New alternatives for detecting and treating esophageal cancer

Diagnosed early, esophageal cancer is usually curable. But for about 90 percent of patients, early detection and treatment are missed, and the outcome is fatal

BY **JANE E. BRODY**
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Half a century ago, my grandmother died of esophageal cancer. For decades preceding her death, a bottle of milk of magnesia was her steady companion because she suffered daily from heartburn, now known as gastroesophageal reflux disease, or GERD. But many years passed before a link was clearly established between chronic irritation of the esophagus by stomach acid and this usually fatal cancer.

Now that the role of acid reflux is well known in cancer risk and unpleasant conditions like chronic cough and hoarseness, drug companies market several products, prescription and over the counter, that are far better able to control the backup of stomach acid than milk of magnesia. And gastroenterologists now know to be on the alert for early signs of trouble among patients who suffer from GERD.

The cancer that results from chronic reflux is preceded by a benign condition called Barrett's esophagus, a cellular abnormality of the esophageal lining that can become precancerous. If untreated, about 10 percent of patients with Barrett's esophagus eventually develop esophageal cancer, the US' fastest-growing cancer. In the last four decades, the annual number of new cases has risen 300 percent to 500 percent.

The American Cancer Society estimates that 16,470 new cases of esophageal cancer will be diagnosed in the US this year and that more than 14,000 people will die from it.

Diagnosed early, well before patients develop swallowing problems, esophageal cancer is usually curable. A cure is most certain if the problem is detected and corrected before or during the advanced precancerous stage. But for about 90 percent of patients, early detection and treatment are missed, and the outcome is fatal.

DETECTING TROUBLE

Unfortunately, the esophagus, unlike more accessible body parts like the breast and skin, is not very easy to monitor. In the traditional exam, called gastrointestinal endoscopy, the patient is heavily sedated, usually in a hospital, and a scope the diameter of a garden hose is inserted through the mouth into the esophagus.

For patients with GERD who have already developed Barrett's esophagus, annual endoscopy is recommended to check on the health of esophageal cells. If a biopsy indicates an impending or existing cancer, the usual treatment is a rather challenging operation in which all or part of the esophagus and the upper part of the stomach are removed and the remaining parts of the digestive tract are reattached.

Another technique uses light therapy to destroy the inner lining of the esophagus, which can result in scarring and strictures that impede swallowing.

After this treatment, patients must stay out of sunlight and direct artificial light for about six weeks to avoid severe sunburn on exposed skin.

NEW METHODS

But now there are simpler and safer alternatives for both detecting and treating an esophageal problem even before it becomes a serious precancer.

A colleague who suffers from chronic reflux recently underwent the new detection method, called TransNasal Esophagoscopy, or TNE. It can be done safely and effectively in a doctor's office, and it does not require sedation or involve loss of a day's work. Nor does it leave the patient with a sore throat.

"Surprisingly easy," was how my colleague described it. "I had an exam that involved sending a tube, slim as a wire, with a camera, down through a nostril."

His doctor, Jonathan E. Aviv, medical director of the Voice and Swallowing Center at New York-Presbyterian Hospital/Columbia University Medical Center, said he and other ear, nose and throat doctors around the country started using the technique in the mid-1990s.

"Patients are examined awake, sitting upright in a chair," Aviv said in an e-mail message. "An ultra-thin flexible scope, the size of a shoelace, is placed via the patient's numbed nose past the throat and then into the esophagus, thereby avoiding the powerful gag reflex which sits in the mouth."

Aviv described the technique as a triple bonus: One that avoids the risk of anesthesia and loss of work time for patients, increases the efficiency of medical practice for doctors and reduces the costs to insurers.

Even newer than TNE is a technique that can both diagnose and, using radiofrequency energy, treat abnormal cells.

Joseph Broderick of Hudson, Florida, had suffered for years with periodic attacks of reflux, especially after eating spicy foods.

"I had a bottle of Maalox at the ready to quiet it down," Broderick, 77, said in an interview.

At his doctor's suggestion, he underwent a traditional endoscopy and esophageal biopsy, which revealed the presence of Barrett's esophagus. He was prescribed medical, dietary and behavioral treatment to control reflux and told to return a year later for another test.

But before the second test, he began having pain in his chest. This time, the endoscopy and biopsy found advanced dysplasia, a cellular abnormality that can progress to cancer without warning. A repeat exam three months later found no improvement, and an operation was recommended.

