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Chemotherapy

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Liver Cancer Treatment Turns Up the Heat on Chemotherapy

By John Fauber, Reporter, Milwaukee Journal Sentinel/MedPage Today
Published: November 21, 2011

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As Mark Vetter lay on the operating table, doctors isolated his liver and began bathing it in a heated, highly toxic poison sent through the organ's blood vessels.

Over the course of an hour, cancer cells in the liver started to die and continued doing so for days.

The operating room at Froedtert Hospital in the Milwaukee area was filled with onlookers who wanted to get a glimpse because the treatment was one that few doctors have witnessed.

"If everything is successful it will kill the remaining cancer cells and it is a healthy liver," a hopeful Vetter said a couple weeks after recovering from the surgery.

For someone like Vetter, who hopes to live for years, there is enough science to offer a glimmer of hope, but also the dark reality that the treatment may only offer another year or so.

The therapy he chose to undergo may have its physiological underpinnings in a theory that has come to be known as the "Lance Armstrong Effect."

The legendary cyclist bounced back from testicular cancer that had metastasized to his lungs and brain, and he went on to win several Tour de France races.

The Armstrong Effect

Why did Armstrong and nearly 70% of other testicular cancer patients survive, even when the disease had metastasized to other parts of the body?

The answer, according to proponents of this theory, lies in anatomy -- the testicles normally are a few degrees cooler than the rest of the body, and when testicular cancer cells spread to other, warmer environments inside the body, they are confronted by a heat wave.

In that stressed state, the theory goes, the cancer cells become more susceptible to treatments such as chemotherapy and radiation.

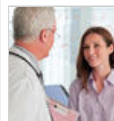
The combination of heat and chemo may be a promising approach to treating intractable cancers, said Robert Getzenberg, MD, the Johns



Doctors at Froedtert Hospital, in Wauwatosa, Wis., performing isolated hepatic perfusion surgery on Mark Vetter. Photo credit: John Fauber, Milwaukee Journal Sentinel.



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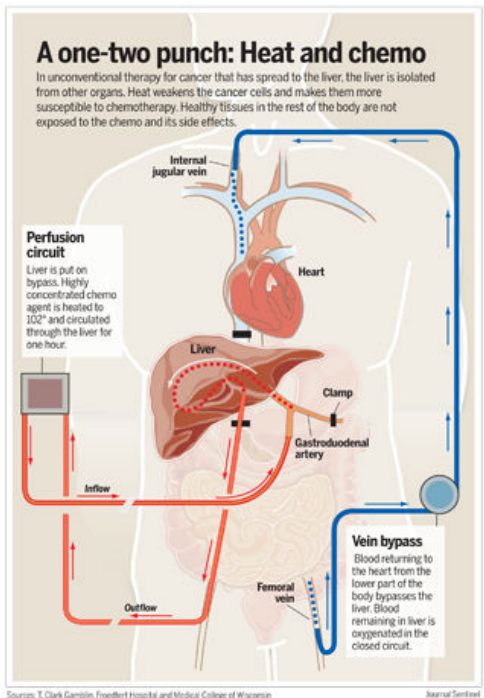
Hopkins University School of Medicine researcher who coined the term "Lance Armstrong Effect" five years ago in a commentary in the *Journal of the American Medical Association*.

"We have not had much success with cancer," Getzenberg said. "There are few things that really work. Every drug we come up with, cancer develops a resistance to," Getzenberg said.

Old Idea Finds New Believers

For decades, doctors have known that heat can kill cancer cells. Dating back to the 1960s, small trials of combining heat and chemotherapy were conducted, but the treatment never caught on mainly because of its complexity and a lack of data showing a clear survival benefit, said H. Richard Alexander, MD, associate chairman of clinical research at the University of Maryland Medical Center.

But in the 1990s, Alexander and other researchers began finding benefit in difficult-to-treat cancers that had spread to the liver.



"If (liver perfusion) were just a pill, the FDA would approve it immediately because it is as good as anything else we have tried," he said. "In some patients you see very dramatic results. In some cases, you can make tumors disappear from X-rays."



Mark Vetter and his wife, Nancy. Photo credit: Mike Sears, Milwaukee Journal Sentinel.

Average survival is about two years, he said. About 5% of patients live five years. One man still is alive 12 years after undergoing the treatment, Bartlett said.

Not Too Hot, Not Too Cold

At Froedtert, the doctors use a basic, highly invasive approach:

- Wheel the patient to the operating room
- Make a long incision in the abdomen
- Isolate the liver with clips, catheters, and cannulas, and perfuse it with the drug melphalan
- The drug is heated to about 102 degrees and mixed at concentration 20 times stronger than a standard chemotherapy dose

Others are in the early stages of testing more sophisticated methods for using heat and chemo, including the use of iron oxide and gold nanoparticles that have been chemically bonded with antibodies designed that seek out specific cancer cells. With the tiny metallic particles inside, the tumors, but not healthy tissue, then are heated using friction caused by radiofrequency or alternating magnetic field devices.

"We can heat them so much that we can burn them up," Getzenberg said.

The ideal approach, though, which now is being tested with prostate cancer in lab and animal models, involves heating the tumors to 107 degrees, which makes them much more vulnerable to chemotherapy agents, he said. Such nanoparticle and heat cancer therapies remain unproven and likely are a few years down the road

The "If" Factor

From his perspective as a patient undergoing a newly discovered "old" therapeutic approach, the

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treatment is just one more "if" for Vetter.

If he had not gone in for a routine eye exam two years ago, doctors would not have found the tumor in his left eye and he might be dead -- he's one of about five in one million people a year who develop ocular melanoma, a disease that often metastasizes to the liver.

If he had preferred, he could have traveled hundreds of miles to one of a couple centers in the country that specialize in the unconventional treatment. Instead, he chose to be one of the first such patients to undergo that unconventional treatment at a center in his hometown.



Doctors at Froedtert Hospital, in Wauwatosa, Wis., performing isolated hepatic perfusion surgery on Mark Vetter. Photo credit: John Fauber, Milwaukee Journal Sentinel.

Of course, there is the biggest if: if this treatment works, how long will he live?

At 66, Vetter, a Milwaukee area private labor attorney, is no Lance Armstrong.

He looks trim and fit, hardly like someone who had been battling an often fatal disease for more than two years.

The Process

The treatment Vetter underwent lasted about an hour, "the most tolerable duration," according to T. Clark Gamblin, MD, one of the Froedtert/Medical College of Wisconsin cancer surgeon who operated on Vetter.

The trick is to get the right mix of chemo, heat, and time so to be lethal to cancer cells without causing too much harm to healthy liver cells. While some normal liver cells may die, that's acceptable because the liver has the ability to regenerate tissue.

"You are putting the liver on bypass," said Kiran Turaga, MD, a Froedtert/Medical College cancer surgeon. "It's like the liver is out of the body."

Vetter's surgery was the second such case at the hospital and the latest in a long line of treatments he has tried.

As a veteran of the cancer war, he knows he will be undergoing continual monitoring in the months to come.

He also says he understands there is no way to know how much the treatment will help.

"I have not changed much of anything about the way I live my life," he said in a recent interview from his Milwaukee area home. "My goal is to be sitting in this room in 20 years."



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 [trond hildahl](#) - Nov 21, 2011

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The information in this report will help me diagnose and treat patients effectively.
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