Biomarkers And Balloons Help In The Fight Against Esophageal Cancer

Case Western Reserve University

Esophageal cancer is the fastest growing cause of death from solid cancers, primarily because it is hard to detect early enough to be cured. Two new testing methods developed at Case Western Reserve University have the potential to save thousands of lives each year by improving doctors' ability to identify inflammation in the esophagus before it leads to cancer.

In nearly all patients who develop cancer of the esophagus, or the pipe that allows food to pass from the mouth to the stomach, the cancer arises from a precursor condition called Barrett's esophagus, in which the pipe's normal lining is replaced by abnormal cells. Diagnosing Barrett's esophagus lets doctors know that a patient is at high risk for esophageal cancer, which enables them to start treatment that can prevent the cancer from developing.

But most people with Barrett's esophagus don't know they have it until it has led to an incurable esophageal cancer. Until now, the only way to diagnose this disease is with endoscopy, a procedure in which a tiny flexible tube with a tiny camera on the end of it is inserted through the patient's mouth into the esophagus. The camera allows doctors to see if the tissue is abnormal.

Endoscopy is expensive, requires anesthesia, and requires the patient to miss a day of work. That's why more than 90% of esophageal cancer patients never get the opportunity for early treatment that a diagnosis of Barrett's esophagus provides.

Sanford Markowitz, M.D., Ph.D., and his co-investigators, Amitabh Chak, M.D., and Joseph Willis, M.D., at Case Western Reserve University and University Hospitals Cleveland Medical Center in Cleveland, developed two technologies to improve the diagnosis of Barrett's esophagus.

One technology, called EsoCheck, is an innovative way to get tissue samples for testing without the need for endoscopy. Instead of a camera, a small, soft balloon is swallowed into the esophagus and gently inflated so ridges on the outside of the balloon can collect tissue samples. The other technology is a DNA test called EsoGuard that is used to detect genetic markers diagnostic for Barrett's esophagus if present in the tissue sample collected using EsoCheck. In a clinical trial, the combination of EsoCheck and EsoGuard detected more than 90% of patients with early Barrett's esophagus.

EsoCheck and EsoGuard have recently been commercialized and made available to physicians and patients through a license to Lucid Diagnostics, a biotechnology company. The technology transfer office (TTO) at Case Western Reserve University helped connect the researchers with Lucid Diagnostics, and with local partner Nottingham Spirk to develop the balloon-based sample collection device.

The American Gastroenterological Association and the American College of Gastroenterology recently updated their clinical practice guidelines to add Lucid's EsoCheck Cell Collection Device and EsoGuard Esophageal DNA Test as an acceptable alternative to endoscopy.

These innovations were developed with support from programs of the National Cancer Institute, the State of Ohio, the Case-Coulter Partnership, and with collaboration among oncologists, gastroenterologists, and pathologists. The EsoCheck device was recently named a 2020 Edison Award Silver Winner as one of the year's most significant innovations in the Medical Testing category.

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