

***Harrison's Gastroenterology and Hepatology.***

Editors: Dan L. Longo and Anthony S. Fauci  
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*Harrison's Principles of Internal Medicine* has been in publication, now in its 17th edition, has served as a major source of information covering a broad spectrum of internal medicine for many practitioners and trainees. In its evolution, the book has become nearly 3000 pages, leading to a number of subspecialty extractions that focus on certain specialties. *Harrison's Gastroenterology and Hepatology* is one of the products of that effort. True to Harrison's longstanding tradition, this subspecialty book's coverage of expertise from renowned editors and contributors thoroughly delivers the recent advances and updates in guidelines within gastroenterology and hepatology, relevant to students and clinicians alike.

The format of *Harrison's Gastroenterology and Hepatology* is arranged in 58 chapters and 11 sections written by gastrointestinal specialists who have personally made notable advances in the following fields of their expertise: (I) Cardinal Manifestations of Gastrointestinal Disease; (II) Evaluation of the Patient with Alimentary Tract Symptoms; (III) Disorders of the Alimentary Tract; (IV) Infections of the Alimentary Tract; (V) Evaluation of the Patient with Liver Disease; (VI) Disorders of the Liver and Biliary Tree; (VII) Liver Transplantation; (VIII) Disorders of the Pancreas; (IX) Neoplastic Disease of the Gastrointestinal System; (X) Nutrition; and (XI) Obesity and Eating Disorders. In addition to the didactic value of each chapter, the book is accompanied with a complete atlas of liver disease, 140 high-yield questions, answers, explanations of the correct answers drawn from *Harrison's Principles of Internal Medicine Self-Assessment and Board Review*, and an appendix of laboratory values of clinical importance. Each chapter reflects the analyses by the leading physicians within individual gastroenterology and hepatology topics, bringing attention to the latest information on genetics, cell biology, pathophysiology and treatments available.

Chapter 12 (Gastrointestinal Endoscopy) reviews endoscopic procedures, risks, indications for urgent versus elective endoscopy, and open-access endoscopy

with pictures, images, pathology slides, and radiographic images from endoscopy ultrasound and endoscopic retrograde cholangiopancreatography on a variety of disease entities. Chapter 53 emphasizes nutrition, a focus that is always of great importance, particularly to the trainee within gastroenterology, hepatology, and general medicine practitioners. This chapter outlines information pertinent to protein-energy malnutrition, micronutrient malnutrition, and nutritional assessments. Additionally, Chapter 53 contains detailed charts depicting clinical findings of the malnourished including comparisons of nutritional excess versus deficiency.

Each chapter contains a thorough overview of a specific disease, detailed descriptions of clinical findings and treatment options, and thoughtful clinical approaches based on the latest official guidelines. Certain chapters additionally provide a high-yield summary of highlights to clearly emphasize key points to the discussion at hand.

*Harrison's Gastroenterology and Hepatology* is an extraction of *Harrison's Principles of Internal Medicine* that certainly serves as a perfect counterpart/accompaniment to those interested in this particular field of medicine that is constantly undergoing rapid changing. With the authoritative analyses from leaders within each field of expertise, this book provides a balanced combination of didactic lessons from each chapter combined with appropriate training tools, serving as a needed reference for both trainees and clinicians.

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### Impedance Monitoring in Children: Do Symptoms Correlate?

It is increasingly recognized that multiple intraluminal esophageal impedance recording with pH monitoring (MII-pH) has improved utility in correlating gastroesophageal reflux (GER) events (both acid and non-acid) with symptoms in adults. However, little data is available in children. The authors of this study prospectively evaluated the effectiveness of MII-pH monitoring with GER symptoms. A 6-channel MII-pH probe (Sandhill Scientific, Highlands Ranch, Colorado) was used to detect GER, and symptoms were considered associated with GER if they occurred within 2 minutes of a GER event (before or after). Patients were divided into 3 groups including 1 to 6 months of age, 6 to 12 months of age, and greater than 12 months of age.

