Laparoscopy Shows a Benefit in a Growing Number of Oncologic Procedures

by Sunni Hosemann

In little more than a decade, laparoscopic procedures have revolutionized surgery, replacing many types of conventional open procedures. Today, laparoscopic surgery is a standard choice for most gallbladder removals and has become an acceptable alternative to many other open procedures: herniorrhaphy, appendectomy, splenectomy, gastric bypass, and a number of gynecologic procedures. In many cases, it can be offered in place of an open laparotomy for exploratory purposes. But the trend toward laparoscopic surgery in malignancies has been slower—and more controversial.

The main advantage of laparoscopic surgery over an open procedure is that it... (Continued on next page)
Laparoscopy in Oncologic Surgery

Cancer surgery, however, poses some unique challenges that make the application of laparoscopic surgery in oncology more problematic. First, because of the relationship of a tumor to the tissues that surround it, critical important in cancer staging, specimens or whole organs should be removed intact (en bloc) so that pathologists can properly examine them and measure and document the depths and margins of tumor invasion. A second concern for surgical oncologists is cell transfer or cell spillage: diseased tissue must be removed without contaminating adjacent tissues and structures with cancer cells. Because of these concerns, tissue morcellation—a technique commonly used in noncancer laparoscopic surgery in which the tissue is divided into pieces so that it can be removed more easily—should not be used for oncologic procedures.

One of the early concerns about laparoscopic procedures in oncology was that they caused so-called port-site recurrences or trocar metastases—the appearance of recurrent tumor tissue at the site of trocar entry. In a five-year study of all laparoscopic procedures at The University of Texas M. D. Anderson Cancer Center (performed in more than 500 patients), there were four port-site recurrences, and three of these patients had widespread tumor growth elsewhere. This result is different from those seen in studies of open-procedure incisions, according to Barry Feig, M.D., an associate professor in the Department of Surgical Oncology at M. D. Anderson, who said that this type of recurrence is now generally considered to be related to biologically aggressive disease rather than to the type of incision.

New techniques for removing tissue have helped increase the number and types of oncologic surgeries that can be done laparoscopically. In some cases, the tissue to be removed is first encased in a specimen retrieval bag. And for many procedures, a hand-assisted technique is used, wherein the surgeon uses his or her hand, inserted through the initial incision, to aid in the exploration, isolation, and removal of tissue. This hand-assisted technique offers distinct advantages—the superior visualization afforded by the laparoscope and a tactile component that is important in many aspects of surgery—and has allowed surgeons to apply less invasive approach to surgeries that previously could not have been done laparoscopically.

Hand-assisted laparoscopy can also serve as a bridge between open surgery and straight laparoscopy, making it easier for surgeons to practice and learn the skills necessary for performing laparoscopic procedures.

Laparoscopic Prostatectomy

These kinds of refinements and knowledge developed through research have contributed to the expanding use of laparoscopy in some of the areas of oncology where its application was previously in question. “In certain urologic oncology procedures, such as nephrectomy, laparoscopic surgery may soon be a standard of care,” said Christopher Wood, M.D., an assistant professor in the Department of Urology.

Dr. Wood was not himself an early enthusiast of laparoscopic surgery, but he has come to see its benefits for patients. He recalled that in the final days of his residency at Northwestern University Medical School in Chicago, he was dispatched to the airport to pick up a nationally renowned expert who had come to demonstrate laparoscopic radical prostatectomy, then a novel procedure. “That operation took 12 hours,” Dr. Wood recalled, “but over the years, it has become refined to the point that it is more routine.” Nonetheless, he points out that even today, most prostatectomies are not done laparoscopically because of the very steep learning curve associated with laparoscopic prostatectomy and because the morbidity rate of conventional prostatectomy compares very favorably with that of the laparoscopic technique.

Laparoscopic prostatectomy does have benefits, however. Surgeons say that, for anatomical reasons, visualization of the prostate is much better laparoscopically than in an open procedure. According to Surena Matin, M.D., an assistant professor in the Department of Urology, there are advantages to radical prostatectomy done laparoscopically: for example, less bleeding, more precise suturing of the bladder to the urethra, and five small puncture wounds versus one long (eight- to nine-inch) incision.

