

Study identifies double-balloon enteroscopy as cost-effective approach for obscure GI bleeding

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A cost-effectiveness analysis conducted by researchers at Stanford University Hospital in Calif., shows that an initial double-balloon enteroscopy (DBE) is a cost-effective approach for patients with obscure gastrointestinal (GI) bleeding. However, capsule-directed DBE (which is when the findings from an initial small bowel capsule endoscopy exam are used to guide the DBE procedure) may be preferred as the initial test due to the potential for fewer complications and decreased utilization of endoscopic resources. The study appears in the November issue of *GIE: Gastrointestinal Endoscopy*, the monthly peer-reviewed scientific journal of the American Society for Gastrointestinal Endoscopy (ASGE).

Endoscopy is a procedure that uses an endoscope -- a thin, flexible tube with a light and a lens on the end to look into the esophagus, stomach, duodenum, small intestine, colon, or rectum, in order to diagnose or treat a condition. There are many types of endoscopy, including colonoscopy, sigmoidoscopy, gastroscopy, enteroscopy, and esophagogastroduodenoscopy (EGD). Capsule endoscopy (CE) uses a pill- sized video capsule, which has its own lens and light source that the patient swallows for examination of the small intestine (or small bowel). The balloon assisted enteroscopy technique is a new method that advances the scope through the small intestine by inflating and deflating one or more balloons, and pleats the small bowel over a tube like a curtain rod. This technique allows for diagnosis and treatment of small intestinal disorders. Balloon assisted enteroscopy can be performed with

one or two balloons. When two balloons are used, the technique is referred to as double-balloon enteroscopy.

"Approximately five percent of patients who present with GI bleeding will have a small bowel source. The expense to manage these patients is considerable," said study lead author Lauren B. Gerson, MD, MSc, FASGE, Stanford University Hospital, Calif. "We performed a decision analysis to explore the optimal management strategy for patients with obscure GI bleeding and found that among the current options for diagnosis and management of small bowel lesions, an initial double-balloon enteroscopy would be a cost-effective approach because of its ability to identify and treat lesions during the initial small bowel examination."

Patients and Methods

The study did not use an actual patient, but rather a model that played out different possible treatment options. The base-case (hypothetical) patient was a 50-year-old man with a six-month history of recurrent melena (stools stained black by blood pigment or dark blood products) and associated iron deficiency. The patient had a prior normal upper endoscopic examination, colonoscopy, and small bowel x-ray series. The patient was considered to be a candidate for a CE, as well as endoscopic or surgical therapy, for presumed small-bowel sources of the bleeding.

A cost-effectiveness analysis is a quantitative method used to evaluate the outcomes and costs of interventions designed to improve health. Researchers in this study used decision analysis software to create a decision flow chart to compare no therapy (reference arm) to five other treatment options: (1) push enteroscopy, (2) intraoperative enteroscopy (done in an operating room requiring a formal surgery), (3) angiography, (4) initial antegrade DBE, followed by a retrograde DBE if the patient had ongoing bleeding, and (5) small bowel CE followed by a DBE

guided by the CE findings. Patients in the CE arm would only proceed to a DBE if they had persistent obscure bleeding after the CE examination. Patients with normal CE examinations and ongoing GI hemorrhage would undergo an initial antegrade DBE, with the assumption that a lesion might have been missed on the prior CE examination. The patients in the no-therapy arm would not undergo any endoscopic interventions.

The analysis was performed from a third-party payer perspective over a one-year time horizon. Facility and professional fees were based on Medicare allowable payments for rural and urban areas for four major markets in the U.S. (Calif., Ill., NY and Ga.). Costs of inpatient hospital services were obtained by using the 2005 Medicare Prospective Payment System diagnosis related group. Only direct health care costs were considered and did not account for the cost of non-health care expenditures such as transportation or time lost from work.

The primary focus of the analysis was cost per quality-adjusted life-years (QALY). The QALY is a number ranging between zero to one, where zero represents the state of death, and one a condition of perfect health. In order to generate a QALY value associated with a particular condition, in this case chronic gastrointestinal bleeding, patients with the condition can be interviewed. Patients are asked how many years or months of their projected life expectancy they would trade in order to achieve perfect health. The QALY is calculated as the current amount of years remaining according to U.S. life tables for a particular individual minus the amount of time traded by the patient, divided by the remaining life expectancy. Prior studies have demonstrated that the QALY associated with chronic bleeding is approximately 0.80.

Results

The main outcomes evaluated included overall costs per model arm,

QALYs, the number of patients with cessation of bleeding, the frequency of endoscopic complications, and the overall mortality. The researchers estimated the probability of death over the course of the year based on age specific death rates from 2003 U.S. life tables in addition to the probability of death resulting from endoscopic procedural complications.

The study showed that the no-therapy arm was the least expensive but was also the least beneficial to the hypothetical patient (in other words, associated with the lowest number of quality-adjusted life-years). The arm that had a DBE performed as the initial procedure was more expensive, but was associated with the greatest number of quality-adjusted life-years and the greatest number of patients with cessation of bleeding. All of the other strategies were less effective than the DBE arm and more expensive (with exception of push enteroscopy and the no-therapy arm, which were both less expensive). The no-therapy arm cost \$532 and was associated with 0.870 QALYs, whereas the DBE arm cost \$2,407 and was associated with 0.956 QALYs, which resulted in an incremental cost-effectiveness ratio of \$20,833 per QALY gained. Cost-effectiveness ratios that are less than \$50,000 per QALY are considered to be associated with favorable strategies and a reasonable health investment; other examples include \$10,000 - \$25,000 per QALY for colon or breast cancer screening (figures according to the American Health Quality Association).

Compared with a DBE, an initial CE was more costly and less effective. Based on these results, approximately 86.5 percent of patients would experience cessation of hemorrhage over the course of a year in the DBE arm compared with 76 percent in the CE arm and 59 percent in the no-therapy arm.

The authors concluded that double-balloon enteroscopy, compared to other imaging modalities for obscure GI bleeding, is a cost-effective

approach based on the capability of administering therapy during the examination and avoiding the additional cost of the capsule examination. The limitation of these conclusions, however, is the current lack of availability of DBE in many centers. In addition, the rate of complications associated with DBE is currently higher (approximately one percent) compared to standard endoscopic procedures. The study notes that because an initial capsule endoscopy reduced the number of DBE procedures and had fewer associated complications, capsule-directed DBE may be associated with better long-term outcomes. The study authors stated that future research is warranted.

Source: American Society for Gastrointestinal Endoscopy

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