A total of 225 patients initially were included in the study although some patients were not included in the final analysis due to lack of symptoms or technical difficulties with the MII-pH probe. There were 2172 symptoms recorded, and 52% were associated with GER (45.5% with acid reflux, 51.5% with weakly acidic reflux, and 3% with alkaline reflux). Over half of enrolled children had at least one symptom associated with GER. Fewer symptoms were reported in those patients with no GER-association compared to patients with symptoms that correlated with GER.

The most commonly reported symptoms were crying, cough, vomiting, and pain. The percentage of symptoms related to GER did not differ in regards to patient age. Children in the first 6 months of age were significantly more likely to have a correlation of GER with weakly acidic GER while older children had more of a correlation with acidic GER. Crying was more likely to be associated with GER in older children compared to infants while coughing and vomiting was more frequently associated with GER in infants compared to older children.

This study suggests that MII-pH is a valuable diagnostic tool in the diagnosis of GER in children. More studies are needed to corroborate these findings;

however, MII-pH will most likely be available in the arsenal of the pediatric gastroenterologist for diagnosing GER. Standardized values for GER diagnosed by MII-pH are needed in this patient population.

(Salvatore S, Arrigo S, Luini C, Vandenas Y. "Esophageal impedance in children: symptom-based results." *The Journal of Pediatrics*. 2010; 157: 949-954).

(Editor's Note: The editor also recommends the interesting editorial that accompanies this article, Putnam P. "Obituary: the death of the pH probe." *The Journal of Pediatrics*. 2010; 157: 878-880).

John Pohl, M.D., editor of "From the Pediatric Gastroenterology Literature" is a member of the Editorial Board of *Practical Gastroenterology*.



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## Remote-Controlled Capsule Endoscope Safely Examines The Stomach

*Feasibility study shows that a magnetic maneuverable capsule is safe and well-tolerated in the stomach of healthy volunteers*

A study from researchers in Germany showed that magnetic maneuvering of a modified capsule endoscope in the stomach of healthy volunteers under clinical conditions is safe, well-tolerated, and technically feasible. Maneuverability of the capsule within the stomach was excellent and visualization of the gastric mucosa, the inner lining of the stomach, was satisfactory in the majority of subjects. Apart from a single experiment performed with a supervising flexible gastroscopist, this was the first study to use the system in the stomach of healthy subjects. The study appears in the January issue of *GIE: Gastrointestinal Endoscopy*, the monthly peer-reviewed scientific journal of the American Society for Gastrointestinal Endoscopy (ASGE).

Data from prospective studies indicate that gastric cancer screening programs may have a positive impact on mortality associated with the disease. Upper endoscopy is the reference method for the detection of gastric mucosal alterations (changes in the lining of the stomach) and therefore might be the most appropriate screening tool. Unfortunately, some view endoscopy as uncomfortable, and worry about low patient compliance. Capsule endoscopy might offer a more “patient-friendly” alternative. However, conventional capsule endoscopies have shown that visualization of the stomach is highly variable.

A conventional capsule endoscope examines the small intestine using a pill-sized video capsule which has its own lens and light source. The camera takes 50,000–60,000 digital images during the procedure. The system consists of an ingestible pill camera (26 × 11 mm), a data recorder, and computer software for interpretation. Images recorded by the capsule camera are transmitted and stored on a data recorder worn by the patient. The images are downloaded onto a computer, where they are then viewed and interpreted by a specially trained gastroenterologist. A wireless colon capsule for visualizing the colon for screening purposes has been developed, but is not currently FDA approved for use in the U.S.

“To address the problems with a conventional capsule endoscope in visualizing the stomach, a new tool for maneuvering the capsule using an external handheld magnet was developed, allowing targeted investigation of all regions of the stomach,” said study lead author Junta Keller, MD, Department of Internal Medicine, University of Hamburg, Hamburg, Germany. “The aim of our study was to evaluate the safety and feasibility of the magnetic maneuvering of a capsule endoscope in a human stomach. We found that the magnetic maneuvering of the capsule was safe and very well-tolerated, with excellent responsiveness of the capsule to movements of the outer magnet so that detailed visualization of the gastric mucosa could be achieved.”

