Johns Hopkins surgeons are increasingly finding that once-thought unresectable pancreatic cancer is sometimes resectable.

In 2012, surgery team director Chris Wolfgang and surgical oncologist Matthew Weiss started offering an additional therapy for unresectable, locally advanced pancreatic cancers. Called irreversible electroporation (IRE), the treatment has proven effective for liver cancer and is now being used at The Johns Hopkins Hospital for pancreatic cancer.

A few of the medical centers that provide IRE in the U.S. use a percutaneous technique, but Wolfgang and Weiss prefer a laparotomy. Under intraoperative ultrasound guidance, the surgeons work together to insert several probes through the transverse mesocolon and into the tumor. These send short, high-voltage pulses to the tissue to create cell membrane permeability, which then induces cellular apoptosis.

“We irreversibly poke holes in the cell membrane of the cancer tissue. The cells suck in water and then they die,” says Weiss.

Unlike thermal ablation techniques, which deliver thermal energy that can dissipate from the tumor to the major blood vessels, Weiss says IRE is safe to use around blood vessels and even bile ducts. “Collagen and other structures are not affected by IRE.”

Since the duo started providing this therapy, they’ve had some unintended results. “Once we get a laparoscopic view of the tumor during IRE, we
**COLORECTAL SURGERY**

**A Quicker Recovery After Colorectal Surgery**

If I were to need major bowel surgery,” says anesthesiologist Christopher Wu, “I would want treatment that avoids narcotics and anesthetic gases, as well as manages fluid rightly.” But that is not the entirety of Wu’s colorectal surgery wish list.

“I would want every piece of evidence I could to have my best outcome,” he says, “and with the new enhanced recovery after surgery (ERAS) pathway being used at The Johns Hopkins Hospital, I think we’re doing that.”

In early 2014, a Johns Hopkins team of nurses, surgeons and anesthesiologists started incorporating ERAS for colorectal surgery. It encompasses the preoperative, intraoperative, postoperative and post-discharge phases of care, as well as a standard perioperative anesthetic plan.

Surgeon Elizabeth Wick says ERAS changes the paradigm of how patients are treated. Typically, a patient stays in the hospital between five and 10 days after colorectal surgery. A recent meta-analysis of 13 studies, however, found that ERAS decreased length of stay by 50 to 60 percent.

Now at Johns Hopkins, nurses work closely with patients before surgery to provide print and electronic educational materials, supplies for surgery preparation, checklists and instructions. “It engages the patient much more in their care,” says Wick.

Then, during surgery, to avoid anesthetic gases, intravenous fluids, and postoperative nausea and vomiting, “We are trying to use modalities like epidural anesthesia and propofol infusion,” says Wu. “And when patients are ready for oral medications, we use nonopioid agents, like NSAIDs, as well as other nonnarcotic painkillers.”

Postoperatively, nurses encourage patients to drink the proper amount of fluids, to get out of bed more quickly, to get moving and to eat, explains nurse clinician Deb Hobson.

**Length of Stay After Colorectal Surgery**

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<th>Typical Stay</th>
<th>Using ERAS</th>
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<td>5 to 10 days</td>
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**GASTRIC CANCER**

The Migration of Gastric Cancer to the GE Junction

Over the last 100 years, gastric cancer has fallen from being the number one cancer in the U.S. to one of the top ten. Another change that has taken place is where it tends to physically occur in the body. “Now, in addition to lower in the stomach, it’s also frequently found at the stomach’s junction with the esophagus,” says surgeon Nita Ahuja, head of mixed tumor services at The Johns Hopkins Hospital.

The symptoms of cancer at the gastroesophageal (GE) junction are similar to those of other cancers in the upper gastrointestinal tract: reflux, a change in the esophageal lining, unintended weight loss, difficulty swallowing or eating, and anemia. The demographic, however, is different. “We’re seeing a younger group of Caucasian males in their 30s and 40s with these tumors,” says Ahuja.

