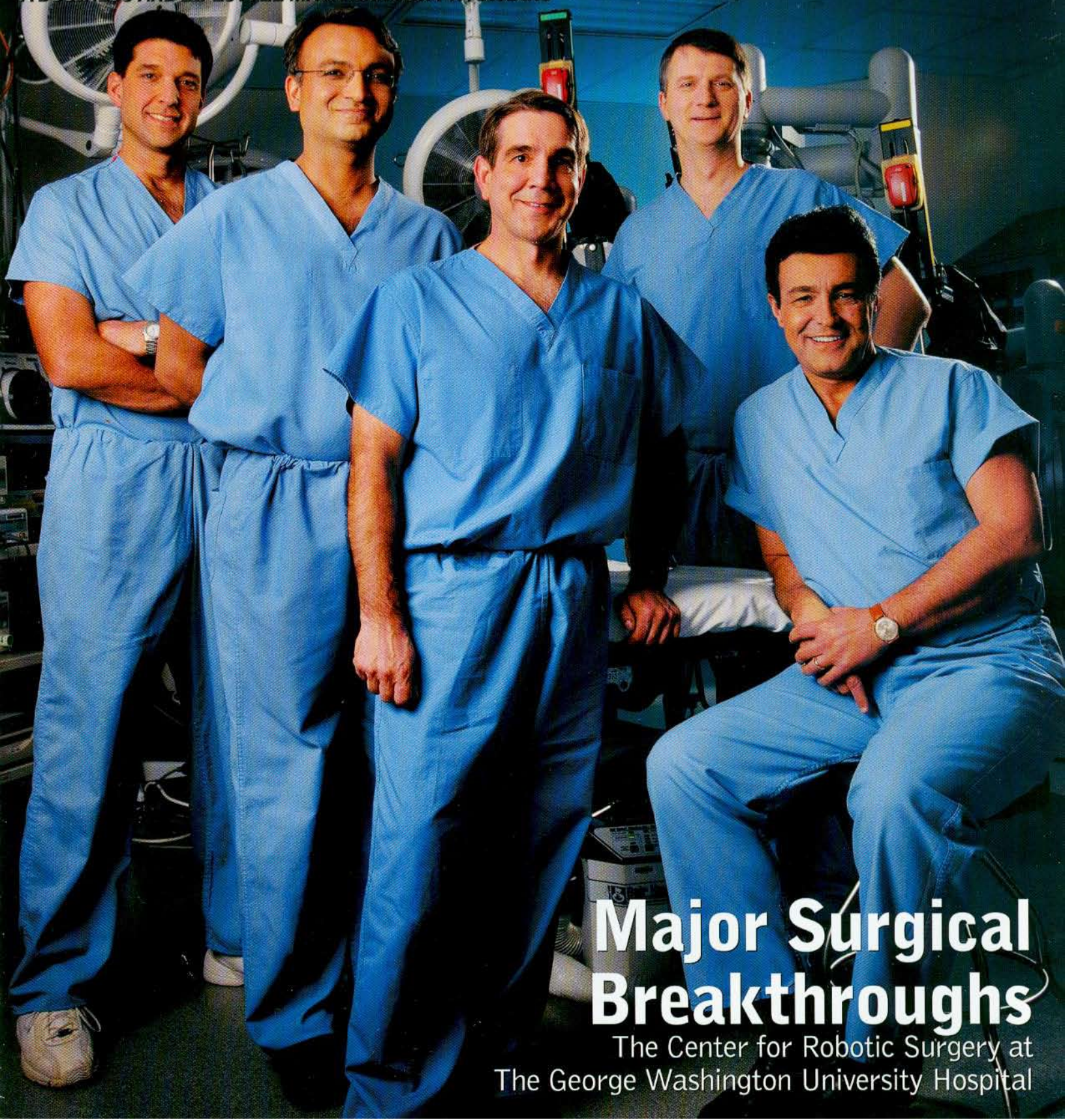


M.D. NEWS

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Major Surgical Breakthroughs

