Medical Xpress

Cutting-edge robotics to treat cardiac arrhythmias

April 5 2011

Cardiac experts who fix arrhythmias, which are electrical problems of the heart, must perform complex catheter procedures while the heart is still beating in order to pinpoint where an electrical malfunction is taking place. Now, electrophysiologists at Rush University Medical Center are using a new robotic system that allows them to treat abnormal heart rhythms with greater precision.

Rush is the first academic medical center in Chicago to use the Sensei Robotic Catheter system, aflexible robotic platform that integrates advanced levels of catheter control with 3D visualization.

The tool has a robotic arm and flexible catheter system that enables physicians to maneuver into places in the heart difficult to reach by traditional methods.

“The robotic system enhances a doctor's natural ability to navigate the heart, provides a greater level of catheter stability and we believe it will contribute to improved procedural outcomes," said Dr. Kousik Krishnan, director of the Arrhythmia Device Clinic at Rush. He is also an assistant professor of medicine at Rush University.

The robotic system is used in a procedure, called a catheter ablation, which treats irregular heartbeats such as atrial fibrillation. A catheter that is inserted into the heart from a vein in the leg is used to deliver heat energy to small areas of the heart muscle and eliminate the abnormal rhythm.

Prior to the introduction of robotic technology, the majority of electrophysiology (EP) procedures were done using a manual technique requiring physicians to perform a series of complex manipulations to guide the tip of the catheter by gently pushing, pulling and turning one end of the catheter while the other end was inside a patient's heart. As a result, achieving stable contact at every anatomic site within the heart necessary for a successful EP procedure could be difficult.

With the robotic system, rather than standing over the patient, the physician sits at a work station, where he or she manipulates the catheter by operating a joy stick. The movement of the catheter is displayed on a computer screen. For example, when the physician moves the joystick to the right, guide wires embedded in the catheter move the catheter in that direction.

"You get more precise control of the catheter than you can by hand," said Krishnan. "You can move the catheter millimeter by millimeter in the heart to the exact place you want it to go."

The robotic system provides greater precision and accuracy for better mapping and more exact targeting of abnormal tissue. By constantly measuring the force of the catheter, the correct amount of pressure is consistently applied. The catheter destroys targeted tissue without damaging the heart wall.

The system can reduce procedural times for complex arrhythmias, which typically take 5 to 6 hours to complete, by 20 to 30 percent Shorter procedures significantly decrease a patient's exposure to radiation used to image the heart. In addition, the work station can be positioned outside of the patient treatment area to reduce the physicians' repeated exposure to radiation.

"This changes the way we perform complex cardiac procedures,

especially those for atrial fibrillation," said Krishnan.

Atrial fibrillation is the most common form of irregular heartbeat that affects more than two million Americans. Complex cardiac arrhythmias can cause more than 850,000 hospitalizations annually. With this complex arrhythmia the atria or upper chambers of the heart beat rapidly and never adequately fill the ventricles or lower chambers with the blood. This condition is responsible for 75,000 strokes each year because of blood clot formation within the quivering atria, and these numbers continue to escalate as the population grows older.

Provided by Rush University

Citation: Cutting-edge robotics to treat cardiac arrhythmias (2011, April 5) retrieved 3 May 2024 from https://medicalxpress.com/news/2011-04-cutting-edge-robotics-cardiac-arrhythmias.html