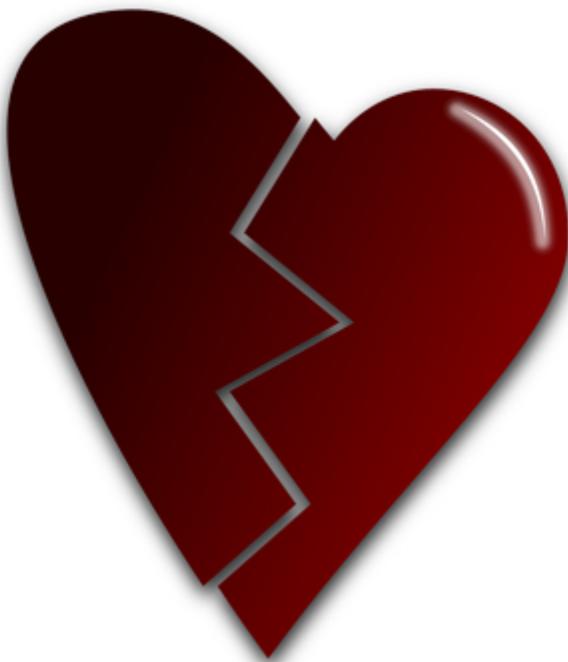


UC San Diego Cardiac Team Pioneers Procedure for Righting a Wronged Heart

By Bonnie Ward | April 09, 2015

A 73-year-old man whose pacemaker leads – the wires that deliver live-saving charges – had been errantly placed on the wrong side of the heart became the subject of a first-ever procedure by UC San Diego Health heart experts.



The team, led by [Ehtisham Mahmud, MD](#), chief of cardiovascular medicine at the Sulpizio Cardiovascular Center, used a novel approach to protect the brain while successfully extracting the left-sided pacemaker leads without the need for open heart surgery. This debuts a new technique that could provide a safer alternative for a number of percutaneous left-sided cardiac interventions. The procedure is described in a paper published online March 24 in the journal [Catheterization and Cardiovascular Interventions](#) [↗](#).

“We were very pleased with the procedural outcome,” said Mahmud. “This technique enabled us to remove the leads in a less disruptive and safer way for the patient, while still ensuring protection for the

brain throughout the surgery.”

The patient arrived at UC San Diego 18 months after having his pacemaker implanted at another facility. “We had a patient referred to us who had pacemaker leads placed in the left ventricle and left atrium,” said [Ulrika Birgersdotter-Green, MD](#), director of pacemaker and ICD Services. It’s a rare occurrence, but problematic because the left side of the heart is connected to the brain, and placing the leads there makes patients more vulnerable to stroke.

[Victor Pretorius, MBChB](#), a cardiothoracic surgeon and a part of the team, said the traditional approach for removing left-sided leads is open heart surgery, during which the patient is placed on a heart-lung bypass machine so that normal blood flow can be interrupted. Blood flow is

temporarily halted to avoid the potential of debris from the leads breaking free during removal and blocking circulation to the brain, causing a stroke.

“The patient wanted to avoid open heart surgery,” said Mahmud. “We also wanted to proceed with a less invasive option and avoid a sternotomy and open heart surgery, which is associated with greater risk.” The team decided to remove the heart leads percutaneously, while maintaining natural blood circulation to the brain in a specially protected manner. “We wanted to remove the leads without opening up the chest,” said Mahmud, “but if something were to embolize, we wanted to protect the brain.”

Mahmud said percutaneous extraction of left-sided leads had been previously performed, but it had never been done while providing complete cerebral embolic protection, meaning fully safeguarding against possible blood clots to the brain during the surgery. “Since our patient’s symptoms were suggestive of embolic phenomena originating from his pacemaker system, we felt complete cerebral protection was imperative for a percutaneous lead removal to proceed,” he explained.

To accomplish this, the team placed embolic protection devices in the four major arteries providing blood flow from the left ventricle of the heart to the brain. “We placed these embolic protection devices through arteries in the legs,” said Mahmud. The devices are filters that can capture any debris, but allow blood to continue to flow.

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“When you place these filters within the four major blood vessels to the brain, blood flows normally to the brain, but it prevents the embolization of any material to the brain that could cause a stroke,” he explained.

After removing the misplaced left leads, the physicians inserted new leads on the right side of the heart. The filters were removed at the end of the procedure.

Mahmud said the patient experienced no post-procedural complications and has completely recovered. He credits the stellar work of the interdisciplinary team for enabling this new technique to successfully move forward. “One of the things that we’re especially proud of at the Sulpizio Cardiovascular Center is that various specialties come together with new and innovative approaches to treat patients with cardiovascular disease,” he said. “In this particular case, we had interventional cardiologists, electrophysiologists and cardiothoracic surgeons thinking, working and planning together as to how we might be able to handle this particular case with the safest possible outcome for the patient.”

The technique may also have application to other types of left-sided cardiac procedures and surgeries, Mahmud noted. One example of the procedure’s potential use would be transcatheter aortic valve replacement (TAVR), which involves percutaneous replacement of the aortic valve. The surgery is currently done without cerebral protection at most hospitals around the country, said

Mahmud. Other examples include left-sided electrophysiology procedures and left atrial appendage occlusion, particularly in cases with heightened risk of cerebral embolization.

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