The Center for Robotic Surgery at
The George Washington University Hospital

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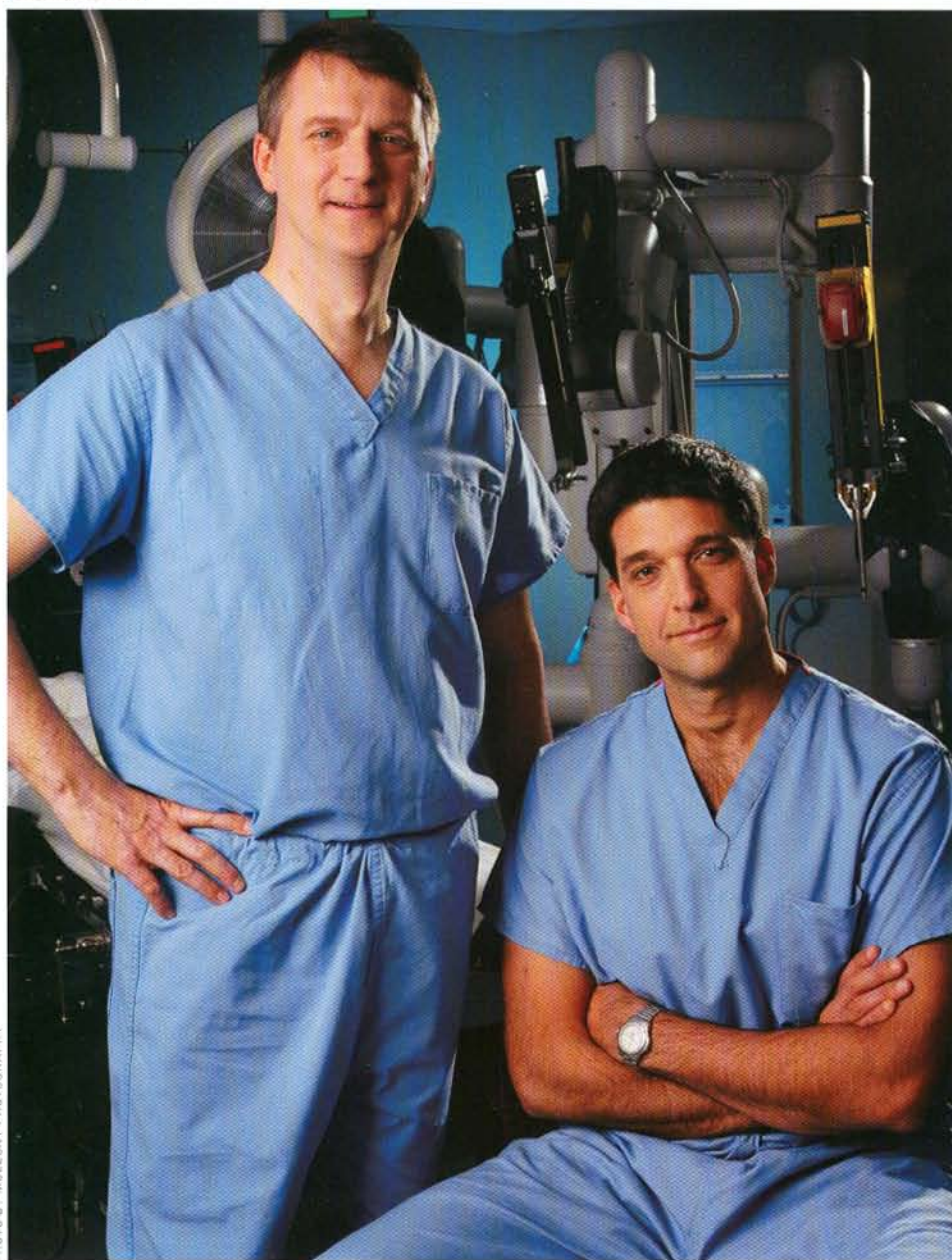
By Martie Callaghan

Navigating the innermost reaches of the human body with microscopic equipment is the newest innovation at The George Washington University Hospital, with the application of robotic technology. Specifically, the da Vinci Surgical System builds on the advances made by laparoscopic surgery over open surgery, taking the concept even farther — beyond the limits of the human hand. The first robotically

assisted surgeries were performed in urologic and thoracic specialties, and those continue to be the more prevalent applications.

