Medical Xpress

Fighting cancer with light

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Gloria Correa has tried all the standard weapons in her war against cancer: chemotherapy, radiation, and finally surgery.

But when a surgeon opened her up last fall to cut out the deadly tumor that was squeezing her bile duct, he saw that it had engulfed nearby arteries. It was impossible to remove.

Now Correa is trying a gentler-sounding approach at Thomas Jefferson University Hospital: light.

First she was infused with medicine that made the tumor cells light-sensitive. Two days later, physician David Loren carefully threaded a flexible fiber down through her intestines and bathed the cancerous mass with the glow of a red laser.

Called photodynamic therapy, the technique represents part of medicine's continuing quest for treatments that target tumors while sparing the rest of the body from unpleasant side effects. Though far more common in Europe, this light-based therapy is gaining proponents in the United States, where it has long been approved for treating certain lung and skin cancers.

Loren is among the researchers who seek to expand its use. He is participating in a University of Virginia-led effort to gain approval to use it on bile-duct tumors.

Separately, researchers at University of the Sciences in Philadelphia are

using the technique to combat prostate cancer in lab animals.

Correa, 54, of Langhorne, feels like something of a lab animal herself. She is among just a handful of U.S. patients who have gotten the treatment for bile-duct cancer (cholangiocarcinoma), and at first she was a little hesitant.

So were her two sons, both in their 20s.

"They asked me if I was going to glow in the dark," she said, before undergoing the first of several treatments last month.

No, but the therapy does have one significant side effect:

The medicine that makes the tumor cells sensitive to light has a similar effect on the rest of the body. Regular cells excrete the medicine more quickly than do cancer cells, yet the kind of drug Correa received still had a fairly long impact. She would have to stay away from bright light for several weeks, or else suffer a bad sunburn.

So when Correa arrived at Jefferson for her first encounter with the laser, she wore a floppy, wide-brimmed hat and dark sunglasses.

GRIM PROGNOSIS

The bile duct plays a key role in digestion, ferrying bile salts from the liver to the small intestine, where they help break down fats.

Developing a tumor in this duct is a grim fate, as it chokes off the path to the intestine, eventually leading to jaundice, malnutrition, and often infection. Such cancers kill more than 4,000 people in the United States each year -- though it is likely even more common than that, as some patients are misdiagnosed with pancreatic cancer, says Michel Kahaleh,

a bile-duct expert at the University of Virginia School of Medicine. He is seeking funds for a trial at 15 medical centers, including Jefferson.

Typically the first sign something is wrong is jaundice. By that time the disease is often too far along for surgery, says Loren, director of endoscopic research at Jefferson.

Chemotherapy and radiation can buy some extra time for the patient, but Correa had been through that already and wanted no more of the nausea and other side effects. So she agreed to try light.

In a randomized European study, photodynamic therapy had extended the life of patients with inoperable bile-duct cancer by more than a year, on average -- in some cases several years. It worked so well that the trial was stopped early.

During that time, the patients reported having a better quality of life. And unlike with radiation, there is no limit to how much the body can take. Patients can repeat the process as much as needed.

(Loren says the laser-light therapy, which costs about $5,500 per treatment and is covered by most insurers, need not be viewed as an alternative. Willing patients can receive it in addition to chemo and radiation.)

Correa received her infusion of the light-sensitizing medicine, called porfimer sodium, on Dec. 15. Two days later, she was placed under anesthesia, and Loren inserted an endoscope down her throat and into her small intestine.

X-rays revealed that the tumor had reduced the flow of fluids through her bile duct down to a trickle. Upstream of the tumor, two branches of the duct were swollen with backed-up fluid and measured six times their

normal width.

First, Loren removed two slender plastic stents that were propping open Correa's bile duct. He then put on dark glasses for eye protection, turned on the laser, and guided the illuminated fiber down through the scope and up into the duct where the stents had been.

He held it there for 12 { minutes, shining red light into the tumor from within the narrow duct that it surrounded.

"The beauty of this is, we're right there," Loren said as he held the laser in place. "We're touching tumor."

Afterward he replaced the stents. Inside the medicine-infused tumor cells, the light had stimulated the production of a toxic form of oxygen. Within days, dead tumor cells would be discarded and carried away through Correa's digestive system.

The light from the laser cannot penetrate very far, and so much of her tumor remained unaffected.

"We're coring out the apple," Loren says. "We're not treating the outside."

Still, the doctor thought it would extend her life, and make her feel better in the process.

For some other cancers, at least in the early stages, photodynamic therapy can eliminate the malignant growth entirely. This is true for lesions of the skin and esophagus, and also for some superficial lesions of the lung, said pulmonologist Michael Unger, who uses the technique at Fox Chase Cancer Center in Philadelphia.

At University of the Sciences, Bin Chen has had some success using the approach on prostate cancer in rats and mice. He uses a laser to target the blood vessels that supply a tumor with nutrients, and recently won a four-year, $718,000 grant from the American Cancer Society to pursue the work.

The medicine being given to the bile-duct patients at Jefferson is not approved for that purpose by the Food and Drug Administration. But doctors are allowed to give it on an off-label basis. The hope is that the hospital will soon be testing it in a trial led by the University of Virginia, assuming it receives funding.

In the meantime, Correa says she has some good days, some bad. Often she is tired, but feels better than she did during chemo.

For the first few weeks, she stayed in the house until 5 p.m. each day, and she kept away from her sunlit back room. Twice, she wasn't careful and got a sunburn on her face.

Now life is starting to return to normal -- as normal as it can be for someone with bile-duct cancer.

One of her sons asked her to promise that she was not going to die.

Her response, she recalls, was this:

"I can't promise you I'm not dying. I can promise you I'm doing everything I can to live."

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