

# Intelligencer Journal

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## Device helps prevent cancer

Mark Johnston's lightbulb flashed on. He was at a medical conference taking in other physicians' new treatments for a deadly throat condition. That's when it came to him — what if he could freeze off precancerous cells lining the esophagus?

Johnston, then a physician with the U.S. Navy, went home and built a gadget in his garage that would spray liquid nitrogen through a catheter connected to an endoscope that could be guided into the esophagus, the muscular tube that carries food and liquid from mouth to stomach.

That's how Johnston's self-dubbed "Cryoblaster" was born, and that marked the start of Johnston's crazy ride to invention.

"It's been quite a saga, actually ... for a lot of reasons," said Johnston, 49, now a physician with Lancaster Gastroenterology Inc.

In the early 1990s when his lightbulb lit up, Capt. Dr. Johnston was at National Naval Medical Center in Bethesda, Md., caring for about 200 patients who suffered from Barrett's esophagus, a potentially deadly condition often resulting from chronic acid reflux, a condition in which cells lining the esophagus can become cancerous.

At the time, standard treatment for esophagus cancer was an esophagectomy, a gruesome surgery in which the entire esophagus is removed and the stomach is moved into the chest and attached to the neck.

Even at the best medical centers, Johnston said, an esophagectomy still carried a 5 percent mortality rate. In the best case, the surgery was much more difficult than open-heart surgery and required a long recovery time. And a patient is never really the same again. "So, I thought, why not get rid of the Barrett's before it turns into cancer?" Johnston said.

He said he knew researchers were already experimenting with lasers, heated probes and other methods of destroying the lining of the esophagus, after which, it would naturally grow back without precancerous cells.

"A lightbulb went off — the unifying principle was controlled damage of the esophagus," Johnston said. "But by freezing, there would be a delayed injury of two to three days, and then the lining sloughs off. Because the injury is delayed, the patient experiences less pain." When Johnston tried out his Cryoblaster on pigs, it not only worked, it worked remarkably well.

Over the last 25 years, the incidence of esophageal cancer has increased in the U.S. and Europe more than any other malignancy — meaning Johnston's invention could be the vehicle to make his mark on medicine and make him a rich man.

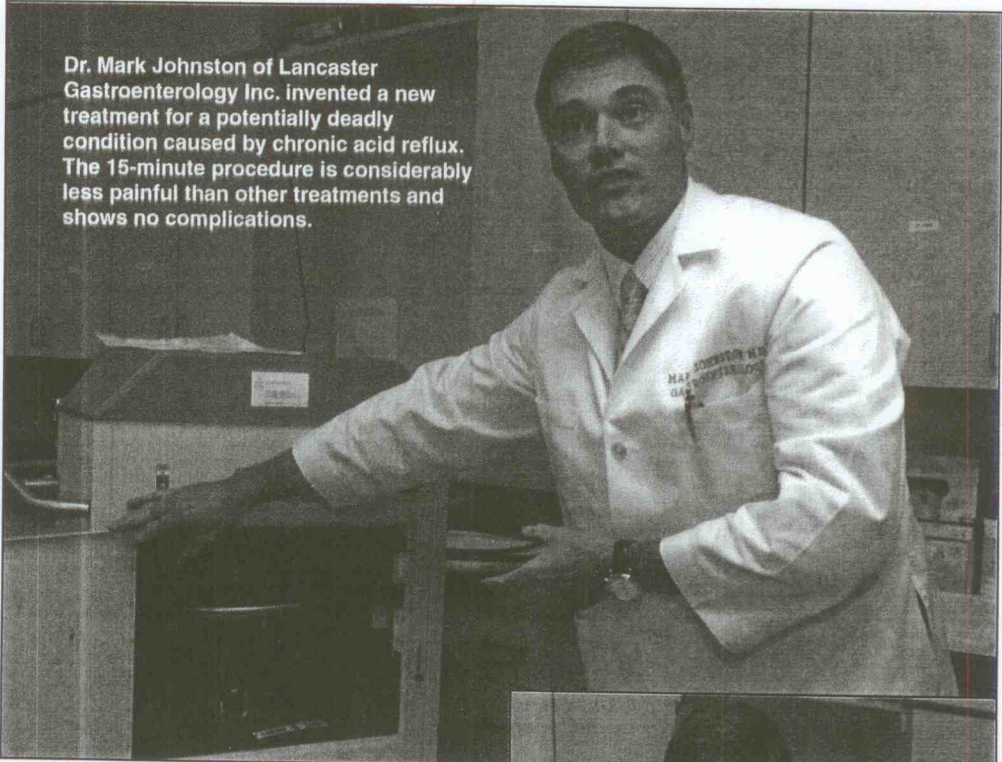
"I didn't realize I was onto something this big," Johnston said. "A friend of mine said, 'Mark, you have to patent this.'" That's when things started to get sticky.