Using the da Vinci System, the surgeon has a clear and magnified view of the surgical field and is able to perform the procedure with greater precision and less blood loss than with open surgery. “Patients today have done their research,” says Thomas W. Jarrett, M.D., Chairman and professor of urology at GW Hospital. “They already know about the robot and they know that we have it! They come to The George Washington University Hospital because they know they will be able to have the least-invasive procedure with the potential for more optimal results and the least amount of pain and downtime.”

Harold Frazier, M.D., and Jason Engel, M.D., use the da Vinci robot to perform robotic radical prostatectomy.



PIONEERS IN ROBOTIC-ASSISTED PROSTATECTOMY

Drs. Jason Engel and Harold (Hal) Frazier were pioneers of the technology in Washington, DC, performing the first robotic-assisted prostatectomies at GW Hospital in early 2004. “The program was in its infancy around the country at that time,” Dr. Frazier says. That means there were no fellowships available for training in robotic-assisted surgery.

In the very beginning, the two surgeons attended a training course sponsored by Intuitive Surgical. “It was a great learning experience,” Dr. Frazier recalls. “There were a handful of centers around the country when we started that were already doing a few cases. So, we went and watched. Then we embarked on our first patient with assistance and guidance from one or two of those from around the country who had already tried the procedure. They were our mentors. By patient No. 5, we were on our own.”

Interestingly, it was and still is the patients who actually request the robotic-assisted procedures. Most of them work in the IT field and are somehow knowledgeable and enamored with the technology. “With our

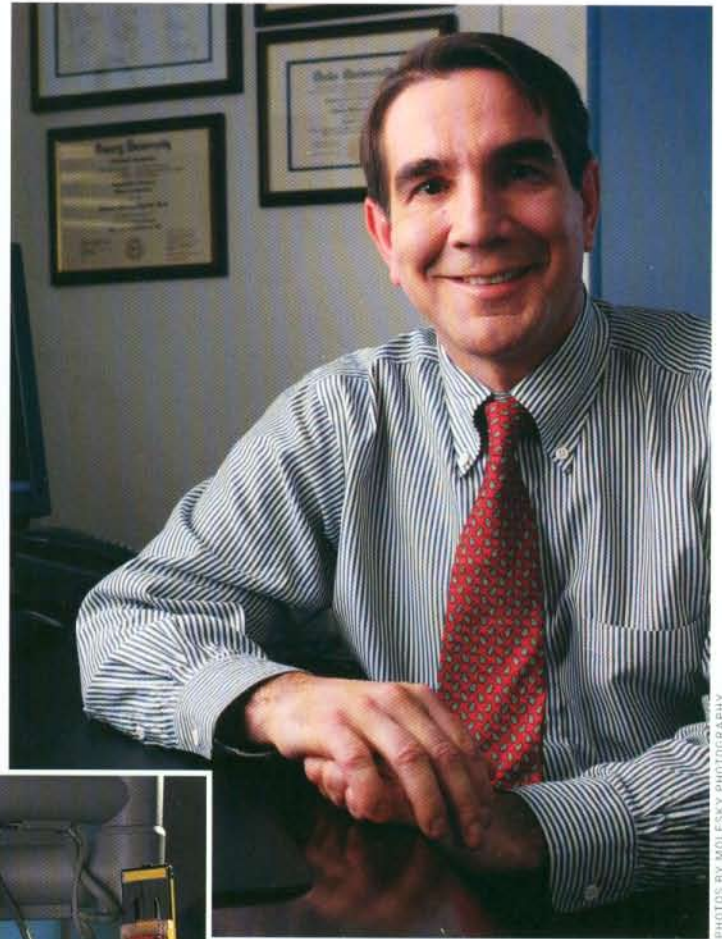
first 20 to 30 patients, we were very honest and told them they were 'Patient No. 3' or 'Patient No. 7,' and they were fine with that," Dr. Frazier says. "Now, we have done more than 400 cases of radical prostatectomy at GW."

