



NEWS

SWALLOWING

VOLUME 16

NOVEMBER 2004

NUMBER 2

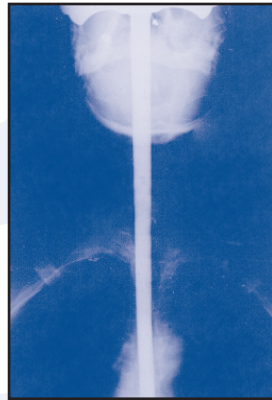
DIRECTOR'S FORUM

ESOPHAGEAL FOREIGN BODIES: INTENTIONAL AND ACCIDENTAL

H. Worth Boyce, M.D.
Professor of Medicine and Director

Intentional swallowing of foreign objects has been widely recognized by the public through observation of the classic circus sideshow sword swallower. The sword swallower has developed the unique ability to position mouth, neck and esophagus to stomach in a straight line and voluntarily relax the cricopharyngeus muscle (upper esophageal sphincter) allowing passage of the sword (Figure 1A & 1B).

For this reason, Adolph Kussmaul selected a professional sword swallower in the year 1868 to be the first person to have an esophagoscopy. He used a 47 cm (approximately 18 inches), rigid open tube to examine the esophagus and upper stomach. Interestingly, there has been only one report of a perforation or full thickness tear of the esophagus in a professional sword swallower. However, foreign objects or "bodies" of many types are swallowed accidentally and for numerous other reasons. Some of these challenging, unusual and risky voluntary and accidental occurrences will be reviewed here.



1A. Anterior-Posterior View of Sword Passed to Stomach

Foreign body ingestion results in about 1,500 deaths annually in the United States. The vast majority (80-90%) of foreign bodies ingested will pass spontaneously through the gastrointestinal tract in 7-10 days without producing complications. This leaves about 10-20% that will require removal by endoscopy and about 1% by surgery. Nearly 75% of all documented ingested foreign bodies are lodged in the esophagus at the time of diagnosis.

The main categories of patients with foreign bodies include: children (75-80%) with most aged 18-48 months, psychiatric illness/suicidal persons, the mentally challenged, prisoners and the edentulous elderly. Alcoholic persons and "party animal" college students are others at risk. In a recent series of 414 adult patients with ingested foreign bodies, approximately 38% were non-food related objects. Seventy-five percent of these objects were found in the esophagus (36% cervical, 19.8% mid-esophagus, and 19.1% distal esophagus).

The accidental ingestion of foreign objects other than food that impact in the esophagus is far less common in "normal" adults than in children, psychotic individuals and prisoners. Prisoners indulge in recurrent, deliberate ingestion

of surprisingly unique foreign bodies for secondary gain, i.e. for a change of environment or for attention. Children on the other hand, may ingest anything because of their primitive desire to feed or curiosity, rather than for any secondary gain. This practice obviously may lead to occult symptoms, signs or complications that are difficult to diagnose unless the responsible physician includes esophageal foreign body in his differential diagnosis of esophageal, cervical and/or thoracic symptoms. The most common esophageal foreign body in "normal" adults is food, especially meat bolus impaction proximal to a benign esophageal stenosis.

Non-food foreign bodies are ingested primarily by children. Any object small enough to swallow is a potential esophageal foreign body. It is truly amazing to learn of this litany of possibilities, including: open safety pins, button batteries, coins, chicken and fish bones, wrist watch, plastic bread bag tab, unopened blister pack with enclosed tablet, dentures, toothpick, toothbrush, metal paper clips and almond/Brazil nuts, among many others. College students have a

propensity for accidental ingestion of coins as a consequence of a flip and mouth-catch game usually played under the influence of alcohol.

Children ingest foreign bodies while playing with them. Elderly patients who ingest foreign bodies most often have their palatal sensation reduced or eliminated by a denture plate. Hence, small objects that may be mixed with food are not sensed on their palate. Adults who have esophageal foreign bodies impacted in the esophagus usually have underlying lesions partially obstructing the esophagus. This is usually not the case in children.