"I was a Navy officer at the time, so basically, I belonged to the government, and everything I did belonged to the government," Johnston said. "I battled the Navy over who the patent belongs to, but eventually, they let me have it because it doesn't kill anybody." That's Johnston's funny answer, but there's a little truth in it.

Johnston said the Navy did eventually relinquish its claim to all three patents related to his device because he built it in his garage, not on government property; because he was hired by the government as a clinical doctor, not a researcher; and because the Navy didn't have sufficient interest in pursuing ownership.

But there was another catch that would twist Johnston's path again. As inventor of the device and treatment, it would be a conflict of interest for Johnston to have a hand in research and development of it if he also earned royalties from its success.

While large research facilities have teams to handle



**Dr. Mark Johnston of Lancaster Gastroenterology Inc. invented a new treatment for a potentially deadly condition caused by chronic acid reflux. The 15-minute procedure is considerably less painful than other treatments and shows no complications.**

research investigation so an inventor may avoid conflict of interest, the Navy does not. The Navy gave Johnston the choice of taking the royalties and not having a role in the research investigation or relinquishing royalties and taking part in its research. Johnston decided to take a role in the research and sign over the royalties to charity. "I think (the Navy) did the best they could, but their decision was probably not totally right," Johnston said.

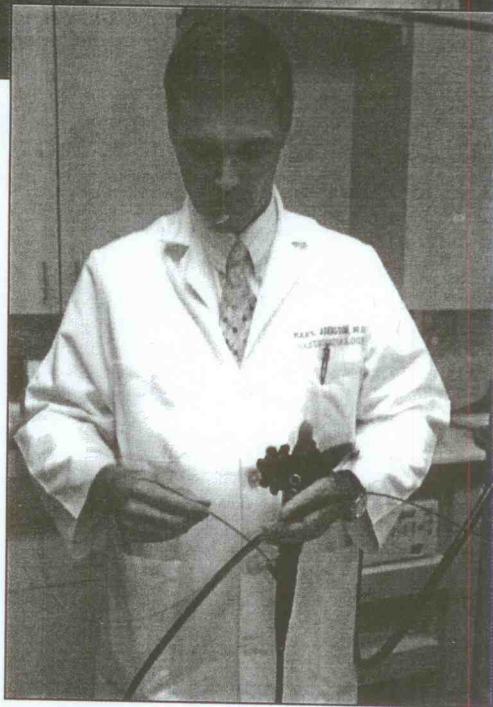
CSA Medical of Baltimore is manufacturing and marketing his device, and Johnston's royalties are now set up to funnel into his nonprofit Christian charity, Johnston's Hope Foundation, which performs medical missions work in developing countries. And that has made his struggle to bring his garage-born "Cryoblaster" to market worth it.

Next month, Johnston and his family head to Kenya, where he will train physicians there to use the device. And there's great potential down the road. Johnston said Kenya, Iran and China lead the world in incidence of esophageal cancer, where patients can be as young as 30 compared with American patients who tend to be in their 60's or older.

So far, Johnston has successfully used his freezing method on three patients at Lancaster Gastroenterology, which he joined in September 2005 after retiring from the Navy. While the device is approved by the U.S. Food and Drug Administration, CSA Medical is holding multicenter trials at major U.S. medical centers, and Johnston is heading part of that trial at Lancaster Regional Medical Center.

"We have enough data right now to know it works," Johnston said. "We know it's a cheaper treatment, and it's better tolerated. Now we need long-term data."

In spite of the roller-coaster ride to get here, Johnston holds no grudges. "Basically, I started out with a problem I was trying to fix, and it took on a life of its own," he said. "People always say to me, 'Oh, you're going to get



(Above) Dr. Mark Johnston threads part of his new medical invention through an endoscope.

rich.' I say, 'No, I'm not.' But honestly, I feel I'm wealthy in other ways."

In the end, Johnston credits the power that turned on his lightbulb, not the light that resulted.

"God gave me this idea, and I wanted to honor him in a real way as a personal conviction," he said. "I was committed to giving that money to charity. God has made me very prosperous by giving all this to me."