HOW IT WORKS

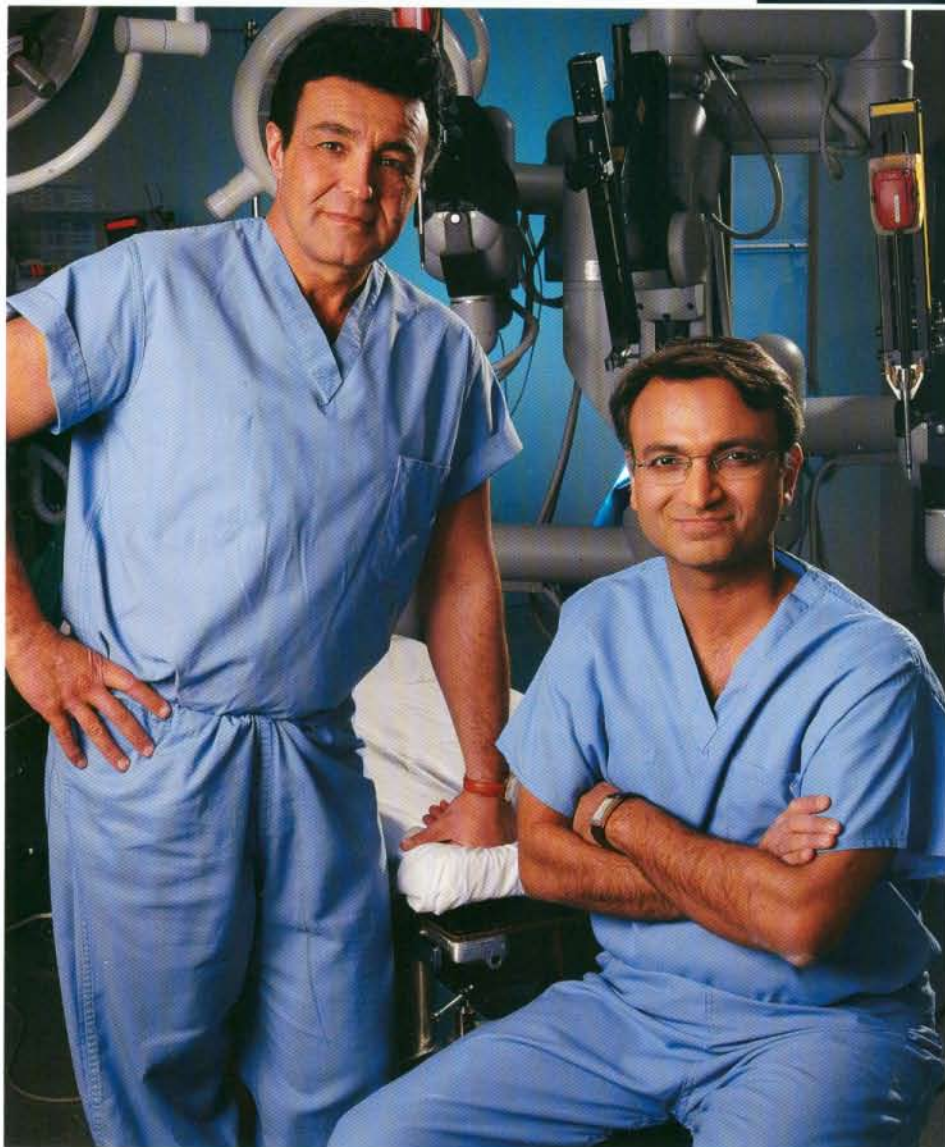
Combining the latest technology with a surgeon's skill, the da Vinci Surgical System features an ergonomically designed console, where the surgeon sits comfortably, their hands and wrists naturally positioned at the controls. They have separate eyepieces so they have binocular vision and three-dimensional depth perception. They have a clear, magnified view of the surgical field as their hand, wrist and finger movements govern the precise, real-time movements of the tiny surgical instruments inside the patient, using angles and ranges of motion that are not possible with standard laparoscopic instruments.

