

## Gastric Cancer: At a New Junction

Over the last 100 years, gastric cancer has fallen from being the No. 1 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



THE STANDARD IS A REGIONAL LYMPHADENECTOMY, BUT WE PREFER AN EXTENDED PROCEDURE TO TAKE OUT A WIDER AREA OF NODES.

—ANITA AHUJA

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.”

Information: 443-997-4278 (GAST)



“Johns Hopkins is one of the first children’s hospitals in the country to have the newest robotic surgery system,” notes Ardavan Akhavan.

## Expanding Robotic Surgery for Pediatric Patients

“There is an enormous opportunity to improve the surgical care of children,” says Johns Hopkins pediatric urologist **Ardavan Akhavan**, who specializes in minimally invasive surgery. Akhavan joined the Johns Hopkins urology faculty from Seattle Children’s Hospital, University of Washington Medical Center, and his job is an exciting one: to build a minimally invasive pediatric surgery program.

“Johns Hopkins is one of the first children’s hospitals in the country to have the newest robotic surgery system,” says Akhavan, “which will allow us to expand the limits of minimally invasive surgery in children and offer the most advanced surgical technologies to our smallest patients.”

Over the last few years, the applications for pediatric minimally invasive urology have expanded dramatically, he adds. “Minimally invasive surgery has revolutionized the care for patients as young as 6 months by allowing for smaller incisions, decreased pain, shorter hospitalization and quicker recovery,” he says. Many procedures can be done on an outpatient basis.

Akhavan uses robotic, laparoscopic and endoscopic techniques to treat a variety of disorders involving the kidney, ureter, bladder, gonads and genitals with minimal to no incisions.

“For correction of a ureteropelvic junction obstruction,” he says, “we can perform a robotic pyeloplasty. For surgical repair of vesicoureteral reflux, we offer robotic ureteral reimplantation. The list is ever-expanding.”

When he’s not in the operating room or clinic, Akhavan is involved in research, working to correlate surgical skills with patient outcomes to standardize the training and evaluation of robotic surgeons.

“Robotic surgery is as operator-dependent as any other form of surgery,” he says. “We hope our research will help establish the criteria for assessing and teaching robotic surgical skills to improve the safety and outcomes of patients undergoing minimally invasive surgery everywhere.” ■

Information: 443-997-1851

## Liquid Biopsy Could Spare Surgery

Today’s big advances in medicine are built on a foundation of past discoveries, new technologies and forward thinking. At the Ludwig Center at Johns Hopkins, all the parts are coalescing into major gains for diagnosing and controlling cancer. The latest is a liquid biopsy, “a noninvasive way of monitoring a person’s cancer status,” typically by using the patient’s blood, explains Johns Hopkins neurosurgeon **Chetan Bettegowda**.

“Our research is focused on understanding the genetic makeup of a tumor. Once we know it, we can search for a particular DNA biomarker in a patient’s blood and use that signature to quantify the cancer, decide on the best treatment, and monitor the patient over time for drug resistance and other responses,” he says.

As a neurosurgeon, Bettegowda is focused on a unique aspect of a liquid biopsy for brain cancers. “Brain cancers do not shed much DNA into the blood, probably because of the natural blood-brain barrier,” he explains. The Ludwig Center researchers and worldwide collaborators are working to detect brain cancers in cerebrospinal fluid (CSF) instead, via a spinal tap.

Bettegowda wants to avoid surgical procedures whenever possible. He envisions, for example, using a CSF liquid biopsy for brain tumor patients who develop treatment side effects that mimic tumor progression. “We’d spare the patient going into surgery for a biopsy of the tumor itself.”

