1. Epiphrenic diverticulum is a congenital disorder. (A) True (B) False

2. Epiphrenic diverticula are most often associated with an abnormality of the: (A) Lower esophageal sphincter (B) Ganglion cells (C) Myenteric plexus (D) Vagus nerve

3. Which of the following statements about patients with epiphrenic diverticula is not true? (A) Achalasia and hiatal hernia are common (B) Often associated with dysphagia for solids and liquids (C) Patients may present with chest pain (D) Patients rarely present with dietary restrictions

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5. Transoral incisionless fundoplication (EsophyX) is currently the only endoscopic procedure available for treatment of recurrent reflux. (A) True (B) False

6. It has been estimated that ____ % of patients presenting for bariatric surgery have a psychiatric disorder. (A) <20% (B) >40% (C) <60% (D) >80%

7. Which of the following may indicate that a patient is not a suitable candidate for bariatric surgery? 1. Argues frequently with office staff 2. Missed 4 appointments with the dietitian in 2 mo 3. Separated from spouse during 6-mo period before surgery 4. Gained 10 lb in period preceding surgery (A) 1, 2, 3 (B) 2, 4 (C) 1, 3 (D) 1, 2, 3, 4

8. Which of the following statements about bariatric surgery is not accurate? (A) Gastric bypass and bilipancreatic diversion are better choices than the gastric band for diabetic patients (B) There is little scientific research upon which to base patient screening (C) Crohn disease contraindicates purely gastric procedures (D) Not all patients are good surgical candidates

9. All the following are associated with the endosleeve, except: (A) Weight loss (B) Improvement in hemoglobin A1c (C) Diarrhea (D) Normalization of blood glucose

10. Which of the following statements about the vagal blocking (VBLOC) device is true? (A) Degree of weight loss shown to be dose-related (B) Has too many adverse effects to justify use (C) Has no effect on hypertension (D) Requires that patients adhere to a special diet

Answers to Audio-Digest General Surgery, Volume 58, Issue 01: 1-2, 3, 4, 5, 6, 7, 8, 9, 10

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SURGERY OF THE FOREGUT
From the 9th Annual Surgery of the Foregut Symposium, presented by Cleveland Clinic Florida

Epiphrenic Diverticula: Etiology and Surgical Treatment Options

Thomas W. Rice, MD, Professor of Surgery, Cleveland Clinic Lerner College of Medicine, and Section Head, Department of Thoracic and Cardiovascular Surgery, Cleveland Clinic, Cleveland, OH

Description: acquired abnormality, presumed to arise from obstruction of distal esophagus; false “pulsion” (pushed out) diverticular production at site of weakness (thought to be entry of arterial or venous channel into esophageal wall); commonly associated with motility disorders; classic presentation on right side; frequently associated with achalasia

Categorization of patients: speaker and colleagues reviewed findings on 40 patients; tests included barium esophagography, esophagogastroduodenoscopy (EGD), and biopsy of muscle distal to diverticulum (to evaluate ganglion cell number and evidence of neurologic inflammation and fibrosis); Findings: >80% of patients had abnormality of myenteric plexus; >40% had diminished ganglion cell number and nerve cell damage suggestive of achalasia; nearly 75% had motility disorder detectable on standard manometry; most patients had achalasia, ineffective esophageal motility, diffuse esophageal spasm, nutcracker esophagus, and hypertensive lower esophageal sphincter (LES); >50% had associated hiatal hernia

Cases unrelated to hiatal hernia: 100% of patients with diffuse esophageal spasm (including 3 with ganglion cell loss or neural findings); similar findings in patients with achalasia (however, not all had classic findings; suggests etiology other than myenteric damage alone)

Cases related to hiatal hernia: of 3 patients with nutcracker esophagus, 2 had myenteric plexus abnormalities; myenteric plexus abnormalities also seen in patients with ineffective esophageal motility; patients with no motility disorder most had myenteric abnormalities; of 3 patients with hypertensive LES, 2 had inflammatory abnormalities of nerves