Right: "I think there is a huge role for robotic-assisted surgery right here and right now, and it will definitely be the way of the future," says Thomas Jarrett, M.D.

Below: Farid Gharagozloo, M.D., and Farzad Najam, M.D., use the da Vinci robot for thoracic surgeries and coronary artery bypass.



PHOTOS BY MOLESKY PHOTOGRAPHY



Across the room, other members of the surgical team assist in preparing the 1- to 2-centimeter ports in the patient and placing the proper instruments. A cart next to the patient holds an endoscopic arm with a tiny camera attached and three instrument arms. Two of the instrument arms are guided by the surgeon's hands. The third arm can grasp things and hold other structures out of the way. The instruments pivot near the operating ports, eliminating the use of the patient's body-wall for leverage.

Open radical prostatectomy typically involves an incision from the umbilicus to the pubic bone. With robotic-assisted laparoscopic radical prostatectomy, the operation is done through ports about the size of the surgeon's pinky finger, with a pair of "hands," or instruments, a little smaller than a dime in diameter. The instrumentation goes from the robot connection outside to down deep inside the pelvis of the patient.

"Our goal is not to be the urologists who do everything," says Dr. Jarrett. "In order to be world experts, you must focus on one area. Dr. Engel, as Director of Urology Robotic

THE LEARNING CURVE

As with most new procedures today, physicians are not only learning anatomy, they are also learning machinery. “The most typical method of producing a good surgeon would be a fellowship after residence, where a fellow would do case after case with a robotic surgeon like me,” Dr. Engel says. “Otherwise, a successful pattern of learning is achieved by partnering with another doctor, and both going into the arrangement with a lot of experience, willing to make sacrifices — personally and economically. Some docs never get over the hump ... and that is probably true with a lot of procedures. Eventually, this will be so commonplace that it will be taught to residents.”

Dr. Engel says he would like a specific console developed for teaching, which would be much like a car with two steering wheels. The “teacher” could take over control of the instruments at any time and return control back to the “student” at any time. “The [existing console] is really a one-person show,” Dr. Engel says. “Only one pair of hands can go in there.”

PATIENTS KNOW EXPERIENCE MATTERS

A period of transition currently exists where patients diagnosed with prostate cancer and their physicians are not necessarily familiar with robotic-assisted surgery and its advantages with regard to outcome. Most patients request the procedure because they have heard about it by word of mouth or have done their research and found out about it on the Internet.

“Patients that have the robotic procedure seem to be talking to friends about it and convincing their friends to also choose the robot,” says Dr. Engel. However, it’s still very important for a patient to do their homework. It is now a matter of seeking out not only the

Farzad Najam, M.D., Associate Director of Cardiac Surgery, is working on application of the da Vinci robot in bypass and mitral valve surgeries.



Farid Gharagozloo, M.D., Clinical Chief of Cardiothoracic Surgery Services, uses the da Vinci robot to perform a lobectomy in a lung cancer patient.

Surgery and Vice Chair of the department, is the prostate person, and his focus is on that area of the robotic surgery. Dr. Frazier is a fellowship-trained urologic oncologist. We are fortunate to have him here full time, as well, as we pursue our department’s philosophy for minimally invasive surgery: to get increasingly better results. We cannot compromise outcomes just to get a quicker recovery.”