Before deciding on a surgical approach to remove a GE junction tumor, Ahuja says it’s paramount to pinpoint exactly how high up on the esophagus or how low down on the stomach the cancer stretches.

After an endoscopy and CT scan, an endoscopic ultrasound maps out the tumor, including whether it reaches the lymph nodes, and helps determine whether to administer neoadjuvant therapy. “People with locally advanced gastric cancer survive longer when they have chemotherapy up front,” says Ahuja.

If the cancer originates in the stomach and reaches up to the esophagus, Mark Duncan, head of surgical oncology at Johns Hopkins Bayview Medical Center, says he would remove the lower esophagus, most or all of the stomach, and lymph nodes in the chest and abdomen. If the cancer extends down the stomach, he would remove all of the stomach, some of the esophagus and a large area of nodes within the abdomen. For tumors mostly in the esophagus, the operation would remove most of the esophagus and a portion of the stomach with lymph nodes.

“These tumors can be either stomach cancer that goes up to the esophagus or esophageal cancer that goes down to the stomach,” he says.

When the cancer is gastric, Ahuja says the standard procedure is a regional lymphadenectomy to remove the nodes around the stomach, but she and Duncan prefer an extended lymphadenectomy to take out a wider area of nodes. “If you get enough nodes,” she says, “it increases survival.”

This practice of taking out more nodes was adopted from Japan, where the incidence of gastric cancer is significantly higher. Because the disease is so widespread there, Duncan encourages earlier endoscopies in the U.S. for Japanese patients who report gastric symptoms. He says people from China, Korea, Iran and Chile are also at higher risk.

Even though gastric cancer is no longer a leading cancer in the U.S., it remains the fourth leading cancer in the world. At the Johns Hopkins Gastric Cancer Center, Duncan and Ahuja work with surgeons, medical and radiation oncologists, and gastroenterologists to personalize treatment for every patient—including those with cancer at the GE junction.

“There are many different options,” says Duncan, “and we have the ability to do each one.”
ESOPHAGEAL CANCER

A Highlight for Esophagectomies: Fluorescence Imaging to Reduce Anastomotic Leaks

Treatment for esophageal cancer is not what it used to be. “Ten years ago, we would remove the esophagus when we heard the words cancer or high-grade dysplasia,” says Daniela Molena, director of minimally invasive and robotic thoracic surgery. “We don’t do that anymore.”

Today, Molena and Anne Lidor, director of upper gastrointestinal surgery, turn to several minimally invasive techniques: ablation to burn or freeze dysplasia or early-stage cancer, an endoscopic mucosal resection to remove an early-stage tumor, and, when necessary, a minimally invasive esophagectomy (MIE) to remove part or the entire esophagus affected by a more advanced cancer.

“MIE allows us to complete the same task as open surgery, but the incisions are smaller,” says Molena. “Patients have less pain, faster recovery time and fewer complications.”

Despite the benefits, Molena says some of the complications are comparable to those after a traditional esophagectomy. One of the most serious is a postoperative anastomotic leak where the remaining esophagus is reconnected to the stomach.

“When we see a pink stomach during surgery,” says Molena, “we might assume it has good blood flow, and we connect that area of the stomach to the esophagus. But if the blood flow is not sufficient to keep the tissues alive, the suture line can fall apart a few days later.”

To reduce the chances of an anastomotic leak, Molena and Lidor are testing fluorescence imaging. After injecting the patient with a fluorescent agent, a special camera intraoperatively captures the highlighted areas in the stomach, which represent areas with healthy blood flow.

Now, Molena says, “We can distinguish the part of the stomach that is well vascularized.”

With this approach, Molena and Lidor are optimistic that there will be fewer complications after surgery from the destruction of sutures. “We also think that in the future, we might be able to one day link a fluorescent agent to a particular cancer-related molecule,” says Molena. “Surgery could then be targeted to the tumor or an exact lymph node.”

