

# Bringing the heat to abdominal cancers

April 26 2018

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Credit: Rush University Medical Center

A thin wall called the peritoneal lining surrounds the abdominal cavity, which contains the stomach, intestines, kidneys and other organs. While the lining supports and protects these vital organs, it makes it difficult to treat cancers inside this wall with traditional chemotherapy, which travels via the bloodstream all over the body.

"The abdominal cavity is like a sanctuary," explains Sam G. Pappas, MD, division chief of surgical oncology at Rush University Medical Center. "Conventional [chemotherapy](#) has limited penetration into the actual cavity, because there are not a lot of blood vessels inside. It's kind of like delivering chemotherapy to the pipes within the wall of a room instead of treating the tumors within the room."

Pappas is among a limited number of surgical oncologists in the United States skilled in a targeted approach for treating advanced abdominal cancers called HIPEC, which stands for hyperthermic intraperitoneal chemotherapy. HIPEC combines surgery to remove any visible tumors in the abdominal cavity with the delivery of a heated chemotherapy solution to the cavity during the same procedure to destroy any microscopic [cancer](#) cells the surgeon cannot see.

The chemotherapy is warmed to 42 degrees Celsius (109 degrees Fahrenheit). Cancer cells do not like either heat or chemotherapy, and the combination adds up to a powerful weapon.

"The two are synergistic," says Pappas, who is also an associate professor in the Department of Surgery at Rush Medical College. "One plus one is three in this case."

## **HIPEC adds years to lives of some patients**

The state-of-the-art procedure is adding years to the lives of patients with certain types of Stage IV abdominal cancers who have few, if any, other treatment options. "The HIPEC procedure leads to significant prolongation of survival for individuals with certain tumor histologies," Pappas says.

"For example, people with mesothelioma in the belly cavity used to have less than two years survival. Now, with this approach, the expected

survival is an excess of five years."

HIPEC may also be used to treat other advanced abdominal cancers, including appendix, colorectal, ovarian, stomach (gastric) and peritoneal cancers.

## **A regional cancer therapy approach**

HIPEC is an example of regional therapy for cancers that are isolated to a certain area of the body, whether a leg or arm, the liver, or the abdominal cavity. Instead of delivering chemotherapy or radiation to the entire body as conventional chemotherapy does, targeted treatments are provided during procedures performed in a specific region or organ. This approach helps to limit treatment side effects and the destruction of healthy cells throughout the body, which systemic chemotherapy treatments sometimes kill along with cancer cells.

Physicians and surgeons at Rush University Medical Center provide a number of regional cancer therapies in addition to HIPEC. For instance, Rush interventional oncologists attack liver cancer and other isolated cancers with electrical currents delivered via thin needles to tumors.

In another example, surgical oncologist Cristina O'Donoghue, MD, recently performed an isolated limb infusion on a patient with recurrent sarcoma in her leg. This regional therapy involved circulating high-dose, heated chemotherapy directly to the affected leg.

With Pappas' return to Rush last October, nearly 20 years after he graduated from Rush Medical College, the Medical Center can now provide additional regional cancer therapies for abdominal cancer. Over the past decade, Pappas has performed more than 200 HIPEC procedures with a high level of success, along with other regional cancer therapies.

## Care team carefully evaluates HIPEC candidates

Determining whether HIPEC is the right treatment for a patient requires multidisciplinary input, Pappas says. At Rush, an abdominal cancer patient's team typically includes a medical oncologist, a surgical oncologist, and a radiation oncologist. This team meets to review each case, consider the patient's and family's wishes, and recommend a treatment plan.

HIPEC is an intensive surgery, often taking 10 hours and requiring a prolonged hospital stay. In addition to killing cancer cells in the abdomen, the heated chemotherapy can make it difficult for patients to eat and get proper nutrition until their bodies recover.

Some patients have extensive tissue or entire organs removed during the surgery, which may result in health issues or side effects. In addition, some patients require systemic chemotherapy after HIPEC to kill any lingering [cancer cells](#).

For these reasons, the Rush cancer team needs to consider many factors before recommending HIPEC, including the degree of likelihood that the cancer will go into remission after the procedure.

"Based on our knowledge of the literature, we know that HIPEC has a big bang for the buck with certain tumor histologies, but not with other tumor histologies," Pappas says.

## Advancing robotics and molecular profiling

Pappas is thrilled to be back at Rush, working side-by-side with some of the Rush surgeons and professors who inspired him to specialize in cancer, including Daniel Deziel, MD; Alexander Doolas, MD; Keith

Millikan, MD; and Theodore Saclarides, MD.

"When I was a medical student, I liked the relationship that cancer surgeons had with their patients," Pappas says. "When people are diagnosed with cancer, I like the fact that the surgeon helps them navigate the medical system to try to get the best response."

Now that he is in a leadership position at Rush, Pappas is excited to help advance cancer treatments to improve patient outcomes and quality of life. Robotic surgery is another potential way to achieve these goals.

Pappas has more than 10 years' experience in robotic surgery, which involves using tiny instruments equipped with video cameras to perform minimally invasive procedures with high precision. In recent months, under Pappas' leadership, surgical oncologists and general surgeons at Rush have collaborated to remove a patient's pancreas robotically and another patient's adrenal gland via tiny incisions.

Pappas also is committed to furthering research into the molecular mutations that can identify various subtypes of tumors. Scientists have begun to uncover the molecular mechanisms of certain common cancers, such as breast cancer, but less is known about rare cancers, including some that occur in the [abdominal cavity](#).

One day, Pappas hopes to be able to ask: "Did we test for these types of mutations and are we treating this cancer based on the knowledge that cancers with different mutations behave differently?"

Provided by Rush University Medical Center

Citation: Bringing the heat to abdominal cancers (2018, April 26) retrieved 6 July 2024 from <https://medicalxpress.com/news/2018-04-abdominal-cancers.html>

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