea that needed to go back in the oven."

As he considered mechanical methods to support a failing heart, Melvin progressed through engineering classes at the University of Cincinnati, but eventually needed to study biomedical engineering. At the time, the nearest program was at Ohio State University in

called for "applying advanced engineering concepts to thoroughly understood cardiac pathophysiology problems."

Mechanical hearts have been used with varying but limited success in the past 20 years. Melvin says there are two main issues that have not been fully overcome.

One is getting power to the heart so it can pump continuously. The other is accomplishing effective pumping without damaging the blood itself.

Melvin used the hearts of pigs he obtained from a slaughterhouse to study a number of theories, because pig hearts closely resemble those in humans. Eventually, he progressed to the diseased human hearts that were being replaced in University Hospital's transplant program. He went to blood banks to obtain pints that had passed their expiration dates.

For a goal-oriented person like Melvin, the move to research posed mental challenges outside the research itself.

"As a surgeon, you start at 7 a.m. and by noon you know whether you did some good or whether you should have been somewhere else that day," says Melvin. "In research, it takes years to know if you've done any good."

As with all experimentation, there were scores of failures and many dead-ends.

"In medical research, this process is called 'iterative development,'" Melvin says. "Most people would just say 'trial and error.'"

One result of this work is an exterior harness for diseased hearts Melvin has trademarked under the name RePower.

"It allows us to replace the heart's muscle power without replacing the living blood-contacting surface inside it."

The power sources are electromechanical, electrohydraulic or other muscles in the body. Since the device is external, it does not touch blood.

About two years ago, experiments showed the process could work. Then the surgeon in Melvin took over to develop a survivable operating procedure. More resources are needed, and Melvin is seeking investors.

Estimating when RePower could actually be ready for human patients is very difficult, but Melvin thinks it will be at least five years. Much of the experimentation has involved sheep and goats.

"As a patient, I would want to know it kept a sheep or goat alive for more than two or three hours," says Melvin. "I would want that sheep or goat walking around and smiling at me for six months."



By 1990, David Melvin and his team had performed 100 heart transplants.

Photography provided by the University of Cincinnati Department of Surgery

hours without sleep.

The historic surgery also happened to coincide with Melvin's 20th wedding anniversary.

"Two of my partners insisted I had to leave the hospital long enough to have dinner with Sue," says Melvin with a smile. He chose Cincinnati's most exclusive restaurant, but about 15 minutes into the special meal, there was a problem.

"The head waiter came over, looked at Sue, and said to her 'should I wake him up?'"

Melvin says he and his team at University Hospital performed 33 heart transplants that first year.

"It's not a terribly difficult operation," says Melvin. "It has to be done right, but it's certainly no more [technically] difficult than a valve replacement or a coronary bypass."

More difficult, he says, is the management of the transplant team. You need layers of support to help with medical decisions.

that come from extending human life. But Melvin had a global perspective and a love for research that started in his undergraduate years at Union.

"Helping 100 people is nice, but globally, it's a drop in the bucket."

A few years earlier, Melvin had been a group leader in the Walk to Emmaus, an ecumenical program built on 72 weekend hours of lecture, prayer and meditation. Melvin's lecture topic had been discipleship, something he defined for his audience as the willingness to listen to God's leading, and then doing whatever it takes to do what He wants you to do.

"It led me to something I had been wrestling with for a long time. I love what I'm doing. But I have no question in my mind that it's not what I'm meant to keep doing."

"I came to the realization that I've done this for long enough."

So Melvin put the heart transplant program



David Melvin and Mary Ann Deck celebrate 20 years of heart transplantation in Cincinnati.

Columbus, a four-hour round-trip from home.

At Ohio State, the faculty saw a promising student whom they encouraged to pursue a Ph.D. When he earned that terminal degree in 2002, it might have satisfied an impulse he had nurtured for decades – to become the inventor of devices with the potential to improve lives by the thousands rather than one-by-one.

"Every life is important," says Melvin. "But how much of a dent are you making?"

"Two Main Goals"

Melvin founded CardioEnergetics in 1998. The mission statement of his new company

A Family Man at Heart

From his hometown of Bradford, Tenn., Melvin says his family was happy to see him enroll at Union University in 1960. He never seriously considered any other schools. By the time he was a senior, he had been elected vice president of the student body.

"Back then, everyone at Union had their little area and they stayed in it," says David Blackstock ('64), Union's long-time athletic director and a student during Melvin's time at the university. "What I remember about David was he was rather quiet, but everyone in each of those areas had a great deal of respect for him."

"Even then, everybody at Union recognized his special gifts. He was an intelligent, studious individual who was also very friendly."

Associate Professor of Biology Elsie Smith started her teaching career at Union two years prior to Melvin's graduation. She has taught thousands of students since then, but Melvin still stands out in her mind as "an outstanding scholar, especially in biology." Melvin applauds plans for White Hall, the \$18.5 million science building currently under construction on campus. He says students now have so much more to learn than those in his day.

"The body of basic scientific knowledge now is probably ten times as large as when I was at Union."

Melvin's four grown sons, like their father, have done a lot of studying. Eldest son Mark works in computer and information technology. Second son Alan is a biomedical engineer and runs the engineering and fabrication section of his father's research lab. His third son John is an attorney, and his youngest Peter is a Ph.D. student in mathematics at Vanderbilt.

Melvin says the fact that none of them became doctors maybe is "the result of seeing my work hours."

With those years of long days in mind, Melvin describes his wife Sue as "wonderfully patient and tolerant." The couple recently marked their 40th wedding anniversary.

But Melvin also has an extended family of Cincinnati transplant recipients. Many of them gathered last year to celebrate 20 years of heart transplants at University Hospital.

Mary Ann Deck was there, posing for pictures with Melvin and perhaps showing off pictures of two granddaughters she would never have known if she hadn't received a heart transplant.

She says she still receives Christmas cards from Melvin.

"One Christmas, a long time ago, he had a conference in Lexington, Ky.," says Deck.

"Instead of driving, he took a bus so he could have time to write Christmas cards to all his transplant patients."

"Is that not unbelievable? That just gives you a little glimpse into the type of man he is." ❖