Technology advances shape how surgery has evolved

By MICHAEL IORFINO (STAFF WRITER)

Published: March 16, 2014

Russell Stahl, M.D., leaned over the patient’s open chest and stared at the still heart.

Clear tubes running from a heart-lung machine pumped blood to the patient’s aorta, bypassing the heart and sending blood through the body.

A continual beep broke periods of silence on Valentine’s Day, as Dr. Stahl stitched one end of the vein and artery grafts to the blocked coronary arteries, creating seven new paths around the blockages for the blood to flow to heart muscle.

Five days later, in-mid February, 62-year-old patient Michael Chapman walked around his grandchildren’s playroom.

From laparoscopic and robot-assisted procedures to the imaging system that allowed Dr. Stahl to spot plaque along one of Mr. Chapman’s posterior walls, advances in technology over the last two decades have enhanced surgical teams’ ability to perform surgery and slashed patient mortality and readmission rates.

“The outcomes have gotten better and better,” said Dr. Stahl, chief of cardiothoracic surgery and co-director of the Heart and Vascular Institute at Geisinger Community Medical Center. “I showed the technology we use in the operating room, and that’s why the mortality rates have gone down and the success rates have gone up.”

Though many forms of cutting-edge technology have emerged to improve surgery and patient safety, health care experts pegged surgical simulators and robotic surgery among the most significant advancements.

While pursuing a medical degree at Yale University 30-plus years ago, Steven J. Scheinman, M.D., joked that he learned how to stitch by putting a needle through an orange peel.

Now, he said, simulated surgery centers across the nation provide medical students and practicing physicians an opportunity to practice on training mannequins that simulate medical conditions, such as vital signs or spikes in blood pressure. Depending on the facility, rooms might include a beating heart simulator, which allows providers to perform open-heart procedures, or a minimally invasive cardiac training model.

Instead of practicing on real patients, the students or practicing physicians can hone their techniques in the simulated environment. Dr. Scheinman, president and dean of the Commonwealth Medical College, said officials are in the process of adding a simulated operating room to the college’s simulation center. The room, he said, will mirror a real operating room, with operating table, overhead surgical lights and other medical equipment.

“It’s the best way to prepare students before they do anything with a live patient,” he said.

Gus Geraci, M.D., chief medical officer at the Pennsylvania Medical Society, likened the surgical simulation centers to pilots training in flight simulators.

He echoed Dr. Stahl’s sentiment, saying the explosion of technology in recent years has helped cut mortality and readmission rates among surgery patients.

Mortality rates from complications of surgical and medical care decreased among all age groups 45 and older from 1999 to 2009, with a 38 percent drop among adults ages 65 to 74, according to the Centers for Disease Control and Prevention.


Dr. Geraci said he believes advances in technology will continue to shape how surgery evolves. He cited an innovative approach tested by some surgeons in recent months: bringing Google Glass in to the operating room.

During operations, surgeons have used the device to examine an X-ray or MRI scan without having to move away from the patient. Others, using the built-in camera, wear it to stream live video of the procedure to colleagues hundreds of miles away, allowing for real-time virtual consultation.

“The colleague can watch what the surgeon does, and say ‘wait, look at the right there,’” Dr. Geraci said.

Since she started practicing in Northeast Pennsylvania about two decades ago, Barbara L. Plucknett, M.D., has seen first-hand how advances in technology have fueled minimally invasive procedures.

Controlling a surgical robot, such as the da Vinci surgical system, surgeons can insert miniaturized wristed instruments and a high-definition 3-D camera attached to a tube into small incisions.

While seated at a console, surgeons see the magnified, 3-D image of the surgical site inside the patient’s body - without having to make a large incision. At the same time, the surgeon remotely controls the robotic arms. Any hand movements translate into precise movements of the instruments inside the body.

As opposed to larger incisions, small incisions translate to less pain, reduced risk of infection and a quicker recovery, said Dr. Plucknett, a member of the medical staff at Regional Hospital of Scranton and owner of Advanced Gynecology Associates.

“It’s tremendously grown our field of surgery, and allowed us to do so many things with the little incisions,” she said.

“When I started, people were in the hospital for three days, with large incisions and a great amount of pain. Now, people go home the same day. It’s amazing.”

Contact the writer: miorfino@timesshamrock.com, @miorfinoTT on Twitter