First, Broderick sought a second opinion from John E. Carroll, a gastroenterologist and assistant professor of medicine at Georgetown University Medical Center. Given the treatment options, Broderick said the choice was a no-brainer: burn out the precancerous cells with radiofrequency energy before they become invasive cancer.

The therapy uses a device, produced by BARRX Medical of Sunnyvale, California, that fits on the tip of a gastroscope, with a balloon that expands to fill the esophagus. The device, which has been approved by the US Food and Drug Administration, is coupled to a generator that emits radiofrequency energy deep enough to burn off the inner lining of the esophagus. Normal esophageal cells then form to replace the destroyed cells.

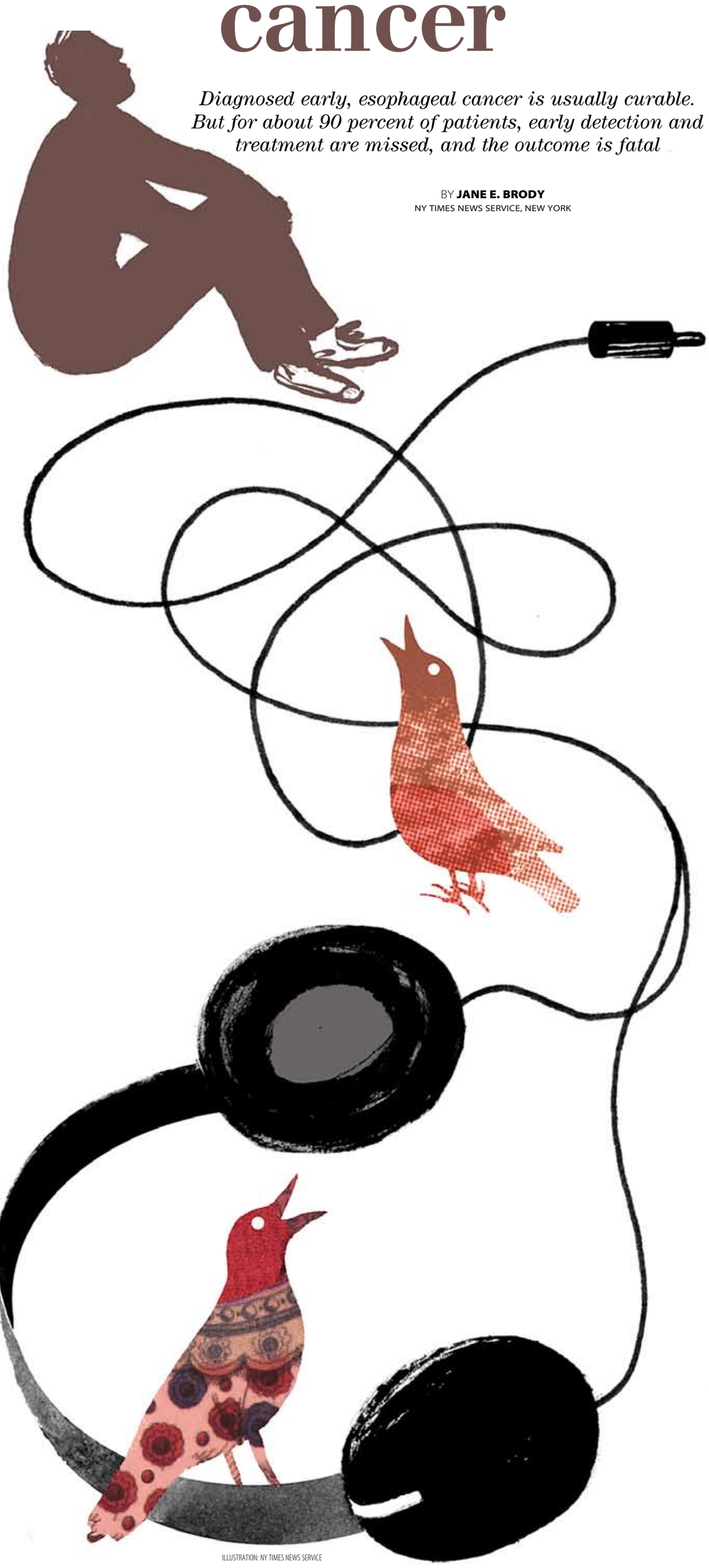
PREVENTION

In a report published this year in the journal *Gastrointestinal Endoscopy*, cellular abnormalities were eliminated in 98 percent of 70 patients with Barrett's esophagus who were treated at eight medical centers around the country. The improvement lasted the duration of the study, up to two-and-a-half years.