Conclusions: myenteric plexus abnormalities common among patients with epiphrenic diverticula; may be sole finding in patients with no motility disorder or hiatal hernia; isolated epiphrenic diverticulum uncommon (may reflect inability to investigate patients; muscle biopsy at myotomy site recommended; consider high-resolution manometry for all patients)

Operative management: patients presented with solid and liquid dysphagia, regurgitation, chest pain, and heartburn; of 67% of patients operated on by speaker and colleagues, only 15% had unrestricted diet; achalasia and hiatal hernia common; 73% of patients underwent diverticulectomy, myotomy, and partial fundoplication; hiatal hernia not repaired in 3 of 9; required esophagomyotomy — speaker prefers access through left chest (“minithoracotomy”); twist esophagus 180° to bring diverticulum into field; diverticulum sits like mushroom cap on top of esophagus, dissect off to find muscle defect from which submucosa protrudes; speaker prefers open surgery (permits use of pan stapler to encompass entire diverticulum and avoid leaks; more difficult to ensure with laparoscopic approach from below); then perform myotomy

Complications: 33 in 17 patients; pleural effusions, atelectasis, and pneumonia most common; 15% of patients had surgical problems; one patient had leak requiring immediate esophagectomy (leaks disastrous and require immediate management — speaker prefers to bring diverticulum into field; diverticulum sits like mushroom cap on top of esophagus, dissect off to find muscle defect from which submucosa protrudes; speaker prefers open surgery (permits use of pan stapler to encompass entire diverticulum and avoid leaks; more difficult to ensure with laparoscopic approach from below); then perform myotomy

Results: 97% improvement in dysphagia; average improvement in symptom score 2.9; reflux main problem associated with surgery (warn patients that operation should improve symptoms but may induce reflux requiring medication); 67% of patients had unrestricted diet postoperatively

Recurrent Symptoms After Antireflux Surgery: What to Do

Jeffrey L. Ponsky, MD, Olivier H. Payne Professor and Chair, Department of Surgery, and Surgeon-in-Chief, University Hospitals, Case Western Reserve University School of Medicine, Cleveland

Thorough history: determine possible causes (eg, tissue may have stretched in ensuing years, patient may have sustained trauma); get detailed description of timing and nature of symptoms (history more important with recurrent symptoms than with initial surgery) — speak to patients in complete physical examination; determine if lungs clear; check for recent changes in weight

Work-up: not necessary if symptoms mild (start patient on medical therapy; consider surgical therapy for severe symptoms)

Medications: important to determine which medications are necessary after 10 yr (proton pump inhibitors recommended)

Endoscopic therapy: radiofrequency procedure (Stretta) — balloon with metal prongs; muscle of esophagus “burned” (prevents reflex without cutting esophageal wall; more effective than endoscopic devices)

Educational Objectives

The goal of this program is to improve surgical management of epiphrenic diverticula, gastroesophageal reflux disease, and obesity. After hearing and assimilating this program, the clinician will be better able to:

1. Diagnose epiphrenic diverticula.
2. Manage reflux symptoms that recur after antireflux surgery.
3. Identify patients requiring reoperation after antireflux surgery.
4. Recognize patient characteristics that contraindicate bariatric surgery.
5. Cite research on surgical management of metabolic syndrome.

Faculty Disclosure

In adherence to ACCME Standards for Commercial Support, Audio-Digest requires all faculty and members of the planning committee to disclose relevant financial relationships within the past 12 months that might create any personal conflicts of interest. Any identified conflicts were resolved to ensure that this educational activity promotes quality in health care and not a proprietary business or commercial interest. For this program, the following has been disclosed: Dr. Ponsky is a consultant for U.S. Endoscopy. Dr. Shikora is a consultant for Betametam, EnteroMedics, and GI Dynamics. Dr. Rice and the planning committee reported nothing to disclose. In his lectures, Dr. Shikora presents information that is related to the off-label or investigational use of a therapy, product, or device.
Matching patient to procedure: factors to consider include patient's physical and mental health status, current comorbidities, body mass index, comorbid conditions, history of previous abdominal disease, surgeries, or irradiation, behavior and eating habits, and choice of surgeon. Procedures better suited to particular comorbidities (e.g., esophageal bypass surgery for patients with hiatal hernia) may be associated with higher rates of resolution of diabetes than gastric banding; patients with Cronh disease or history of gastric irradiation may experience less nutritional side effects of gastric banding. A multidisciplinary approach may be necessary for patients with multiple comorbidities (consider BPD for patients with history of anorexia or bulimia). Patient characteristics may influence the success of the procedure: studies on factors predictive of success with gastric bypass procedures show conflicting conclusions. Considerations: need for long-term follow-up; some procedures do not succeed every time; currently, no formal means of identifying good or bad candidates; must balance risks and benefits of surgery to patient's lifestyle, personality, and comorbidities.

