IN THE NEWS

The Methodist Hospital Opens Country's Most Advanced Robotic Operating Room

In July, the Methodist DeBakey Heart & Vascular Center opened the most advanced hybrid, robotic operating room in the United States. The new suite integrates advanced robotics, imaging, and navigation with surgery to offer patients the least invasive and safest surgical and interventional treatments for cardiovascular disease.

"The new suite is perfectly designed for advanced procedures like the percutaneous valve," said Dr. Alan Lumsden, chair of cardiovascular surgery at Methodist. "The crystal-clear 3-D imaging we'll have in this new room will enable us to maneuver the valve into place and position it much more accurately and precisely than ever before. This is vitally important in such an advanced technique."

As medicine becomes less invasive for the patient, the new hybrid, robotic OR blurs the lines between an operating room and a catheterization lab. It houses a highly flexible robotic system, the Siemens Artis Zeego, which makes it easy for physicians to visualize a patient's internal organs from all angles, reducing the need for exploratory surgery and improving diagnostic capabilities without incisions.

Attached to the end of the flexible robotic arm is a high-speed CT scanner that instantly creates 3-dimensional images of complex anatomy or overlapping blood vessels. This system helps guide the physician with clear views of the patient's blood vessel disease, cardiac blockages, dissected aorta, or calcified valves, for example.

"The suite further strengthens Methodist's advanced cardiovascular robotics capabilities," added Lumsden, who is also the medical director of the Methodist DeBakey Heart & Vascular Center. "It is the interface of 3-D imaging and robotic navigation that will permit increased accuracy in advanced endovascular procedures."

In addition to the robotic CT arm, the hybrid OR will also house a robotic catheter guidance system. "Using the Hansen robot to help control the movement of the catheter makes the procedures more precise and safe," Lumsden said. It also helps physicians guide catheters to previously impossible-to-reach locations in the heart or vascular system. When the robot can guide the catheter through tight, twisting anatomy, it can prevent patients from having to have open surgery. Research conducted by Methodist surgeons has recently shown less blood vessel damage when using the Hansen Robot.

Like the most advanced gaming systems, the Hansen robotic technology incorporates tactile feedback for the

IN THE NEWS

cardiologists as they view visual feedback on high-definition monitors, making guidance more intuitive for the surgeon.

"In all, we are now infinitely more flexible in what we can do for our patients, because this technology adds a level of visualization and accuracy that has not been seen before in the cath lab or in existing hybrid operating rooms," Lumsden said. "Clearer visualization lets surgeons and cardiologists perform real-time fine-tuning of surgical procedures on the fly, which is common in open surgery, but has been more difficult in interventional procedures in the past."

The new suite also supports Methodist's comprehensive program dedicated to valve disease, including a valve clinic and a regular valve conference at which all valve patients' cases are reviewed by a multidisciplinary team to ensure the best care. Methodist also has a cerebral vascular monitoring team that specializes in transcranial Doppler imaging to watch and protect patients against stroke, the most common and debilitating side effect of the percutaneous valve implant procedure and other cardiac procedures.

Surgeons at The Methodist Hospital Show Use of Flexible Robotics Reduces Trauma in Vascular Surgery

Research conducted by surgeons from the Methodist DeBakey Heart & Vascular Center shows that using robotics reduces blood vessel trauma during minimally invasive procedures to repair diseased arteries. Research results were presented at the Society for Vascular Surgery's 2010 Vascular Annual Meeting in Boston, Massachusetts.

"When we manipulate a catheter through a diseased artery using the standard manual approach, the catheter follows along the walls of the artery. This movement can dislodge plaque into the bloodstream, where it can travel to the brain and cause a stroke or damage other organs like the kidneys," said Dr. Jean Bismuth, vascular surgeon at Methodist and principal investigator for the study. "We have shown that using robotics significantly reduces this risk because we can navigate precisely down the center of the vessel, avoiding contact with the walls of the artery."

The research also showed a reduction in the time it takes to access a vessel, which translates into less radiation exposure for the patient and the surgeon, and the potential to standardize catheter navigation, which may lead to more predictable procedures.

"At Methodist, we have been using the Hansen Medical robot to safely and successfully conduct minimally invasive treatments for atrial fibrillation, with Dr. Miguel Valderrábano leading this effort. This new research into robotic vascular therapies is early, but it may help open up higher levels of safety for treating our patients with ischemic vascular and cardiac disease, as well," said Dr. Alan Lumsden, chair of the department of cardiovascular surgery at The Methodist Hospital and co-investigator on the study.

About the Study

The pre-clinical in-vivo study used an investigational robotic catheter made by Hansen Medical. The study endpoint was safe cannulation and deployment of balloon and stent in the contralateral superficial femoral artery, the renal artery, and the mesenteric arteries. Safety was evaluated through gross visual examination and histopathology of target vessels, and angiographic evidence of trauma.

The study featured the use of a new, smaller vascular robotic catheter made by Hansen Medical, which incorporates a removable diagnostic catheter inside of a 6 French robotically shapeable sheath for delivery of therapeutic devices.

Specifically, a single vascular catheter was able to successfully navigate the aorta and access several primary and secondary branches.

Additionally, 3 stents were successfully delivered through the 6 French robotic sheath in several target vessels.