The researchers haven’t completely ruled out a blood-based liquid biopsy for analyzing brain tumors and responses to treatment. Blood- and CSF-based liquid biopsies are being researched in parallel. “We expect to develop new ways of detecting molecules of DNA from nervous system cancers that could show up in blood,” says Bettegowda. ■

Information: 410-955-8620



View a Video: [Chetan Bettegowda discusses his research on a new liquid biopsy to screen asymptomatic people to detect cancers when they are not yet clinically detectable. Visit \[bit.ly/liquid-biopsy\]\(http://bit.ly/liquid-biopsy\)](#)



“Our multidisciplinary team of fetal, maternal, neonatal and pediatric experts care for mother and fetus at every stage, from pregnancy to delivery and beyond,” says Ahmet Baschat.

## Treatment for the Tiniest Patients

Maternal-fetal medicine specialist **Ahmet Baschat** has little use for the word “can’t.”

As one of the leaders in a specialty that as recently as three decades ago was still largely in the “what if” stages, he’s been a prominent contributor to the exponential growth in the number of fetal diseases and anomalies that today can not only be detected but corrected in utero. And Baschat, who

directs Johns Hopkins’ Center for Fetal Therapy, is equally at home advancing both diagnosis and treatment.

For example, second-trimester echocardiography has been the preferred method for diagnosing the presence of congenital heart disease, because by that stage of gestation it can show the needed cardiac planes, landmarks and anatomic details. Baschat and colleagues, however, recently showed that in a selected

## When Robotic-Assisted Mitral Valve Repair Is the Answer

Sixty-eight-year-old Jim Watkins of Overland Park, Kansas, knew he had a heart murmur. Diagnosed with benign mitral valve prolapse in 2000, he was told by his cardiologist not to worry about it but to have a follow-up every three years or so. In the fall of 2013, Watkins and his wife started planning a European trip for the following spring, but that December, a routine echocardiogram revealed moderate-to-severe mitral valve leakage and marked leaflet regurgitation.

“They wanted me to have open-heart surgery before Christmas,” Watkins says, “but I wasn’t ready.”

Exploring alternatives, Watkins learned that minimally invasive robotic repair was an option that offered faster recovery and minimal scarring. The Midwest hospitals that could do it, however, had months-long waits. Deciding to expand his geographic search criteria, Watkins found Johns Hopkins cardiac surgeon **Kaushik Mandal**, a valve disease specialist with expertise in minimally invasive repairs.

When Watkins phoned Mandal’s office, he didn’t have high hopes, but Mandal returned the call within five minutes. A few weeks later, Watkins was aboard a plane to Baltimore. On Valentine’s Day, he underwent robotic surgery to repair his mitral valve and was discharged a week later with no restrictions. In May, he and his wife traveled across Europe.

But the ending in Watkins’ case masks the nuanced decisions that preceded it, Mandal says, because not everyone is a good candidate for the robotic approach. In fact, Johns Hopkins has stringent patient-selection criteria to ensure optimal results and maximum safety.

Besides being in good overall health, the ideal candidate has no lung disease, Mandal explains, because the right lung is collapsed repeatedly for several minutes at a time during the procedure. In addition, the peripheral arteries must be free of plaque and calcification because the lung-and-heart bypass machine used during the procedure can destabilize plaque, leading to stroke or myocardial infarction. This is why, in addition to a stress



**Early repair is vital, says Kaushik Mandal, because valve leakage can go from mild to severe in a short period of time.**

echocardiogram and a physical, Watkins underwent a CT angiogram to rule out not only significant arterial pathology and peripheral artery disease, but also leaflet calcification.

“Patients with notable calcium deposits on their valve leaflets should have a traditional open-chest operation,” Mandal says. And since echocardiography is notorious for missing calcifications, a cardiac CT scan is essential, he adds.

To further minimize Watkins’ intraoperative risk, the Johns Hopkins team monitored oxygen saturation in his legs and brain during the procedure.

Another critical variable is early referral, Mandal says, because “once a patient develops symptoms, the valve may be salvageable but the outcomes are not as great.”