Knowledge of these high-risk groups and a thorough history are paramount for diagnosis since physical examination is not usually helpful. Symptoms may be obvious, subtle or quite occult, especially in children and mentally challenged adults. It is reported that 7 to 35% of children with proven esophageal foreign bodies are asymptomatic. Symptoms that should provoke a suspicion for an impacted esophageal foreign body include difficulty or inability to swallow, increased saliva



1B. Lateral View of Sword Position

production (sialorrhea), chest pain, pressure sensation, feeling of “something stuck”, or low neck pain. Children are more likely to have neck or high chest symptoms while adults have symptoms at any chest level. Aspiration pneumonia, acute onset “asthma”, inability (aphagia) or refusal to swallow, sialorrhea or signs of esophageal perforation represent some of the most occult manifestations of an esophageal foreign body.

Neck and chest x-rays are the initial diagnostic step for suspected foreign bodies in the esophagus. However, it must be remembered that objects such as fish and chicken bones, plastic, most glass, and very thin metal objects are not reliably detected by x-rays. In selected cases, a CT scan of the chest is helpful in identifying non-metallic objects. A negative CT scan has proven very reliable for ruling out the presence of a foreign body. A contrast esophagram is usually not desirable because of the risk of aspiration into the lungs.

Endoscopy is usually indicated whether or not the above studies are positive in patients with symptoms of a foreign body. Urgent endoscopy is indicated if a disc battery or sharp object is impacted. The examination is best performed using a flexible, direct viewing video endoscope. Accessory instruments such as several types of grasping forceps, snares, baskets and an endoscope overtube should be available and tested for effectiveness with an object similar to the one swallowed before the endoscopy begins. Most experts practice and recommend a proper selection of equipment and planning with a “dry run” using accessories to practice grasping a similar foreign body prior to the actual procedure. This process provides the endoscopist and the endoscopy assistant with a feel for both the eventualities that might occur during the retrieval and the suitability of the accessory equipment to be used.

A plastic overtube is a versatile, multipurpose accessory that should be stocked in every endoscopy unit. It is passed over a dilator which is then removed and allows multiple passages of the endoscope. While retrieving sharp objects such as pins, needles, blades, wires, etc., these objects can be withdrawn into and removed via the tube thus protecting the esophageal mucosa from damage.

Ingestion of “button” batteries follows an old axiom, “toddlers put in their mouth what they get their hands on”. “Button” battery ingestion is a relatively new phenomenon. These miniaturized alkaline batteries have rapidly replaced the older cylindrical cells. With electronic toys and quartz watches replacing their mechanical counterpart, these batteries are present in every modern household. They contain a highly concentrated solution of potassium or sodium hydroxide and potentially toxic compounds of mercury and zinc, lithium and cadmium. Over a ten-year period (1982-1992), 2,320 cases of button battery ingestions were reported to the National Button Battery Ingestion Hotline at Georgetown University Hospital’s National Poison Center (1-202-625-3333).

The major mechanism of injury to the esophagus is by leakage of the caustic alkaline solution from the button battery. Esophageal mucosal damage may occur within one hour of ingestion. The longer the duration of contact with mucosa, the deeper the damage is likely to be. It was earlier believed that severity of injury depended in part on the electrical status of the battery. However, one report did not find this to be a determinant of injury in 1,718 cases where the battery status and outcome were both known. Instead, they found that lithium batteries with their larger size and higher voltage (3 volts) were associated with more severe damage.

Due to their potential for causing rapid damage, it is extremely important to keep these batteries out of reach of children. Sixty-six percent of the battery ingestions are in

children younger than six years of age. Children who use a hearing aid require closer supervision because nearly half of the reported ingestions involved a battery from a hearing aid.

Popularity of cocaine as a recreational drug within the United States has resulted in increased smuggling of this drug across international borders. Its abundant availability in South American countries and enormous cost difference between these countries and the United States has resulted in people devising ingenious ways to smuggle narcotics. “Body Packing” or ingesting cocaine-filled latex condoms is one such ingenious method used to conceal the illicit material. Usually each pack contains up to 5 grams of cocaine. Once the “packer” arrives at his destination, the ingested pack is retrieved after it is passed in feces.

