Driving MIS

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How robotic surgery is driving the trend toward minimally invasive surgery and what it could mean for the future.

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The potential benefits of minimally invasive surgery have been widely publicized and discussed. Less blood loss, scarring, pain and a shorter hospital stay have all warranted the development of less-invasive procedures in recent years. Robotic surgery, with the introduction of Intuitive Surgical's da Vinci Surgical System, has continued the trend toward minimally invasive surgery and will be influential in shaping the surgical landscape now and into the future.

Robotic construction

With the establishment of the surgical robot and discussion of the potential benefits of robotic procedures, it didn't take much convincing at Swedish Medical Center in Seattle, WA, when they decided to update the facility's ORs to include a dedicated robotic suite.

"Looking at where the technology is going and balancing out the need to keep up, it was an obvious choice," says Carla Brannen, RN, BSN, MAM, clinical program manager for perioperative services at Swedish Medical Center. "We needed to upgrade our rooms anyway to support the new technology used with MIS cases. Plus, with the equipment that was in there, we had cords all over the floor, which really became a hazard to the staff. So, to promote ergonomics and staff safety, we chose to go this way."

Utilizing the help of vendors Intuitive Surgical and Stryker, the hospital embarked on the project of designing and building the first integrated robotic suite in the United States. The room opened in October 2009 as the facility's robotic room, but it is multi-functional to serve small cases or regular minimally-invasive cases without use of the robot.

The hospital is currently performing robotic surgeries in several specialties, such as gynecology, genitourinary surgery, thoracics, bariatrics, colorectal cases, and ear, nose and throat. Brannen says the robot's use will only continue to grow.

"We expect to see an increase in the type of cases utilizing MIS/robotic technology, especially with general surgery cases, she says. "Our surgeons are starting to perfect more and more MIS cases so the patients are able to be discharged faster, and experience less blood loss and pain. We are really starting to see how everything is moving to minimally invasive surgery."

According to Brian Louie, MD, MHA, MPH, FRCSC, FACS, Director of Thoracic Research and Education and Co-Director of the Minimally Invasive Thoracic Surgery Program at Swedish Medical Center and Cancer Institute, most procedures that are done minimally-invasive are candidates for robotic surgery. As an attending surgeon, Dr. Louie says learning how to use the robot only takes a few cases, but learning the nuances of this technology is a longer process.

"Learning the nuances of robotic lung surgery took probably about 20 to 25 cases," he says. "The nuances are in how to position the robot and how to set it up. The conduct of the actual operation is not vastly different. It's about understanding how to set it up and use the technology to facilitate the operations."

Robotic training

As robotics becomes an increasing trend in surgery, its impact has not only been felt by experienced, practicing surgeons, but it has become a part of the curriculum for surgeons-in-training.

Summa Health System, based in Akron, OH, obtained the standard da Vinci robotic system in 2004 and upgraded to the da Vinci SI, which is a dual-console system, about a year ago. Currently, OB/GYN, urology, cardiothoracic, general and plastic surgical specialties are utilizing the robot at Summa Akron City Hospital.

According to Edward Ferris, MD, OB/GYN Residency Director at Summa, a minimally invasive surgery curriculum for residents will soon take effect to include more practice on the surgical robot. Starting in July 2011, the health system will have more “structured didactics” for robotic training. This means more time for practice exercises when the robot is not being used for patient care. These exercises will entail moving pegs or practicing suturing to enhance hand-eye coordination and dexterity using the robot in a situation that does not involve a live patient.

Currently, residents in years one through four of training have exposure to the surgical robot based on their level of interest and training, Dr. Ferris says. The first year involves watching and becoming familiar with the technology. Beginning in year two, residents can begin sitting at the console and performing parts of a procedure. By the final year of residency, some residents have completed entire procedures, such as hysterectomies, solo.

“I think the robot helps residents better understand the anatomy and how you approach certain surgeries because your dexterity is so much improved,” Dr. Ferris says. “I think it really helps them with their straight laparoscopic skills, too, because it mimics a more open approach, but you’re doing it through small incisions.”

With the dual console robotic system, specific safety features have been built in to facilitate training on the technology. While the resident sits at one console, an attending can sit at the other. At any moment during a case, the attending can take over control of the system. Or, the attending can press a button to activate icons to redirect where the resident should cut or place a clamp, for example.

According to Jennifer VandeVelde, DO, Chief Resident at Summa, training on the surgical robot is likened to taking a drivers’ education course. “If I’m making a mistake, and the attending can actively see that I’m making a mistake, they can apply a lock or a brake,” she says. “You can stop what the resident is doing and take over at that point and show exactly, ‘No, don’t go this way, the ureters are over there.’ They can point and show you, or they can freeze your instruments so you can’t make the mistake.”

Shaping the future

The future for robotics in surgery looks bright, but more information and research is needed to see the lasting effects.

“In terms of robotics, there are a lot of people who ask: is this really the best way?” Brannen explains. “Is it cost-effective? It depends on the cases. There is a lot of controversy out there about should you or should you not do it. Those are things that are still being decided.”

Despite the controversy, Brannen says, robotic surgery is seeing increasing demand from patients. “People want it,” she says. “The patient population is very smart and savvy. As they start to research their condition and treatment options, they are coming to the doctors and saying ‘I want it done robotically. What can you do?’ So, it’s a fine balance.”

The technology is also in high demand from surgeons and residents. “It has become a recruiting tool, as well,” Dr. Ferris says. “Medical students looking for residency positions are asking about the robot and about the potential to train on the robot. Many students are looking for a residency training program in which they will get some hands-on experience with the robot. That is becoming a very frequently asked question during our interviews.”

“It brings us up to date,” Dr. VandeVelde says. “It keeps us informed on what’s new and what can be improved. I know for a fact that I will use my skills here when I graduate in six months and definitely use my robotic skills.”

According to Brannen, their first robotic surgical suite will definitely not be their last. They have plans to open more robotic suites at their facility as well as at a new hospital the health system is building. She says top surgeons in the country are performing advanced procedures utilizing the robot, and are drawn to the telesurgery capabilities the technology offers.

“We have a lot of surgeons who are at the forefront in the country with the type of cases that they’re doing,” Brannen says. “Many times, they’re asked to do a live case so that other surgeons around the country or the world can see how they’re doing those cases. We have the ability to do cases here and show it in real-time in other parts of the world. Rather than having them come to us, we’re able to, via the Internet and video, push it out to them.”

Overall, physicians agree that robotics will only continue to improve and drive minimally invasive surgery trends in the future.

“I think this is going to be one of the major developments in surgery in the future,” Dr. Louie says. “I think it will have a huge role to play and is already starting to have that role to play. I think it’s also a stepping stone to better equipment and better tools for the surgeons in the operating room as they make cuts smaller and smaller and we do more intricate surgery on complicated patients.”

Dr. VandeVelde predicts robotic surgery could replace some laparoscopic procedures and make an overall impact on the choices patients have in their treatment.

“I see it evolving into something great,” Dr. VandeVelde says. “I think every day

they’re coming up with new ideas of how to make the robot even better. I see this taking off. I feel I’ll look back at what we think of as the high technology of the robot now and kind of laugh because there will be even more advanced technology out there.”

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