“We also know that return of bladder control is as good or better than it is after conventional surgery. And although we do not yet have good information about the return of erectile function, the reported outcomes we do have suggest equivalency when a nerve-sparing procedure is done,” Dr. Matin said. “Additionally, there are no long-term data yet about cancer control. Outcomes based on specimens from both kinds of procedures appear to be equivalent, as do data from a recent three-year follow-up study.”

Kidney Cancer Surgery

Perhaps the biggest impact of laparoscopic surgery in urologic oncology has been seen in cancers of the kidney. The first laparoscopic radical nephrectomy was performed in 1990, and for several years after that its value was questioned because of its complexity. “Today, after thousands have been performed, laparoscopic approaches to kidney cancer surgery, including hand-assisted laparoscopy, are rapidly becoming the standard of care in most major centers,” said Dr. Wood. Many patients...
In the top photo, Dr. Surena Matin (right), an assistant professor in the Department of Urology, and Dr. Carlos Bermejo, a fellow in the Department of Urologic Oncology (TIC), perform a laparoscopic nephrectomy on a patient with kidney cancer. The bottom photo shows the resected kidney with tumor (above a 15-cm ruler) and the small incision in the patient's abdomen.

who are treated at M. D. Anderson for kidney cancer undergo surgery using a laparoscopic technique.

“We believe that there is less morbidity, there is less bleeding, less pain, a faster recuperation, and also a cosmetic advantage. And the results of two five-year, case-control follow-up studies indicate that it is comparable to open removal in terms of cancer outcomes,” said Dr. Matin. Although the open procedure is still considered the gold standard for partial nephrectomy, the use of laparoscopy is increasing in cases where the tumors are small, particularly if they are on the surface of the kidney.

Another advance in the treatment of small renal tumors is the use of laparoscopic cryoablation. This procedure is associated with remarkably little morbidity and so can be offered to patients who are not able to undergo a more extensive procedure. “Although the curative effects of this technique are not yet known, three-year follow-up indicates good results, as long as patients are carefully selected,” said Dr. Matin.

A related procedure that is even less invasive is percutaneous radiofrequency ablation conducted under computed tomographic (CT) guidance. This technique, done with the help of an interventional radiologist, is currently under investigation. “We have no long-term data for it yet,” said Dr. Matin, “but it highlights the fact that patients with small tumors have tremendous options now, whereas 10 years ago, they would require removal of a whole or partial kidney with a large incision.”

A staging tool

According to Paul Mansfield, M.D., a professor in the Department of Surgical Oncology at M. D. Anderson, laparoscopy has found one of its most useful roles in oncology as a staging tool, and nowhere is its benefit greater than in gastric cancer. Laparoscopy and endoscopic ultrasonography can help identify patients who could be cured by a gastric resection, those who could benefit from preoperative systemic chemotherapy, and those who would not benefit (and can thus be spared) from this major operation.

Dr. Mansfield and Dr. Feig, along with their colleagues at M. D. Anderson, have described a laparoscopic technique that uses water to improve the visualization of peritoneal surfaces in gastric, pancreatic, and other intra-abdominal solid-organ malignancies. Using this technique, investigators are able to visualize metastases so small that they cannot be detected by high-contrast CT. As many as 25% of patients with gastric cancers are found to have CT-occult metastases; laparotomy would not be therapeutic for these patients, and so they can be spared the morbidity of a large operation.

At M. D. Anderson, patients with gastric cancer routinely undergo this type of laparoscopic staging unless an urgent gastrectomy is necessary to control bleeding or remove an obstruction. Typically during the staging laparoscopy, fluid is also injected into the abdomen to obtain cytologic wash specimens, a valuable contribution to (Continued on page 4)
the staging picture that can help further refine care and identify suitable protocols for individual patients. It is also common during this procedure to place a feeding tube, which provides supportive nutrition to the patient during the course of treatment. More than half of patients with gastric cancer have lost 10% of their total body weight or more by the time their disease is discovered, and this can set the stage for complications from the disease or its treatment.