The clinical significance of this crime strikes home when things do not proceed as planned. Usually complications of this ingestion arise when the packages rupture or are not passed in feces within 24-48 hours. The cocaine/drug packs are unique in that an endoscopic removal should not be attempted because it may lead to perforation of the pack and release a fatal dose of the drug. Whenever detected, these packs are best managed surgically. The general condition of the patient merits intensive observation and supportive care if some or all of the packs have traversed the esophagus.

Impacted food bolus is the most common type of foreign body encountered in adults. In a majority of cases, a food bolus impacts in the esophagus due to an underlying disorder. The impacted food is usually a piece of meat that is swallowed without careful chewing. Hence, the commonly used terms: “meat impaction” or “steakhouse syndrome”. There is usually a distal esophageal ring or a stricture that prevents the passage of the bolus into the stomach. Patients frequently present several hours after dining at a restaurant or having a big holiday meal. Meat boluses impacted for over 12 hours or those that contain slivers of bone create a higher risk for esophageal perforation during attempts at removal.

An underlying esophageal structural abnormality is present in up to 80% of adults with foreign body impaction in the esophagus. An appropriate therapy of the underlying lesion may thus prevent future recurrences. The lesion most often encountered is an acid reflux-induced esophageal stricture. Mosca et al. found associated esophageal disorders in 30.7% of their 82 patients (stricture-50, hiatal hernia-11, achalasia-11, and Schatzki ring, varices, diverticula, cancer-11). If the ingested object or food bolus is present for more than 12 hours or the esophageal mucosa shows signs of ischemia/inflammation, esophageal dilation, if indicated, should be deferred for at least one to two weeks after foreign body removal.

A schizophrenic patient was reported to have swallowed 461 coins that required surgical removal from the intestinal tract. Most coins pass through the intestinal tract in adults without problem. The U.S. penny has become a high risk coin, not because of its size but due to its metallic composition. Pennies minted before 1982 contained 95% copper and 5% zinc. Since 1982, pennies contain 97.6% zinc and 2.4% copper. Once a penny is in contact with stomach acid, either refluxed into the esophagus or when the penny passes into the stomach, a chemical action degrades the penny by reaction between zinc and stomach acid. This chemical degradation can lead to zinc intoxication.

Prevention of foreign body ingestion is far cheaper, and infinitely safer, than their extraction. Coins and small objects that can be swallowed should be kept out of the reach of infants and small children. A similar strategy for close supervision should be adopted for the mentally challenged and elderly patients.

DYSPHAGIA AFTER ANTI-REFLUX SURGERY – Part 1

Milton C. Johnson, M.D.

The goal of anti-reflux surgery is to restore competence of the lower esophageal sphincter (LES) preventing reflux of acid gastric contents into the esophagus. The primary indications for anti-reflux surgery include: 1) persistent symptoms of gastroesophageal reflux disease (GERD), i.e., heartburn, regurgitation, chest pain, refractory to medical therapy; 2) complications of GERD [ulcerative esophagitis, esophageal stricture, columnar-lined (Barrett) esophagus with intestinal metaplasia], and pharyngeal-laryngeal-pulmonary (“above the esophagus” or extraesophageal) disease; and 3) regurgitation, chest pain, or heartburn in association with paraesophageal (lying next to the esophagus) or large incarcerated (entrapped or pinned) hiatal hernia.

The most common side-effects associated with anti-reflux surgery include the following: 1) inability to belch or vomit; 2) increased flatus; 3) symptomatic gas-bloat, and 4) dysphagia. The most common anti-reflux operation performed is the laparoscopic Nissen fundoplication. The fundoplication procedure involves creating a surgical wrap with the upper part of the stomach wrapped around the lower end of the esophagus to create an improved barrier.

Transient dysphagia (swallowing difficulty) following Nissen fundoplication occurs in 39% to 50% of individuals and may occur in up to 70% postoperatively. Spontaneous resolution of dysphagia typically occurs within two to three months following anti-reflux surgery in the majority. In these individuals, no therapy or intervention is required. Persistent dysphagia occurs in 3% to 24% of individuals. Dysphagia after anti-reflux surgery occurs less frequently with a shorter (1 cm length) as compared to a longer (4 cm length) wrapped segment.

