



Dr. Neal Seymour and the da Vinci robotic surgery system.

THE FUTURE OF MEDICINE SPACE-AGE SURGICAL CARE

By Sue Spiry

NEW TECHNOLOGIES AND TECHNIQUES HAVE RESULTED IN ENORMOUS CHANGES IN SURGICAL CARE OVER THE PAST TWO DECADES, AND WHAT ONCE SEEMED LIKE SCIENCE FICTION IS FAST BECOMING REALITY.

During the last 20 years, we have seen the introduction of minimally invasive surgery, robotic surgery, minimal access techniques for heart surgery, innovative surgical anti-cancer tools, and even surgery performed on babies prior to birth.

In addition, more advanced diagnostic studies, including computerized imagery of various types, have also changed the surgical approaches to certain diseases. As impressive as these developments have been, the next 20 years may produce even more dramatic changes.

MINIMALLY INVASIVE SURGERY

Minimally invasive surgery refers to procedures that are less invasive than more traditional surgical approaches. Incisions are much smaller, resulting in shorter recoveries, less pain, and a quicker return to normal life for patients.

Minimally invasive surgery has progressed from a technique used in only a few specific situations to a mainstream method employed for most major types of surgery. In fact, says Dr. David Earle, director of Minimally Invasive Surgery, surgeons at Baystate Medical Center perform over 80 different procedures using minimally invasive techniques, from the simple, to the highly complex.

According to Dr. Neal Seymour, vice chair of Surgery and chief of General Surgery at BMC, this evolution will continue, and it is likely that the degree of invasiveness will decrease even further.

“Single incision laparoscopic surgery has now been used successfully to reduce the number of incisions made for access to the abdomen and chest,” he says. “This has prompted the development of entirely new instruments. As this continues, the range of procedures performed through a single miniscule opening will dramatically increase.”

In addition, the use of new types of energy instruments to divide tissue or to destroy abnormal tissue such as tumor cells will greatly improve the ability to perform major operations without creating large openings to enter body cavities. “This will affect the way general, vascular, cardiac, urologic, and gynecologic surgery is performed,” says Seymour.

1,000 ROBOTIC SURGERIES

Surgeons at BMC have been performing robot-assisted minimally invasive surgery using the *da Vinci* system since its acquisition in 2005. The medical center now has two *da Vinci* systems, and earlier this year, Dr. Tashanna Myers, a specialist in gynecologic oncology at BMC, performed the 1,000th robot-assisted surgery at the medical center.

Seymour says the use of robots or tele-manipulation devices to perform surgery that requires great precision or maneuvers that cannot be performed easily

with conventional surgical tools is now commonplace. “There are few areas where greater advances will be made than in telerobotics in surgery,” he says.

Among the imminent possibilities are more flexible and more maneuverable robotic tools, as well as the possibility of totally autonomous robotic “vehicles” that could gain access to surgical sites that cannot be reached without major incisions using conventional surgical techniques.

“Miniaturization of robotic devices to cellular size raises the specter of a ‘Fantastic Voyage’-like future, where the surgeon navigates a patient’s anatomy from a remote workstation, in much the same way that a pilot flies a remotely piloted aircraft,” says Seymour. “These developments have already occurred in areas other than medicine, but it is not unreasonable to expect them to become clinical realities in the next 10 years.”

SURGERY WITHOUT INCISIONS

NOTES®—Natural Orifice Translumenal Endoscopic Surgery—involves passing flexible surgical tools and a tiny camera through a patient’s natural orifice (generally the mouth, vagina, or rectum) to perform surgery, eliminating the skin incisions required for open or laparoscopic surgery and resulting in less pain, fewer infections, and quicker recoveries.

“NOTES is a very recent evolution of minimally invasive surgery and requires refinement and further development before its full promise is realized,” says Seymour. The first procedures have been performed, however, and Baystate Medical Center, the first hospital in New England to offer them, has been recognized for its pioneering work in this area.

Three years ago, a team of surgeons at Baystate Medical Center performed the first ever pancreatic pseudocystgastrostomy to drain a chronic infected pancreatic pseudocyst. In doing so, they





not only saved the patient's life, but they opened up new avenues for next-generation minimally invasive abdominal surgery.

Since then, Baystate surgeons have become pioneers in the emerging field of NOTES having removed several gallbladders transvaginally with this advanced surgical and gastroenterological approach during the past year.

"I believe that minimally invasive approaches like NOTES will in the not-too-distant future become the norm for some types of surgery," says Dr. John Romanelli, director of Bariatric Surgery and Robotic Surgery at BMC. "But first, we need to confirm the new technique is just as safe as current approaches. Currently, Baystate and other academic medical centers across the country are enrolling 140 patients in a rigorous test of NOTES' effectiveness."

In fact, surgeons at BMC have enrolled the first patient in this national multi-center study to determine if NOTES techniques are as effective and safe as traditional approaches while at the same time reducing recovery time, infection rates, post-surgical scarring, and perhaps even health costs. Baystate surgeons performed the first NOTES transvaginal cholecystectomy as part of this study.

TWO-IN-ONE SURGERY

In some cases, patients may also benefit from having multiple surgical procedures performed during one surgery. Drs. Holly Mason and Susan Cash, breast surgeons at the Baystate Regional Cancer Program's Comprehensive Breast Center, now offer oncoplastic surgery, a new type of procedure that skillfully merges traditional breast cancer surgery with cosmetic surgery techniques.

A welcome option for women facing the prospect of a lumpectomy, oncoplastic surgery allows specially trained surgeons to remove cancerous tissue from the breast and repair the breast cosmetically—all in one surgery.

There are many benefits to the patient with this new procedure. Since there is only one surgery, the patient only undergoes anesthesia once and only experiences one recovery period. Emotional and psychological benefits include reduced anxiety at the thought of multiple surgical procedures and less trauma since the patient does not have to endure the time between surgeries during which the breast is misshapen.

LOOKING AHEAD

"Although it is exceedingly difficult to envision all possibilities, the future has a tendency to exceed our expectations in unexpected ways," says Seymour. "Some advances are evolutionary, while others are truly revolutionary, and surgeons may suddenly gain access to dramatic new tools that rewrite an entire approach to human diseases."

Dr. Richard Wait, chair of the Department of Surgery at BMC, agrees. "The techniques and technology we are able to bring to bear today make the concept of surgery almost unrecognizable to our predecessors. The pace of new developments has become greatly accelerated requiring that even "general surgeons" develop a greater degree of specialization. The future remains bright with new technologies, expertise, and instruments, all designed to allow us to treat patients more effectively, less invasively, and with the least amount of trauma possible."

Need surgery? Know your options.

Call 1-800-377-4325 for a referral to a surgeon on staff at Baystate Medical Center, Baystate Franklin Medical Center, or Baystate Mary Lane Hospital.



Drs. David Earle, David Desilets, and John Romanelli at a NOTES press conference in 2007.