### Methods

The objective of the study was to assess the safety and efficacy of the manipulation of a modified capsule endoscope with magnetic materials in the human stomach by using a handheld external magnet. Ten healthy volunteers (five men and five women) in an open clinical trial at the Israelitic Hospital in Hamburg, Germany, participated in the study. The magnetic maneuverable capsule (MMC) is a modification of a standard colon capsule with magnetic disks inserted inside one of the domes of the capsule. The MMC is activated by a novel radiofrequency switch (replacing the thermal switch previously used to initiate MMCs) and operates at four frames per second from a single camera. It transmits images to the data recorder via a set of sensors placed on the patient’s skin. These can be viewed in real time by using the Real Time Viewer and compiled after the examination into a video by using the RAPID workstation. The external magnet paddle has a single strong magnet.

The study participants swallowed the MMC and sherbet powder to distend the stomach, which flattens the folds of the stomach. The external magnetic paddle was used to manipulate the MMC within the stomach. MMC responsiveness was evaluated on a screen showing the MMC film in real time. The main outcome measurements were safety and tolerability, time the MMC remained in the stomach, its responsiveness to the magnetic paddle, and the area of the stomach lining visualized.

*(continued on page 52)*

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**Results**

The MMC was always clearly attracted by the magnetic paddle and responded to its movements. In seven participants, maneuverability was graded as excellent because the MMC followed the rotating and tilting movements of the magnetic paddle smoothly. It remained in the stomach for approximately 39 minutes (plus or minus 24 minutes). In seven subjects, both the cardia (part of the stomach immediately adjacent to the esophagus) and the pylorus (part of the stomach through which contents are emptied into the small intestine) were inspected and 75 percent or more of the gastric mucosa was visualized (greater than or equal to 50 percent in all of the remaining subjects). The researchers noted that a learning curve was clearly recognizable (identification of MMC localization, intended movements). Some limitations of the study included small amounts of fluid that blocked the view of an area of the stomach called the fundus and gastric distention was not sufficient to flatten all gastric folds. There were no adverse events.

Study participants completed a questionnaire after the procedure, asking about difficulties swallowing, pain or other complaints. Nine participants reported no complaints and one reported mild complaints of feeling pressure. The researchers concluded that remote control of the MMC in the stomach of healthy volunteers using a handheld magnet is safe and feasible. Responsiveness of the MMC was excellent, and visualization of the stomach lining was good, although not complete, in the majority of subjects. The system appeared to be clinically valuable and should be developed further.

**Nestlé Introduces PEPTAMEN® BARIATRIC Formula for the Critically-Ill Obese Patient**

*Experts determine that current formulas do not adequately meet the unique nutritional needs of these patients*

Nestlé HealthCare Nutrition announced the launch of PEPTAMEN® BARIATRIC Formula, a unique tube feeding formula specifically designed for the critically-ill obese patient. The announcement came at the American Society of Parenteral and Enteral Nutrition (A.S.P.E.N.) Clinical Nutrition Week meeting where a panel of experts gathered to discuss the issue of obe-

sity in the critical care setting and the unmet nutritional needs of this patient population. These nutrition leaders agree that current nutrition protocols, and the more than 200 existing formulas, unless manipulated, do not adequately meet the nutritional needs of the critically-ill obese patient.

“More than one in four ICU patients are now obese,”<sup>1</sup> said Dr. Juan Ochoa, Medical and Scientific Director, Nestlé HealthCare Nutrition. “As obesity rates increase across the country and around the world, it is vital to provide clinicians with the information and tools they need to serve this patient population with the best care possible.”

Opinion leaders in nutrition including Stephen McClave, M.D., Roland Dickerson, Pharm.D. and Robert Martindale, M.D., Ph.D. were onsite to discuss the lack of consistent protocols used in nutritional assessment and how to best care for obese patients in the Intensive Care Unit (ICU). They emphasized that despite the proven benefit of proper nutrition intervention, many healthcare providers do not have the resources needed to address the unique nutritional needs of these challenging patients.