The learning curve
In much of the literature on laparoscopic surgery, the learning curve for performing the technique is described as steep. In fact, laparoscopy is more than a new technique; it is a completely different way of operating. The visualization is different, the instruments are different, and the tactile aspects are very different. Intracorporeal suturing, for example, is a skill that requires a great deal of practice: "As a young surgeon in training, you sit up all night, night after night, tying knots—over and over and over again—until it becomes second nature," said Dr. Matin. "Then you do the same thing all over again when you learn to do it laparoscopically." And, because laparoscopic surgery is relatively new in practice, it has not been easy for many surgeons to perform the number of procedures (at least 50 in a given technique) that experts say is necessary to become adept. In addition, some advanced laparoscopic procedures, such as colon resection, require a team of two surgeons, said Dr. Feig.

Not for everyone
Even in cases where the surgeon is adequately trained and experienced, however, a laparoscopic procedure may not be the best approach. For some surgeries, both oncologic and nononcologic, laparoscopy has an established benefit: quicker recovery time with similar disease control. For others, such a benefit has not been proven. An example still requiring study is laparoscopic colon resection for colon cancer. One might assume that the short-term quality of life would be better for patients who undergo laparoscopic surgery and that the real question would be whether the long-term survival rates for laparoscopic colectomy are comparable to those for standard colectomy. But according to Dr. Feig, two recent studies conducted elsewhere have presented surprising results: in one, no difference in quality of life was seen, and in the other, higher five-year survival rates were reported for the laparoscopic procedure. These results are the opposite of what one might expect, so more study is obviously needed.

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for lymphatic mapping, which is under investigation in colon cancer. "And it's important to figure out that question first," Dr. Feig said. "Our primary concern, as always, is treating the cancer fully."

A given surgical procedure is heavily influenced by the disease or condition that necessitates it, and the changes wrought in an organ by cancer can be a factor in choosing a method of resection. Splenectomies, for example, are performed somewhat routinely by laparoscopy in noncancerous conditions such as idiopathic thrombocytopenic purpura, but this approach is not always an option for cancer surgery. The spleen is normally a small organ, "but the ones we tend to see," said Dr. Feig, "can be very large—four to five times normal size—and boggy [blood engorged] and thus very difficult to remove with instruments. In many cases, it can be removed more quickly and safely by open procedure."

Patient characteristics also play a role. For example, laparoscopic colon resection is generally less suitable for patients who are large or obese, and conversion to an open procedure is required more often in such patients because tissue thickness impedes the identification of important structures and because manipulating the tissue can be laborious, increasing operative time.

The bottom line
According to Dr. Feig, though laparoscopic surgery is controversial in oncology, "this is not an issue that requires us to be either enthusiast or nihilist." There are clearly situations where there is a demonstrable benefit from laparoscopy, and the real question, he said, is which patients will experience this benefit. "Our task is to identify those patients," said Dr. Feig, "and refine our techniques so that we can offer it when it is most beneficial and appropriate."
The word creativity brings to mind thoughts of fine paintings or improvisational jazz, but a group of physicians at The University of Texas M. D. Anderson Cancer Center recently expressed their creative impulses through a more unusual medium: spinal surgery.

Historically, when surgeons inserted a plate to stabilize or reconstruct the upper thoracic spine after performing a verteectomy to remove a tumor, they had to do so from the patient's back or from an awkward angle in the front to prevent injury to the aorta or superior vena cava. The main problem with these approaches was that they made it difficult to place the screws needed to secure the stabilizing plates onto the upper thoracic spine.

"Because of the anatomic constraints in the upper chest related to the overlying heart and major blood vessels, trachea, esophagus, and nerves, getting these plates secured to the spine can be very difficult, especially in terms of getting the screws oriented in the proper direction," said Laurence Rhines, M.D., an assistant professor in the Department of Neurosurgery and director of the Spine Program at M. D. Anderson.