Dysphagia after anti-reflux surgery may occur due to the following conditions: 1) a fundoplication that is too long or too tight; 2) poor mobilization and fixation of the fundus (upper stomach); 3) a slipped or displaced fundoplication. Immediate post-fundoplication (after the surgical wrap) dysphagia may be transient and possibly related to local edema.

There is no precise term to define a change in the integrity (wholeness) of the fundoplication. Most studies, however,

describe a “slipped” fundoplication as one that has pulled out of its attachments and has slipped down onto the stomach or up into the chest. Waring’s group prefers to define a “slipped” fundoplication as any situation whereby the fundoplication is “displaced.”

A proposed cause of a “slipped” fundoplication involves tension on the fundoplication caused by an inadequately mobilized fundus or a shortened esophagus. A fundoplication that results from incorrectly wrapping the fundus around the proximal stomach may also appear to be slipped. The presence of a paraesophageal (lying next to the esophagus) fundic (upper stomach) herniation after fundoplication is indicative of a displaced fundoplication. A slipped or displaced fundoplication occurs in about 9% of individuals following fundoplication.

Diagnostic Studies

The barium esophagram is essential for the evaluation of post-fundoplication dysphagia. A fundoplication is considered slipped or displaced if a gastric pouch or gastric mucosal pattern is seen above the fundoplication during barium swallow examination.

Esophagoscopy (upper endoscopy) complements the barium esophagram in the evaluation of the integrity or wholeness of the fundoplication (slipped versus intact fundoplication). A fundoplication is considered slipped or displaced if the gastroesophageal junction or gastric remnant is found above the level of the fundoplication with a straight-on or retroflexed (looking backwards) view during upper endoscopy. One third of the patient group with dysphagia studied by Waring had evidence of a slipped fundoplication on barium swallow. Fourteen percent of patients with a slipped fundoplication were diagnosed only by upper endoscopy examination.

Esophageal manometry or motility study is employed in the assessment of dysphagia following fundoplication. The absence of normal propulsive contractions may be an important cause of dysphagia symptoms. The etiology may be related to factors associated with the wrap or a primary motility disorder not discovered before the surgical wrap is performed.

Part 2 of this article will be continued in our next issue.

CONTINUING MEDICAL EDUCATION

The Center for Swallowing Disorders has continued active participation in graduate medical education by lectures at regional, national and international meetings and by contributions to the medical literature.

Lecture Presentations by CSD Staff

December 18, 2003: Grand Rounds, Georgetown University Hospital. Achalasia: Evolution, Evaluation, Eventuation. Washington, D.C. (Johnson)

December 4-6, 2003: 5th Annual Update for Clinicians. New Horizons in Management of Esophageal and Gastric Disorders: 1) Endoscopic Diagnosis of Barrett Esophagus and Biopsy for Dysplasia – Where, When and How? And 2) Esophageal Strictures: Diagnostic Clues and Caveats for Therapy. Orlando, FL (Boyce)

December 4-6, 2003: 5th Annual Update for Clinicians. New Horizons in Management of Esophageal and Gastric Disorders: 1) Achalasia and Its Variants – Clinical, Radiographic, and Manometric Features and 2) Endosonography for Esophageal and Gastric Diseases. Orlando, FL (Johnson)

March 12-14, 2004: Louisiana GI Society and American College of Gastroenterology Postgraduate Course. Treatment of difficult esophageal strictures. New Orleans, LA (Boyce)

April 16-17, 2004: 4th Annual Esophageal Summit, Esophageal Diseases: What’s New and Controversial. Cleveland Clinic Foundation. 1) Endoscopic Overview of the Esophagus in Health and Disease and 2) Esophageal Strictures and Foreign Bodies. Cleveland, OH (Boyce)

April 24, 2004: Update on Gastrointestinal Diseases – Postgraduate GI Course 2004. University of South Florida. Current Management of Gastroesophageal Reflux Disease. Tampa, FL (Johnson)

May 18, 2004: Digestive Disease Week AGA Committee Sponsored Symposium: Should We Stratify by Ethnicity: Studies in Digestive Disease. New Orleans, LA (Johnson)