Many of the existing tube feeding formulas, for instance, do not contain enough protein or the appropriate micronutrients recommended for this patient population in the 2009 Critical Care Nutrition Guidelines. Experts agree that new formulas, protocols and training should be developed to help assure these patients receive the appropriate amount of nutrients within the optimal energy targets.

“The lack of consistent and appropriate nutrition interventions for the obese, critically-ill patient means that some patients may be overfed, others may be underfed and become malnourished, and others may not have their nutritional needs assessed at all. All of these scenarios can present problems with health outcomes and recovery rates,” said Stephen McClave, M.D., Professor of Medicine, University of Louisville.

Obesity is a serious health concern because of its related complications and co-morbidities, including cardiovascular disease, metabolic disorders such as diabetes and respiratory disease. The increased rate of infections and complications associated with obesity in the ICU can be significant, costly and affect treatment across all settings.

“There is a known benefit with early nutritional intervention in the ICU patient. However, despite having more than 236 formulas, until recently, not one met the recommended amount of protein and calories suggested to help support improved patient outcomes for this patient population,” said Robert Martindale, M.D., Ph.D., Chief of General Surgery, Oregon Health & Science University.

To address this important need, Nestlé HealthCare Nutrition has developed a tube feeding formula, PEPTAMEN® BARIATRIC, with a unique protein-to-calorie ratio specifically designed to help meet the protein requirements of the critically ill obese patient recommended in the 2009 Critical Care Nutrition Guidelines.<sup>2</sup>

PEPTAMEN® BARIATRIC tube feeding formula is the latest addition to the Nestlé PEPTAMEN® family of products. PEPTAMEN® is the only family of peptide formulas with over 50 clinical studies and more than 23 years of clinical experience. For the tube feeding of the critically-ill obese patient, PEPTAMEN® BARIATRIC formula provides 37 percent of calories from 100 percent whey protein, enzymatically hydrolyzed to produce peptides. The lipid blend in PEPTAMEN® BARIATRIC contains 50 percent medium-chain triglycerides (MCT) to support improved formula tolerance and successful enteral feeding.

For more information about PEPTAMEN® BARIATRIC and the PEPTAMEN® family of products, please visit [www.peptamen.com/bariatric](http://www.peptamen.com/bariatric).

1. Hogue et al. *Intensive Care Medicine* 2009;35: 1152-1170.

2. This above statement does not constitute an endorsement of PEPTAMEN® BARIATRIC Formulas or any other Nestlé Nutrition formula by SCCM or ASPEN.

## Results of the Placement of Multiple Endoscopic Stents for Postoperative Biliary Strictures Remain Excellent After Long-Term Follow-Up

*New Study Shows Stricture Recurrence Rate Is Low And Those That Recur Can Be Successfully Retreated Endoscopically*

Researchers from Italy have reported results from more than 10 years of follow-up showing that the

placement of multiple endoscopic stents for the treatment of postoperative biliary strictures remains excellent with a low rate of stricture recurrence after this lengthy period of time. When strictures do recur, they can be safely and successfully retreated endoscopically. The study appears in the September issue of *GIE: Gastrointestinal Endoscopy*, the monthly peer-reviewed scientific journal of the American Society for Gastrointestinal Endoscopy (ASGE).

Most patients with biliary strictures, also called bile duct stricture, remain asymptomatic until the lumen of the bile duct is narrowed to cause resistance to the flow of bile. Bile is a fluid secreted by the liver via the bile ducts and is concentrated in the gallbladder before moving into the intestines. With the advent of laparoscopic cholecystectomy (gallbladder removal), the incidence of bile duct injuries has increased significantly. There are approximately 750,000 cholecystectomies performed in the United States each year. Although biliary strictures may be asymptomatic, if ignored, they can cause life-threatening complications. While strictures of the bile duct can be benign or malignant, approximately 80 percent of benign strictures occur following injury during a cholecystectomy.