Effects of Endoelectrode and Neuromodulation in Metabolic Syndrome

Dr. Shikora

Components of metabolic syndrome: diabetes, hypertension, and hyperlipidemia; also associated with nonalcoholic steatohepatitis, including metabolic syndrome; affects almost every organ system; bariatric surgery considered metabolic surgery—improves or resolves many comorbidities. Endoelectrope: permeable or semipermeable, placed in duodenum to secrete insulin from digestive fluids; promises weight loss and improves diabetes control; requires surgery. Implantable gastric stimulator: goal is to achieve gastric motility reprogramming (suggests mechanism of action other than malabsorption). Procedure: sleeve 60 cm in length placed inside stomach, then extended into jejunum, eventually creating duodenal-jejunal bypass; requires passage of guide wire into duodenum, opening of capsule containing device, and deployment and passage of device into jejunum, and fixation of device with nitinol barbs; consistently associated with weight loss of 20% to 30% and improved levels of HbA1c and blood glucose, compared to patients using traditional therapy directions. Neuromodulation: use of electrical pulse stimulator (pacing device) to apply pattern of nerve impulses to target organ; goal is to enhance or inhibit normal physiological responses; effect may be exerted directly on target organ or may be transmitted to other organs. Implanted gastric stimulator (IGS): 2 bipolar leads implanted in lesser curvature of stomach; activated to provide constant, patterned stimulatory current; tested in 800 patients worldwide; overall success limited (did not achieve primary end points in major trials); worked well in small number of patients at speaker's institution; patients reporting regained weight of found to have decreased battery life in device. Tantaussun system: electrodes placed in gastric fundus sense presence of food and activate device to deliver patterned electrical stimulatory current to gastric antrum; modest weight loss (9.4 kg) seen in single small trial; diabetic patients on oral medication experienced 1% drop in HbA1c levels, as well as weight reduction; no significant benefit seen in diabetic patients with a lesion. Vagal Blocking for Obesity Control (VBLOC): electrical leads implanted in vagus nerve, goal is to block all vagal input to brain; 80% of vagal fibers affected with brain from gastrointestinal tract, assumes "default" position of brain with no input, thin gut, both in vivo and in vitro evaluated with 14% weight loss at 6 mo in small study by Camilleri et al; later substudy of Australian patients showed continued weight loss, minimal gastrointestinal side effects in protein, carbohydrate, and fat intake (ie, patients are what they wish, but in smaller quantities). HbA1c levels dropped from 8.7% to 7.8% in 2009, improved in both groups with 1 wk of daily usage; 7% of patients in 1 wk group had minor side effects. Implantation of electrodes into duodenal wall: goal is to manage diabetes; in early pilot studies in animals, delays gastric emptying, increases duodenal flow (duodenal emetopies more rapidly into jejunum), causes some malabsorption of sugars and fats, and decreases blood glucose and insulin levels. Conclusions: vagal nerve is metabolic surgery; endo-electrope, neuromodulation, and other technologies offer novel opportunities to make procedures safer and more palatable to patients; more studies needed to identify full potential.

