

Department of Surgery - In the News

UWMC First in Pacific Northwest to Discharge a Total Artificial Heart Patient

University of Washington Medical Center has become the first hospital in the Pacific Northwest to discharge a patient implanted with the world's only approved Total Artificial Heart. The device, manufactured by SynCardia Systems, is approved for use as a bridge to transplant in the United States, Canada and Europe. The UW Medicine Regional Heart Center is the first Western Washington heart-care service to offer this technology.

The patient, Christopher Marshall, of Wasilla, Alaska, was discharged from the hospital on March 21st. He was implanted with the Total Artificial Heart during a six-hour procedure on February 6th.



Chris Marshall with his "Freedom Pack" portable device and "Big Blue," the machine to which he was connected after the implantation of his artificial heart. With him are his nurse Shauna Andrus and his surgeon Dr. Nahush A. Mokadam.

The surgeon was **Dr. Nahush A. Mokadam**, the hospital's co-director of heart transplantation and director of mechanical circulatory support. He was assisted by Dr. Awori J. Hayanga, chief resident in cardiothoracic surgery. Mokadam is the LeRoss Endowed Professor in Cardiovascular Surgery, UW Department of Surgery.

"Mr. Marshall has done remarkably well on the device. I'm very pleased with its performance and his recovery. We continue to support him as we await his heart transplant," Mokadam said.



The Total Artificial Heart, seen at the lower left, awaits placement during Mr. Marshall's surgery.

Marshall, 51, was admitted to UW Medical Center in January with a heart performing barely well enough to keep him alive, Mokadam said. Marshall had been diagnosed in 1999 with idiopathic cardiomyopathy, a deterioration of heart function with an unknown cause, and ventricular tachycardia, an irregular, fast heartbeat. The conditions progressively reduced his heart muscle's pumping capacity.

Originally designed as a permanent replacement heart, the SynCardia device is approved by the Food and Drug Administration as a temporary solution until a donor heart becomes available. The device is available to patients at risk of imminent death from biventricular failure. This is an irreversible state affecting both chambers that pump blood away from the heart.

In the implantation procedure, the surgeon removes the patient's failing left and right ventricles and all four heart valves. The implanted device consists of two bulbous, polyurethane chambers that act as ventricles. Each chamber has an in-flow and out-flow valve and a four-layer diaphragm. They are sutured into the remaining heart structure: the left and right atria, the aorta and pulmonary artery.

The implanted device has no sensors, motors or electronics. It is powered by a pneumatic driver outside of the patient's body, which is connected by two tubes that exit the patient's abdominal wall. The driver supplies vacuum pressure to pull the diaphragm to the bottom of the ventricle, allowing blood to enter, then produces a precisely calibrated pulse of air that pushes the diaphragm to the top of the ventricle to fully eject the blood.