

Experimental power pack allows man with artificial heart to leave hospital

March 22 2012, By Carol M. Ostrom

Christopher Marshall lost his heart. Most of it, anyway. It was too damaged to keep him alive, so surgeons decided it had to come out. On Feb. 6, in a six-hour operation, surgeons did just that and then implanted an artificial heart in its place.

On Wednesday, more than six weeks later, Marshall left the University of Washington Medical Center to begin what likely will be a long wait for a [heart transplant](#). Leaving the hospital is not something any total artificial-heart patient in Washington has been able to do before.

Previously, such patients were tethered to the only FDA-approved mechanical "driver" for the fake heart - a 418-pound machine - which meant they had to stay in the hospital until a [donor heart](#) became available. That can mean a wait of one to two years or more.

Marshall, 51, Wasilla, Alaska, got his first taste of freedom Saturday, leaving the hospital to take a short visit to the Ballard Locks. He took with him a backpack-size pneumatic machine and batteries - an experimental portable driver system made by SynCardia, now being tested by the University of Washington and other centers.

"I was very glad to feel the BTUs from the sun," Marshall said.

Polite visitors at the Locks didn't ask why he was toting around a machine making a loud blappety-blappety-blappety sound.

"I got a few looks," he mused.

Marshall worked as a lead instrument technician for an oil company on the North Slope of Alaska until his heart condition worsened dramatically last year. He had been diagnosed in 1999 with idiopathic cardiomyopathy, a disease that destroys [heart muscle](#), and ventricular tachycardia, an irregular fast heartbeat.

He and his wife, Kathy, arrived at UW on Jan. 23, figuring it would be a short visit to heart specialists. They had packed for a two-day stay.

Instead, doctors found that Marshall was too sick to fly home. He needed a [new heart](#).

It took some convincing for Marshall to believe that he was so sick he needed to have his chest sawed open and his heart replaced by a bulbous polyurethane contraption with some tubes leading to a machine that makes a very loud sound.

And it wasn't just the operation, or the fake heart, but the whole idea of going around without a heart that bothered him.

"That was one of the things I had to get my mind around," Marshall said. "Do I really need all that?"

"He had wrapped his mind around that he wasn't as sick as he was," said his surgeon, Dr. Nahush Mokadam, co-director of heart transplantation and director of mechanical circulatory support at the University of Washington Medical Center.

That's typical, Mokadam said, because patients with such conditions get worse very gradually and adjust. Marshall was healthier than many patients who need transplants - he hiked and walked and tried to stay

active, despite often feeling short of breath. Over the last 12 years, he said, he had to use an implanted defibrillator some 30 times to shock his heart back into a normal rhythm.

On the day before the surgery, Marshall collapsed on his daily walkabout through the hospital corridors - an incident that helped convince him, he said.

After 10 years of trials, the artificial heart in 2004 was approved by the FDA as a bridge until a transplant could be performed. The artificial heart now used is a refined version of the Jarvik 7 Total Artificial Heart implanted in 1982 into a 61-year-old dentist from the Seattle area, Dr. Barney Clark, who lived for 112 days.

In the 10-year trial, 79 percent of the patients with the [artificial heart](#) survived until a transplant - for one patient, that was more than four years. By contrast, 46 percent of similar patients without the heart survived to get a transplant.

The demand for donor hearts is increasing much faster than the number of available hearts, which has dwindled in recent years, according to the New England Journal of Medicine.

Marshall is one of 40 patients enrolled in this trial at medical centers around the country.

Instead of returning to Wasilla, the Marshalls will be staying in a temporary residence in Bothell, Wash., while they wait for a heart - the kind that doesn't need batteries.

No medical device or procedure comes without a downside.

For Marshall, it's only two hours before he needs to recharge batteries,

which he can do by plugging into an AC outlet.

There was also a scary moment when doctors unplugged him from the refrigerator-size machine and plugged him into the portable driver.

Sort of like a pit stop at the Indy 500, every move went as choreographed, Mokadam said. But still, Marshall admitted, it was one - shall we say? - heart-stopping moment.

This is also expensive. The heart itself costs \$124,000. With hospitalization and surgery, the tab so far - and this is only Part One - will probably reach close to \$250,000.

And then, when a heart becomes available, there will be the transplant surgery and a lifetime of immunosuppressant drugs. That will bring the tab closer to \$1 million, Mokadam said.

Marshall, who is on disability leave from his job, said his insurance will cover expenses. The portable driver, because it's being used as part of a study, is paid for by the company, SynCardia Systems.

John Capps, administrator of the UW Medicine Regional Heart Center, said being able to use the portable machine is very likely to be less expensive than having a patient spend a year or two in the hospital.

There are also physical risks. Marshall has tubes coming out of his body, and that always poses the risk of infection, Mokadam said. The [heart](#) and the driver are mechanical, and could have mechanical problems.

But for patients awaiting a transplant, he said, being able to leave the hospital is incredibly important. "It's not just their physical health that patients have to get through, it's their mental state as well," Mokadam said.

As for Marshall, he was upbeat - even about the weather. He smiles at the nurses and thanks them for everything, his wife said.

"He has an attitude I've never seen in anybody else," she said. "He's actually my hero."

As for the noise, Marshall said he now sleeps with earplugs. Otherwise, he and Kathy are beginning to be sort of fond of it, he said.

"We decided that's the sound of life - absolutely."

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