“The greatest challenge in all prostate surgery is doing the operation so you feel like you’ve done it well and with perfection in every man,” says Dr. Engel. “Some patients’ anatomy is such that it goes well; roughly 30 to 40% are more difficult, either because the tissue does not separate easily or it’s anatomically challenging because of previous surgery or obesity. The robotic approach really shines in these more difficult cases.”

The robot brings three-dimensional visualization and added dexterity — like having an additional “wrist” at the end of the instrument. It makes the old way seem like trying to do surgery with chopsticks!

— Farid Gharagozloo, M.D., Clinical Chief of Cardiothoracic Surgery and Clinical Professor of Surgery

most experienced surgeon but also the most experienced robotic surgeon. "Experience matters," Dr. Engel adds. "You have to do around 200 of these before you feel that you are truly an expert that can tackle almost any case. Obviously, if a surgeon is just learning this, there are probably increased risks. Once a surgeon reaches the skill level of Dr. Frazier or myself, the risk is probably no different than those associated with laparoscopy in general. The whole purpose of the robotic approach is to achieve a better outcome."

POST-OP ERECTILE DYSFUNCTION

Robotic-assisted prostatectomy is the procedure of choice at GW because of shorter postoperative hospital stays for patients and less blood loss than with an open radical prostatectomy. "We are able to perform the vesicourethral anastomosis (the new connection between the bladder and urethra) more effectively so that it is nearly watertight by the end of surgery," says Dr. Frazier. "Because of that, the indwelling time of the urinary catheter is typically a week shorter. The other advantage we find is when the Foley catheter is removed, it is our impression that, in the early recovery phase, more patients are dry from the very beginning."

Return of erectile function seems to be occurring sooner in patients who have the robotic-assisted prostatectomy. "Erectile function is always an issue with prostate cancer," says Dr. Frazier. "All men have impotency as a potential complication. The goal is to try to preserve the nerve that controls erectile function. We're finding we can preserve it very well because of the enhanced visualization of the da Vinci robot. Even if we are successful in preserving the nerve, there's a pretty strong chance that the patient will have some difficulty initially. They have to give it some time."

The hospital stay is typically overnight for a robotic-assisted prostatectomy. Patients report feeling "back to normal" in about two weeks. The open procedure requires two to three days in the hospital and a total recovery time of four to six weeks.

LEADERS IN CARDIOTHORACIC SURGERY

New advances in minimally invasive thoracic surgery never fail to pique the interest of physicians, and GW is definitely on the leading edge in this specialty, as well. "The issues we have faced for a long time have to do with adapting minimally invasive surgery to open procedures that we consider to be the gold standard," says Farid Gharagozloo, M.D., Clinical Chief of Cardiothoracic Surgery Services. "Whether it's lung cancer, esophageal cancer or other malignancy of the chest, we are always interested in trying to decrease



Jason Engel, M.D., has performed over 400 robotic radical prostatectomies.

the pain, hospitalization and complications that can occur as a result of the conventional approach. Significant morbidity is associated with opening the chest."

Lung cancer affects over 200,000 patients each year in the United States. "The biggest problem is that most lung cancer patients come to medical attention in the later stages of the disease," Dr. Gharagozloo says. "For that reason, there is a lot of interest in early lung cancer screening, similar to the approach taken to breast cancer with the mammogram. A recent study article showed that over a 13-year period there was a survival advantage in high-risk patients who were given screening CT scans of the chest. Patients who were found to have Stage 1 disease, detected before onset of symptoms, after undergoing surgical resection experienced a 92% survival rate over 10 years."