Three kinds of treatment for biliary strictures are available: surgical, endoscopic and percutaneous. In 2001, a method for endoscopic management of postoperative biliary strictures was reported that included the placement of multiple stents until stricture resolution. A stent is a short narrow metal or plastic tube in mesh form that is inserted into the lumen of an anatomical vessel (such as an artery or bile duct) to keep a previously blocked passageway open. The initial results of this method were very promising, with a mean patient follow-up of four years.

“We first described endoscopic dilation of postoperative biliary strictures using an increasing number of stents in 2001. A group of 42 patients from that study underwent systematic follow-up, with the last follow-up by telephone in 2009,” said study lead author Guido Costamagna, MD, Digestive Endoscopy Unit, Catholic University, Rome, Italy. “Our current study of these patients confirmed very good results of endoscopic treatment by insertion of multiple plastic stents after a follow-up period of more than 10 years. The stricture recurrence rate was low; if recurrence does occur, it

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may be safely and successfully retreated by endoscopic retrograde cholangiopancreatography.”

### ***Patients and Methods***

The study objectives were to verify results of endoscopic treatment of postoperative biliary strictures at a very long-term follow-up. The study was conducted at a single tertiary-care academic referral center in Italy. A group of 42 patients from the researchers’ 2001 study who had undergone endoscopic dilation of postoperative biliary strictures with a technique employing placement of multiple endoscopic stents, underwent systematic follow-up. The patients were asked to undergo liver function tests and transabdominal ultrasound every six months from the end of treatment, and a telephone interview was done yearly to assess the occurrence of cholangitis (inflammation of the bile duct) and to evaluate the results of liver function tests and ultrasound. These study endpoints were consistent throughout the study period starting from the first series. During the yearly follow-up, patients were asked to provide the researchers with the reports of liver function tests and ultrasound. The last telephone follow-up was done in September 2009. The main outcomes were the occurrence of cholangitis and liver function test evaluation during the follow-up period.

### ***Results***

Of the 40 patients who were alive at the end of the study published in 2001, five patients (12.5 percent) died of unrelated causes after a mean of 6.7 years from the end of treatment, without further biliary symptoms. The overall mean follow-up time for the remaining 35 patients was 13.7 years. Seven patients (20 percent) experienced recurrent acute cholangitis after a mean of 6.8 years from the end of treatment. All seven of these patients underwent endoscopic retrograde cholangiopancreatography (ERCP). Four of the seven patients had postoperative biliary stricture recurrence (11.4 percent of the 35 patients) that was retreated endoscopically with the placement of stents, and the other three patients had common bile duct stones (8.6 percent of the 35 patients) that were extracted. No stricture or bile duct stone recurrences after retreatment were recorded after a mean follow-up period of an additional 7.1 years. Twenty-eight patients (80 per-

cent) remained asymptomatic with normal liver function test results and abdominal ultrasound results after a mean follow-up period of 13.7 years.

The researchers noted that the main limitations of endoscopic treatment of postoperative biliary strictures by the multiple endoscopic stenting method are the need for multiple ERCPs and repeated hospitalizations, leading to high costs and potentially limited patient compliance. In the researchers’ experience, after the risks and benefits of the possible treatments were explained to the patient, with the help of the hepatobiliary surgeon, patients asked for endoscopic treatment and retreatment, if needed.

The researchers concluded that endoscopic stenting with the aim of inserting multiple plastic stents is a reasonable, first-line approach in the treatment of post-surgical strictures; results of the aggressive endoscopic approach to postoperative biliary stricture management after a mean follow-up period of 13.7 years are very good, with 80 percent of patients having excellent results and an 11.4 percent stricture recurrence rate after more than six years from the end of initial treatment. Furthermore, cholangitis in these patients is not always related to postoperative biliary stricture recurrence, but can be secondary to stone formation, as occurred in three of seven (43 percent) of the patients reported in this study.

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