

## Doctors tout NanoKnife for easy tumor removal

February 5 2010, By Fred Tasker

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A University of Miami doctor recently removed two cancerous tumors from a patient's liver using only three needle-like probes, a computer and a powerful burst of electricity.

His instrument was the NanoKnife -- not really a knife at all, but yet another new use of nanotechnology, the science of dealing with particles and dimensions down to the [atomic level](#).

The patient, Maria Gomez of Delray Beach, Fla., went home the next day with little pain and no bleeding. She has a good chance of avoiding the [liver transplant](#) that was being considered before the operation in early January, says Dr. Govindarajan Narayanan, chief of vascular interventional radiology at the UM Miller School of Medicine.

"I think it's the best procedure," Gomez, 67, said a few days after the procedure. "I studied this. It's my life."

"Rather than using surgery or a transplant, we decided to try this non-invasive technique," said Narayanan. "We did a scan afterwards and it looked very good. In a month, we'll get another scan."

Narayanan is enthusiastic about the NanoKnife. It allows doctors to excise primary tumors that until now were considered inoperable, and can be used on tumors that have spread from cancer in other parts of the body, he said.

The UM center got its NanoKnife late last year, becoming the first facility in Florida and fourth in the United States to use one. Developed by AngioDynamics of Queensbury, N.Y., the device costs about \$300,000; each probe costs \$2,000.

Narayanan calls the NanoKnife "a major step forward in [cancer treatment](#)."

"We're still in the early stages of using it," he says. "It's good for tumors less than five centimeters; for really big tumors it's less good. My guess is it will be very effective in selective patients."

Dr. David Hays, a radiologist in Little Rock, Ark., who also uses the NanoKnife, agrees on its importance.

"It adds to rather than replacing the methods we're using today," he says. "When you take them all together, I believe they can increase cancer survival rates."

The NanoKnife is a series of needle-like steel probes with an electrical generator, a computer with monitor and a couple of foot pedals to operate it.

The "nano" aspect of the procedure is that the electrical pulses poke infinitesimal holes in the tumor's cellular walls, causing them to die naturally and be routinely discarded by the body.

"The liver regenerates in the area where we removed the [tumor](#)," Narayanan says.

In his operation on Gomez, Narayanan watched the monitor of a CT scanner to precisely position three probes around the first of her tumors. He then used the NanoKnife's computer and monitor to precisely set the

electrical pulse, then triggered it with a foot pedal. In a minute or so, the tumor was destroyed. He then used two probes on the smaller tumor.

Gomez was then brought out of general anesthesia.

"She woke up, had some Jell-O, slept through the night, got up, brushed her teeth and went home," he says.

"I feel fine," Gomez said a few days after the procedure.

The new procedure was much less arduous than surgery used in 2006 to remove an earlier tumor in her liver. When the tumors recurred, doctors first recommended a transplant. Then Narayanan suggested the NanoKnife.

"I chose to avoid the transplant if I could," Gomez said.

Doctors hope that, because of its precision, the NanoKnife will be more likely to remove an entire tumor, leaving the patient cancer-free.

They say it's easier on patients than previous methods. A few years ago, Gomez's tumor would have called for major surgery. More modern, less invasive methods such as radiofrequency ablation or cryoablation attack the tumor with extreme heat or cold, which can damage healthy surrounding tissue. The NanoKnife creates no heat or cold, avoiding such damage. And Narayanan says there's a large artery running very close to the liver that could be damaged by the other techniques.

Hays, the Arkansas radiologist, agrees that, since the NanoKnife creates no heat or subfreezing temperatures, it can be used in some patients who can't undergo radiofrequency ablation and cryoablation.

Those methods "do well in killing the cancer," Hays says, "but they cause

significant collateral damage to surrounding blood vessels, arteries and bile ducts. So there are some patients we can't treat with those methods."

While Narayanan used the NanoKnife for a liver tumor, doctors in other states and countries also are using it for tumors of the lung, kidney and prostate. In the prostate procedure, they hope the device's precision can spare surrounding nerves and maintain continence and sexual function.

"There's a lot of work going on to see what it can do," Narayanan said.

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