The robot can be used in repairing leaky or stenotic valves, closing atrial septal defects, excising cardiac tumors or treating ablation-resistant atrial fibrillation. However, ventricular and coronary artery bypass surgery may be more suitable for the traditional sternotomy approach, Mandal says, because even though the robot offers excellent intraoperative visualization, it deprives the surgeon of critical tactile feedback.

“I think of the robot as a million-dollar scissors,” Mandal says. “The decision to use it and whom to use it on is mine. Safety is paramount.” ■

group of high-risk patients, a first-trimester 4D echo technique using spatiotemporal image correlation, tomographic ultrasound imaging display and color Doppler could detect a number of serious heart problems—including atrioventricular canal defect, pulmonary stenosis and transposition of the great arteries—with 91 percent sensitivity and 100 percent specificity.

Proper diagnosis is also essential for twin-to-twin transfusion syndrome (TTTS), which can exist as a pure disease by itself in monochorionic twins or present along with twin anemia-polycythemia sequence, in which one twin has a successively increasing blood count and the other a progressive blood loss or anemia. There could also be unequal

sharing of the placenta or twin reversed arterial perfusion, in which the cardiac system of one twin does the work of supplying blood for both fetuses.

Fetoscopic laser photocoagulation to close placental anastomoses that connect monochorionic twins and prevent further transfusion is the treatment of choice for advanced-stage TTTS. However, says Baschat, initial techniques for performing the procedure didn’t achieve effective occlusion of vessels. He and colleagues have shown that a recent advance, called equatorial laser dichorionization, which targets the entire shared zone of the placenta, appears to be better at separating the fetal circulations and reducing the risk of TTTS recurrence.

Although outcomes for any fetal therapy

### Robotic Repair Primer

#### Conditions Treated

- Tricuspid and mitral valve regurgitation
- Valvular stenosis
- Atrial septal defect closure
- Excision of most benign cardiac tumors
- Atrial fibrillation that recurs after trans-catheter ablation

#### Patient Selection Criteria

- Good overall health
- No significant lung disease
- No peripheral artery disease
- No significant coronary artery blockages
- No calcium deposits on valve leaflets

#### Robotic vs. Sternotomy

##### Robotic

- Faster recovery
- Less pain
- Reduced surgical-site infection risk
- Minimal scarring
- Quicker return to normal activities

##### Sternotomy

- Better tactile feedback for surgeon

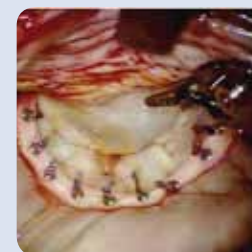
#### Robotic vs. Thoracotomy

##### Robotic

- 3-centimeter incisions
- Does not require parting the ribs

##### Thoracotomy

- 6-centimeter incisions
- Requires parting the ribs



**Robotic-assisted mitral valve repair**



**Mitral valve repair via sternotomy**

**Insight Before Scrubbing In** Visit our new online clinical resource Clinical Connection and watch cardiac surgeon Kaushik Mandal and cardiac anesthesiologist **Nadia Hensley** discuss robotic-assisted heart procedures. Visit [bit.ly/robhrt](http://bit.ly/robhrt)

procedure naturally are focused on the baby or babies, the mother’s health and well-being must also remain paramount. “Our multidisciplinary team of fetal, maternal, neonatal and pediatric experts care for mother and fetus at every stage, from pregnancy to delivery and beyond,” says Baschat. “Our treatment plans include not only fetal surgery and other interventions, but management of the mother’s health, individualized birth plans, and postnatal care plans for both mother and baby, including long-term follow-up care.” ■

**Information: 1-800-JH-FETAL (1-844-543-3825)**  
To see a video Q&A with **Ahmet Baschat** on twin-to-twin transfusion syndrome, visit [bit.ly/twintotwin](http://bit.ly/twintotwin).

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# PhysicianUpdate

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# PhysicianUpdate

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