In a second study by the same multi-center group, 142 patients with advanced dysplasia were treated. The precancerous condition was eliminated in 90 percent, and the Barrett's cells were destroyed in 54 percent of the patients at one year.

The question now is whom to treat with this technique, since most people with Barrett's esophagus never get the cancer.

"The trouble is, there's no predicting which patients will progress to cancer, and when they do, it's a major cancer that spreads quickly," Carroll said. "So I believe this will become a treatment option for most patients with Barrett's."



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[TECHNOLOGY]

It all began with the squeak of a mouse

BY **JOHN NAUGHTON**
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For everyone who works in computers, today is a significant date. It's the 40th anniversary of the day when Douglas Engelbart, one of the industry's great visionaries, gave an audience of geeks at the Fall Joint Computer Conference in San Francisco their first glimpse of the technological future that we all now inhabit.

In the last few weeks, the mainstream media has been reporting this as the public debut of the computer mouse, which indeed it was. But the truth is that the mouse was really just a sideshow that day. The other innovations Engelbart unveiled included hypertext, object addressing, dynamic file linking, and shared-screen collaboration involving two people at different sites communicating over a network using audio and video. Engelbart was speaking in San Francisco but he was showing, via a video link, what was happening on the computers in his lab 64km away. And in those days, that was a very big deal.

It was, as one attendee, Steven Levy, wrote: "The mother of all demonstrations ... The audience stared into the maw of cyberspace. Engelbart, with a no-hands mike, talked them through it, a calming voice from Mission Control ... The coup de grace came when control of the system was passed, like some digital football, to the Augmentation team at the Stanford Research Institute, 40 miles [64km] down the peninsula. Amazingly, nothing went wrong. Not only was the future explained, it was there, as Engelbart piloted through cyberspace at hyperspeed."

This was 1968. Bill Gates was 12; Steve Jobs was 13.

The computer mouse was a key element in the icon-based interface that we now take for granted, and it was a great success in its day (though Engelbart did not make a cent from it). Last week, for example, Logitech, a leading computer accessories manufacturer, announced that it had shipped its billionth mouse. "It's rare in human history that a billionth of anything has been shipped by one company," Logitech's general manager Rory Dooley told the BBC. "Look at any other industry and it has never happened."

Up to a point, Mr Dooley. What about paperclips, Bic pens and Faber-Castell pencils, to name just three? But it may be that the mouse has had its day. It's not much use with an iPhone, and no good at all when it comes to controlling a video wall. The industry is moving towards new interfaces controlled by touch, gestures, voice and maybe even eye movements. In 40 years, Logitech's latest gesture-based MX Air Mouse will doubtless look as quaint as Engelbart's wood-encased wheel-mouse does today.

Not that he will give a damn. Engelbart has always viewed technology as a means to an end, not an end in itself. The vision that has driven him since he was a radar technician in the US army in World War II is the idea that computers offer a way of augmenting human intelligence — power-steering for the mind. That's why his Stanford lab was called the "Augmentation Lab." He and his team created the mouse-driven interface to make computers easier and more intuitive to use.

In that, at least, they were partially successful. Computers are easier to use today than they were four decades ago. But not much. Most of the world still uses Microsoft Windows — an interface that requires users to press "Start" in order to switch off their computers. And not only do "documents" appear on their virtual "desktops" — so too does the trash can. No wonder technophobes think that computer enthusiasts are weird. They are.

But if progress on making computers easier to use has been limited, we have made even less headway on Engelbart's goal of using them to augment human intelligence. And such progress as has been made comes not from the software that runs on PCs but from the fact that we have found a way of enabling them — and therefore their users — to communicate. In that sense, Wikipedia is closer to an embodiment of "augmentation" than any piece of software ever written. And Google can be seen as a memory prosthesis for humanity — or at least for that part of it that has access to the network.

This morning, Engelbart and his wife will kick off a conference at the San Jose Tech Museum of Innovation to mark the 40th anniversary of his landmark San Francisco presentation. The subject is "collective intelligence." He's a famously prickly character, so my guess is that his reaction will be to observe, as Gandhi famously did when asked what he thought of Western civilization: "That would be a good idea."