Rather than continuing to labor under these traditional methods, Dr. Rhines sought out the help of a colleague to come up with a new angle. "Dr. Garrett Walsh, a professor in the Department of Thoracic and Cardiovascular Surgery, developed a technique called the interaortocaval subinnominate window (ISW)...."
A New Approach to Spinal Surgery
(Continued from page 5)

the blood vessels down so far. We must have mentioned this to Garrett one day in the operating room.”

Dr. Walsh responded by developing an approach whereby he dissected between the aorta and vena cava, creating a surgical window through which the neurosurgeons were able to safely and optimally orient the screws. Drs. Walsh and Rhines have termed this technique the interaortocaval subinnominate window (ISW).

“This was an example of a technique that we developed together based on their need to get to the spine and our knowledge of how to move major cardiovascular structures in the chest away from the spine to allow them to have optimal access for all of their instrumentation,” Dr. Walsh said.

To provide the needed access to the thoracic spine in the ISW approach,

Dr. Walsh modified a method that had been used for some time in combined heart and double-lung transplantation. Specifically, the pericardial sac containing the heart is opened, the aorta is mobilized and rotated to the patient’s left, the superior vena cava is retracted to the patient’s right, and the trachea and esophagus are moved away from the spine as a unit.

“It’s an approach that is part of our cardiovascular armamentarium, but recognizing its application to surgeons in another discipline who are interested in getting to another structure within the thoracic cavity will occur when you have the close collaboration that we have within our Division of Surgery,” Dr. Walsh said.

Surgeons in the departments of Neurosurgery and Thoracic and Cardiovascular Surgery have collaborated on 700 to 800 cases in the past eight years, Dr. Walsh estimates, but through the development of the ISW approach, the two groups learned even more about each other’s areas of expertise.

“When you work with another service, you start understanding a little bit more about their needs, and also you understand a little bit more about how they actually do procedures that you may not have been trained for in your surgical discipline,” Dr. Walsh said. “When you start spending hundreds of hours together in the operating room and see how they approach their particular specialty and the tools that they use, you develop an approach that you know is going to be safe for the patient.”

For more information, contact Dr. Rhines at (713) 792-2400 or Dr. Walsh at (713) 792-6849.

PROTOCOLS

Studies Test New Surgical Procedures

Clinical trials in progress at The University of Texas M. D. Anderson Cancer Center include the following investigations of novel surgical techniques and procedures.

- Treatment of patients with stage IB2 carcinoma of the cervix: a randomized comparison of radical hysterectomy and tailored chemoradiation versus chemoradiation alone (GOG-0201). Physician: Charles F Levenback, M.D.

- A trial of lymphatic mapping and sentinel node lymphadenectomy for patients with T1 or T2 clinically N0 oral cavity squamous cell carcinoma (ACOSOG Z0360). Physician: Jeffrey Myers, M.D., Ph.D.

- A phase III, randomized clinical trial of laparoscopic pelvic and para-aortic node sampling with vaginal hysterectomy and bilateral salpingo-oophorectomy versus open laparotomy with pelvic and para-aortic node sampling and abdominal hysterectomy and bilateral salpingo-oophorectomy in endometrial adenocarcinoma and uterine sarcoma (GOG LAP2). Physician: Pedro Ramirez, M.D.

- A randomized trial evaluating the use of fibrin tissue adhesive following axillary node dissection in patients with breast cancer (GSO1-562). Physician: Barry Feig, M.D.

- A randomized, phase II trial evaluating the importance of early erectile dysfunction rehabilitation and unilateral autologous sural nerve grafting in patients undergoing a unilateral cavernous nerve-sparing radical prostatectomy for clinically local prostate cancer (ID01-304). Physician: Christopher G. Wood, M.D.

- A randomized study of axillary lymph node dissection in patients with clinically T1 or T2, N0, M0 breast cancer who have a positive sentinel node (ID99-336). Physician: Kelly K. Hunt, M.D.

- Surgery versus stereotactic radiosurgery in the treatment of single brain metastases: a randomized prospective trial (NS97-199). Physician: Frederick Lang, M.D.