May 27, 2004: Gastroenterology Grand Rounds, Mayo Clinic. Difficult Esophageal Strictures: Diagnostic Clues and Therapeutic Caveats. Rochester, MN (Boyce)

(Continued on the next page)

CONTINUING MEDICAL EDUCATION (Continued from page 3)

Contributions to Medical Literature

Boyce GA, Boyce HW. Esophagus: Anatomy and structural anomalies, Chapter in: Yamada T, Alpers DH, Laine L, Owyang C, Powell DW, eds. Atlas of Gastroenterology, 3rd Edition. Lippincott, Williams & Wilkins, Philadelphia, Pennsylvania, 2003, pp163.

Boyce HW. Focal point: Oesophago-cardial transition, Chapter in: Hagemuller, Manns, Musmann, Reimann, eds. Medical Imaging in Gastroenterology and Hepatology – Falk Symposium 124, Kluwer Academic Publishers, United Kingdom, 2003, pp.

Bloomston M, Durkin A, Boyce HW, Johnson MC, Rosemurgy AS. Late follow-up after laparoscopic Heller myotomy: Early results do not necessarily predict long-term outcome. Am J Surg 2004;187:403-407.

Boyce HW. Benign oesophageal strictures and caustic oesophageal injury, Chapter in: Weinstein, Hawkey, Bosch, eds. Gastroenterology and Hepatology: The Modern Clinician's Guide. Elsevier Science, United Kingdom (submitted 2/04).

Boyce HW. Dysphagia and odynophagia, Chapter in: Weinstein, Hawkey, Bosch, eds. Gastroenterology and Hepatology: The Modern Clinician's Guide. Elsevier Science, London (submitted 2/04).

Boyce HW. Swallowing difficulties: Evaluation and management in the primary care setting. Am Family Physician (submitted 2/04).

Boyce HW, Bakheet M: Sialorrhea: A Review of a Vexing Sign of Oropharyngeal and Esophageal Disease. J Clin Gastroenterol. (Accepted for publication 6/04)

D'Alessio MJ, Fraiji E, Bloomston M, Chambers CM, Zervos EE, Goldin SB, Poklepovic J, Boyce HW, Rosemurgy AS. Esophagram Predicts Favorable Outcome after Laparoscopic Nissen Fundoplication for Patients with Esophageal Dysmotility. Jnl Am Coll Surgeons (submitted 7/04).

6th ANNUAL

UPDATE FOR CLINICIANS

**Disorders of the Esophagus and Stomach:
Challenging Problems and Practical Solutions**

December 2-4, 2004

Location: BoardWalk Inn, Walt Disney World,
Orlando, FL

For further information contact: University of South Florida
Office of Continuing Professional Education
P.O. Box 550610, Tampa, FL 33655-0610
Or Fax to: (813) 974-3217

MEDICAL STAFF

- Director H. Worth Boyce, Jr., M.D.
Professor of Medicine
Hugh F. Culverhouse Chair
in Esophagology
- Medical Staff Milton C. Johnson, M.D.
Associate Professor of Medicine
- Patient Care Coordinator Janet L. Jones, B.A., CGC
Instructor of Medicine
- Assistant Patient Care Coordinator Betsy J. Lamoy, R.N.
- Nurse Practitioner Sarah A. Garza, ARNP
- Office Manager/Research Coordinator Candace K. Harley
- Administrative Secretary Natalie A. Ralyea
- Appointment Secretary Jennifer C. Rust
- Research Assistant Michael Bakheet

**Speech Pathology Consultants for
Oropharyngeal Swallowing Disorders**

- Speech Pathology Joy E. Gaziano, M.A., CCC/SLP
Linda Stachowiak, M.S., CCC/SLP
Vicki Lewis, M.S., CCC/SLP
Melissa K. Czaplá, M.S., CSY/SLP



Joy McCann Culverhouse
Center for Swallowing Disorders
University of South Florida

University of South Florida Health Sciences Center
12901 Bruce B. Downs Blvd., MDC Box 72
Tampa, FL 33612

NON-Profit Organization
U.S. Postage
PAID
Tampa, FL
Permit No. 1632