Assuming that hundreds of thousands of people are walking around with early stage lung cancer and experiencing no symptoms, getting these patients into the operating room will be a hard sell, at best. Hence, there is even greater interest in finding a minimally invasive yet

The da Vinci Surgical System builds on the advances made by laparoscopic surgery over open surgery, taking the concept even farther — beyond the limits of the human hand.

reliable treatment that won't be perceived by the patient as being worse than the disease.

"Until the robot, we had been unable to replicate the gold standard operation for lung cancer — lobectomy and mediastinal nodal dissection done through an open incision — using video-assisted surgery," Dr. Gharagozloo says. "The robot brings three-dimensional visualization and added dexterity — like having an additional 'wrist' at the end of the instrument. It makes the old way seem like trying to do surgery with chopsticks! Furthermore, we are now able to do the robotic procedure in the same amount of time as conventional surgery. A lobectomy would take about three hours either way. We think that's a significant accomplishment."

Esophagectomy is another complicated open surgical procedure associated with high morbidity and mortality rates. "The conventional operation is time-tested and proven, but so invasive that these patients take a long time to recover," Dr. Gharagozloo says. The robot has made it possible to replicate the gold standard operation, i.e., replacement of the esophagus with a portion of the stomach, in a much less-invasive way, returning most patients to a 90% normal lifestyle.

THE ROBOT AND CARDIAC SURGERY

The use of robotics in cardiac surgery is still in its early stage, but definitely moving forward, according to Farzad Najam, M.D., Associate Director of Cardiac Surgery and assistant clinical professor of surgery at The George Washington University Hospital. "Our experience is not yet as extensive as it is in thoracic surgery or urology," Dr. Najam says. "Applications in bypass surgery and mitral valve surgery are being developed and are well underway at GW Hospital."

Dr. Najam was the first surgeon in the District of Columbia to perform robotic-assisted minimally invasive bypass for coronary disease in 2005. Dr. Najam is also an expert in performing the Maze operation, a surgical procedure that has a high success rate for curing atrial fibrillation. He is also working closely with Dr. Gharagozloo to develop a robotic-assisted modification of the Maze procedure so that patients with atrial fibrillation can attain full benefit from the procedure without undergoing a sternotomy and cardiopulmonary bypass. Currently, the full Maze operation requires the patient to be put on a heart/lung machine and uses different energy sources



Harold Frazier, M.D., is specially trained in nerve-sparing robotic prostate surgery.

PHOTO COURTESY OF THE GEORGE WASHINGTON UNIVERSITY HOSPITAL

— radiofrequency or cryoablation — to create lesions on the atrial wall to block the progression of the microreentrant circuits of atrial fibrillation. "We are working on developing a robotic-assisted Maze procedure that will allow us to create almost all of the lesions of the classic Maze operation, hence blocking out the wavelets of afib," says Dr. Najam. The Maze procedure provides a surgical option for patients who cannot tolerate, are not helped by, or just don't want to take blood-thinning medication for atrial fibrillation. It also reduces the risk of stroke, a dreaded complication of atrial fibrillation.

THE FUTURE IS NOW AT GW

Surgeons who use the da Vinci Surgical System agree that its continued use and advancement will bring all of surgery to a higher level.

"I think there is a huge role for robotic-assisted surgery right here and now, and it will definitely be the way of the future," says Dr. Jarrett. "Three or four years ago, less than 10% of radical prostatectomies were performed using this technology. At GW Hospital, we are approaching 50%. Open surgeons learn from robotic surgeons how to potentially get better outcomes, and vice versa. It makes everyone better."

Dr. Najam sees robotic surgery as the beginning of incisionless surgery. "Robotic surgery is a step towards telesurgery, where the surgeon and patient would not need to be in the same place," he says, "maybe not even the same continent or planet."

I think there is a huge role for robotic-assisted surgery right here and now, and it will definitely be the way of the future.

— Thomas W. Jarrett, M.D., Professor and Chairman of Urology

For more information about the Center for Robotic Surgery at The George Washington University Hospital, call 1-888-4-GW-DOCS or visit www.gwhospital.com. ■