Meanwhile, Molena says the treatments at The Johns Hopkins Hospital are achieving five-year survival rates of 80 to 90 percent for early-stage esophageal cancer patients and up to 50 percent for advanced-stage patients.

“What we can offer today,” says Molena, “is very different compared to what was available even five years ago.”

To refer a patient: 410-933-5420

EXCESSIVE SWEATING

Hyperhidrosis and the Evolving Sympathectomy

People may never report excessive sweating because they are embarrassed, while those who do seek treatment may be doing so for the wrong reasons. Medications, anxiety and certain health conditions can all cause sweating known as secondary hyperhidrosis—distinctly separate from the medical disorder primary hyperhidrosis.

At the Johns Hopkins Center for Sweat Disorders, co-director and thoracic surgeon Malcolm Brock works with dermatologists, neurologists and behavioral medicine specialists to customize treatments for this disorder. Therapeutic options include medication, botulinum toxin injection, iontophoresis, microwave thermolysis and thoracic sympathectomy surgery.

“Conservative, temporary therapies generally begin with the least invasive, such as topical cream, and work up to more aggressive interventions such as electric currents and Botox,” says Brock.

For a permanent solution under the arms, microwave thermolysis delivers heat to the underarm sweat glands and completely eliminates them. Even though 2 percent of the body’s glands are affected, Brock says it does not hinder the patient’s overall ability to regulate temperature.

Another permanent option for underarm, palm, scalp or facial sweating is thoracic sympathectomy. Over the last two decades, this procedure has evolved.

“The first sympathectomies would actually remove the sympathetic nerve,” says Brock. “Then we found that cutting the nerve would do the trick, and so we did open surgery to make the cut. Today, we do video-assisted thoracoscopic surgery.”

Since 1998, Johns Hopkins surgeons have performed hundreds of these procedures. One small incision under an arm allows a camera and a scope, as well as a valve to allow air to one lung. The other lung slowly deflates to provide a clear view of the nerve.

Depending on where the sweating occurs, newly established guidelines recommend where to sever the sympathetic nerve corresponding to the ribs: near ribs three or four for palm sweating, near ribs four or five for underarm sweating, and near rib three for facial sweating.

“Surgeons used to cut near rib two, but we now realize this can cause severe compensatory sweating, where patients may begin excessively sweating from other parts of their bodies,” says Brock. “Since going to the third rib, there are less complaints.”

While compensatory sweating can still occur, the satisfaction rates are much higher. Today, 70 to 80 percent of patients who undergo surgery for underarm and facial sweating are satisfied, and more than 90 percent of those who undergo surgery for palm sweating are happy with the results.

To refer a patient: 443-997-9328 (443-99-SWEAT)

WOMEN AT 29 OR 30 COME IN BECAUSE THEY CAN’T ADVANCE AT WORK. MEN ARE COMING IN BETWEEN 18 AND 21, AND MANY SAY THE DISEASE HAS HINDERED THEIR PERSONAL RELATIONSHIPS.

To refer a patient: 410-933-5420
A Potential Boon for Pancreatic Cancer Patients
(continued from cover page)

find that 80 to 90 percent of them are actually resectable,” says Weiss. “It seems the preoperative cross-sectional imaging overestimated the burden of disease; for example, the tumor may have originally appeared to be too close to major blood vessels, but we were actually seeing dead lymphatic tissue or the effects of chemo and radiation.”

Now, as Wolfgang and Weiss work in the operating room to provide IRE, one of three situations presents itself: the cancer turns out to be completely resectable, the cancer is not resectable but can be treated with IRE, or the cancer is resectable and the margins can be treated with IRE (margin augmentation).

“IRE is getting people to surgical resection who wouldn’t have been candidates before,” says Weiss. ■

To refer a patient: 410-933-7262 (PANC)
To see a case study, visit bit.ly/HPBCase_IRE