- A phase III clinical trial of Tissee1 VH fibrin sealant to reduce lymphedema incidence after inguinal lymph node dissection performed in the management of vulvar malignancies (GOG-195). Physician: Pedro Ramirez, M.D.


For more information about these clinical trials, physicians or patients may call the M. D. Anderson Information Line. Those within the United States should call (800) 392-1611; those in Houston or outside the United States should call (713) 792-3245. Visit the M. D. Anderson Cancer Center clinical trials Web site at http://www.clinicaltrials.org for a broader listing of treatment research protocols.
Telling Fact from Fiction on the Internet

The Internet can be a great resource for health information. A recent survey by the Pew Research Center found that 81% of Internet users expect to be able to find reliable information about health or medical conditions online. Unfortunately, the Internet is also an abundant source of misinformation, and much of it is circulated year after year through e-mail. The following are some myths about cancer that are currently circulating on the Internet.

INTERNET MYTH #1
Wearing a bra causes breast cancer.

Some versions of the rumor specify underwire bras. But underwire or not, there is no validity to this one. According to the American Cancer Society (ACS), "There are no scientifically valid studies that show a correlation between wearing bras of any type and the occurrence of breast cancer. Two anthropologists made this association in a book called Dressed to Kill. Their study was not conducted according to standard principles of epidemiological research and did not take into consideration other variables, including known risk factors for breast cancer. There is no...credible research to validate this claim in any way."

INTERNET MYTH #2
Using antiperspirants causes breast cancer.

This urgent warning claims that the body expels toxins through perspiration and that blocking perspiration causes the body to deposit those toxins in the lymph nodes, where they lead to mutations and cancer. The ACS disagrees: "Lymph nodes clear some toxins from the body, but they are not released through sweating. The American Cancer Society is not aware of any evidence that shows substances in deodorants or antiperspirants are toxic or cause DNA damage that could lead to cancer. Such products are rigorously tested before they can be marketed."

INTERNET MYTH #3
Microwaving food in plastic containers releases cancer-causing dioxin into the food.

Other versions of this rumor blame a chemical called di(2-ethylhexyl)adipate (DEHA) rather than dioxin. According to the ACS, "The U.S. Food and Drug Administration (FDA) says DEHA may leach into foods wrapped in plastics.... But the levels are very low...well below levels showing no toxic effect in animal studies. As for dioxin, the FDA says it 'has seen no evidence that plastic containers or films contain dioxins and knows of no reason why they would.'"

INTERNET MYTH #4
Exposing the lungs to air during surgery for lung cancer causes tumors to spread.

Researchers studying patients in three U.S. cities found this belief to be fairly widespread. In a study published in the Annals of Internal Medicine, researchers reported that 38% of all patients surveyed believed the rumor to be true. Among African-American patients, the belief is even more prevalent: 61% believed the rumor to be true. The researchers could find no direct scientific evidence that tumors spread because of contact with air. On the other hand, there is evidence of lower rates of early-stage surgery. This rumor could be one of the reasons for the lower rates of early-stage surgery.

Web Sites You Can Trust

Before incorporating the latest health information chain e-mail into your lifestyle or forwarding it to others, check out reliable Web sites.

Here are some reliable sources of health information:
- The American Cancer Society: http://www.cancer.org
- The National Cancer Institute: http://cancer.gov
- The University of Texas M. D. Anderson Cancer Center: http://www.mdanderson.org
- The Centers for Disease Control and Prevention: http://www.cdc.gov
- The National Institutes of Health: http://www.nih.gov
- The U.S. Food and Drug Administration: http://www.fda.gov

Here are two sites that investigate hoaxes, rumors, and urban legends on the Internet:
- Urban Legends and Folklore: http://urbanlegends.about.com
- Urban Legends Reference Pages: http://www.snopes.com

For more information, contact your physician or contact the M. D. Anderson Information Line:
1 (800) 392-1611, Option 3, within the United States, or
1 (713) 792-3245 in Houston and outside the United States.

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