Patient Selection for Bariatric Surgery

Scott Shikora, MD, Professor of Surgery, Tufts University School of Medicine, and Chief, and General and Bariatric Sur- gery, Tufts Medical Center, Boston, MA

Patient selection criteria: differ according to setting (large academic center provides more support than small private prac- tice, influences decisions to operate on comorbid risk patients). Behavioral issues: most credentialing organizations require multidisciplinary patient selection process; 586% of pa- tients use weight loss drugs, smoking cessation, or dietary behavior modification (various levels of success). Certain behaviors may affect success of surgery (e.g., drug use, compliance skills, low intelligence); concerns or relative contraindica- tions include major depressive disorder, severe mental retardation, severe eating disorder, self-destructive lifestyle (e.g., active bulimia, drug use); literature sparse on evidence of intervention's effectiveness; unclear whether poor candidate can undergo successful behavior- al rehabilitation. Behavioral red flags: patient abusive to staff; misses ap- pointments with support staff (e.g., dietitian, behavioral therapist); unduly impatient to undergo surgery; abuses alcohol or smoking; gains weight during preparative pe- riod; withholds important health-related information; refuses to attend counseling. Psychological classification as a communication disorder: patient-orientation problem, unclear what needs to be improved about patient before operation. Computer-generated screening tool: BaroScreen—developed for research on implantable gastric stimulator; uses classifi- cation and regression tree (CART) analysis (makes predic- tions based on past trends) to aid in patient selection; in prospective trial of 51 cases, patients selected by screen did significantly better on a postoperative weight loss basis than patients subsequently tested in Screened Health Assessment and Paced Evaluation System (SHAPES) trial. Vagal absence and weight loss be- tween patients using implantable gastric stimulator ("on" group) and control group (gastric stimulator implanted but turned off); both groups approved by screening tool; conclusion: screen added little benefit.
Matching patient to procedure: factors to consider include patient's age, body mass index, comorbid conditions, history of previous abdominal disease, surgery, or irradiation, behavior and eating habits, and mental health. In general, procedures more suited to particular comorbidities (eg, gastric bypass for obesity and patients with diabetes; gastric band placement in patients with hiatal hernia) results in higher rates of resolution of diabetes than gastric band placement in patients with hiatal hernia. Patients with Crohn disease or history of gastric irradiation may be better candidates for laparoscopic or endoscopic procedures, which may be associated with less morbidity.

Conclusions: not all patients are good surgical candidates; no procedure is appropriate for all patients; patient selection criteria differ according to setting (large academic center provides more support than small private practice; influences decision to operate on higher risk patients).

Suggested Reading

Audio-Digest General Surgery 58:02

Patient Selection for Bariatric Surgery
Scott Shikora, MD, Professor of Surgery, Tufts University School of Medicine, and Chief, General and Bariatric Surgery, Tufts Medical Center, Boston, MA

Patient selection criteria: differ according to setting (large academic center provides more support than small private practice; influences decision to operate on higher risk patients)

Behavioral issues: most credentialed organizations require multidisciplinary patient selection process; 58% of patients use user-directed procedures as a barrier to bariatric surgery; these procedures may affect surgical success.

Surgical issues: obesity may affect success of surgical procedures; obesity surgery is the most expensive BCS procedure.


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Endoesophageal: permeable or semipermeable; placed in duodenum to secrete insulin from digestive fluid; promotes weight loss and improves diabetes; does not cause diarrhea

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    (D) Requires that patients adhere to a special diet

Answers to Audio-Digest General Surgery, Volume 58, Issue 01: 1-A, 2-B, 3-B, 4-A, 5-A, 6-D, 7-C, 8-A, 9-C, 10-B

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Surgery of the Foregut
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Findings: >80% of patients had abnormality of myenteric plexus; >40% had diminished ganglion cell number and nerve cell damage suggestive of achalasia; nearly 75% had motility disorder detectable on standard manometry; most patients had achalasia, ineffective esophageal motility, diffuse esophageal spasm, nutcracker esophagus, and hypertensive lower esophageal sphincter (LES); >50% had associated hiatal hernia

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Work-up: not necessary if symptoms mild (start patient on medication); swallow barium recommended for postoperative patients; performance of esophageal manometry depends on symptoms (may help identify patients with severe cases)

Endoscopic therapy: radiofrequency procedure (Stretta) — balloon with metal prongs; muscle of esophagus “burned” (pre