ARCHIVES OF HELLENIC MEDICINE: ISSN 11-05-3992

CONTINUING MEDICAL EDUCATION
ΣΥΝΕΧΙΖΟΜΕΝΗ ΙΑΤΡΙΚΗ ΕΚΠΑΙΔΕΥΣΗ

Surgery Quiz – Case 54

ARCHIVES OF HELLENIC MEDICINE 2024, 41(5):713–715
ΑΡΧΕΙΑ ΕΛΛΗΝΙΚΗΣ ΙΑΤΡΙΚΗΣ 2024, 41(5):713–715

A. Skarpas,
V. Kyriakidis,
I. Verzoviti,
S. Veneris,
V. Ioannou,
N. Nikolopoulos,
K. Athanasiou,
A.V. Kyriakidis

Department of Surgery, General Hospital of Amfissa, Amfissa, Fokis, Greece

An 83-year-old man presented to the emergency department with difficulty swallowing. The patient was anxious and frustrated. He complained that it appeared mostly when digesting solid food, though he frequently complained about liquids, too. He was given a glass of oral contrast and an X-ray was performed (fig. 1).

Comment

Achalasia is not a common disorder and develops in about 1 in every 100,000 people in the United States of America (USA), per annum and a prevalence of 10 per 100,000. It is typically diagnosed in adults between the ages of 25 and 60, but can occur in children as well (less than 5% of cases are in children under age 16 years old). Men and women are equally affected. For some unknown reason, the incidence of achalasia increases in individuals with spinal cord injury. Most doctors will not encounter a patient with such disorder, which occurs because the lower esophageal sphincter fails to relax. The esophagus also has a marked absence of peristalsis. In less than 50% of patients, the lower esophageal sphincter is hypertensive. This condition causes a functional obstruction at the gastroesophageal junction (GEJ). Achalasia is thought to occur from the degeneration of the myenteric plexus and n. vagus fibers of the lower esophageal sphincter. There is a loss of inhibitory neurons containing vasoactive intestinal peptide (VIP) and nitric oxide synthase at the esophageal myenteric plexus, but in severe cases, it also involves cholinergic neurons.

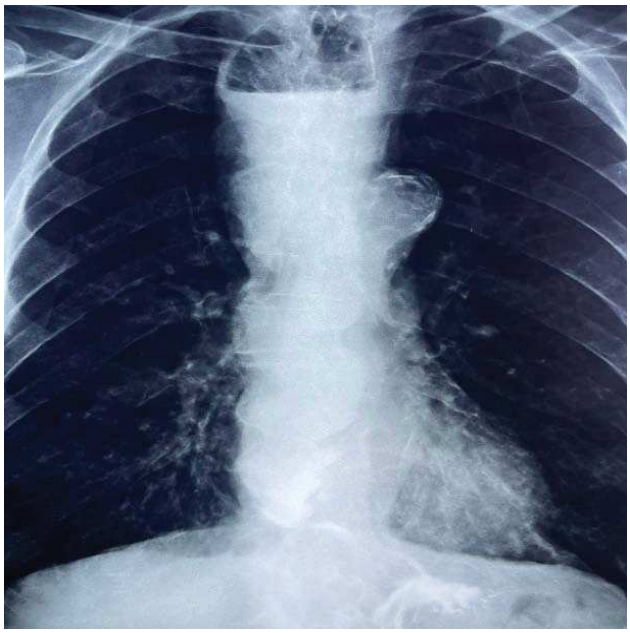

Figure 1.

The transport of food is done from the mouth to the stomach through the esophagus; it also prevents reflux of the contents from the stomach back to the mouth. Peristaltic contractions which are coordinated in the pharynx and esophagus along with the relaxation of the upper and lower esophageal sphincters (LES) achieve the transport. Parasympathetic excitatory and inhibitory pathways innervate the smooth muscles of the lower esophageal sphincter. Modulation of the lower esophageal sphincter pressure and relaxation is achieved by excitatory neurotransmitters, such as substance P and acetylcholine, and inhibitory neurotransmitters, such as VIP and nitric oxide (the most important inhibitory neurotransmitter of the myenteric plexus). Individuals with achalasia lack non-cholinergic, non-adrenergic inhibitory ganglion cells, but the excitatory neurons remain unaffected.

Neural degeneration results in excessive contractions of the lower esophageal sphincter and a loss of its regulation. As a consequence, this leads to the functional obstruction, which then results in dilatation. Therefore, an irreversible aperistalsis and worsening obstructive symptoms occurs. Some studies have associated achalasia with genetic polymorphisms of the three nitric oxide synthase isoforms and specific human leukocyte antigen (HLA) classes. A European study supports the notion that achalasia may be an autoimmune disorder in which autoantibodies appear to interact with DNA, like in type 1 diabetes and lupus. Histopathological findings in advanced achalasia, show a significant reduction in the number of myenteric ganglion cells or complete absence. Inflammatory changes in the myenteric nerves comprise a mixture of lymphocytes, eosinophils (in all cases), and sometimes plasma and mast cells. Myenteric nerves

get focally or wholly replaced by collagen. Other extramyenteric morphological features include submucosal periductal or glandular inflammation, muscular hypertrophy with secondary degeneration and fibrosis, diffuse squamous hyperplasia, lymphocytic mucosal esophagitis or inflammation of the lamina propria and submucosa with prominent germinal centers, infiltration of the muscularis externa and propria by activated eosinophils.

Diagnostic studies to confirm the disease must take place as symptoms do not reliably diagnose achalasia. It is also mandatory to exclude benign and malignant causes of lower esophageal obstruction. The best initial test to diagnose achalasia is a barium esophagogram (barium swallow). The classic finding on the barium swallow is the smooth tapering of the lower esophagus to a "bird's beak" appearance, with dilatation of the proximal esophagus and lack of peristalsis during fluoroscopy. Some cases reveal an "air-fluid level" (fig. 2) and absence of intra-gastric air while in advanced disease. Dynamic, timed barium swallow is used to access esophageal emptying. This variant of the classic barium swallow is performed by having the patient drink 236 mL of barium in the upright position and taking radiographs at one, two, and five minutes after the last swallow.

Endoscopy of the upper gastrointestinal tract (esophagogastroduodenoscopy, EGD) is recommended in all patients with suspected achalasia or dysphagia. Esophageal manometry is the most sensitive test for the diagnosis of achalasia and remains the gold standard. Manometry will reveal incomplete lower esophageal sphincter relaxation in response to swallowing, sometimes a lack of peristalsis in the lower esophagus, and an increase in pressure of the lower esophageal sphincter. With high-resolution manometry (HRM), achalasia is classified by the Chicago criteria (version 3.0) into three distinct categories, which have prognostic and treatment implications. Types 1–3 all show incomplete lower esophageal sphincter relaxation. The esophageal body in type 1 shows aperistalsis and no esophageal pressurization; type 2 shows aperistalsis and panesophageal pressurization in 20% or more of swallows, while type 3 shows spastic (premature) contractions and distal contractility integral (DCI) over 450 mmHG-s-cm in 20% or more of swallows. The best initial treatment option for types 1 and 2 are conservative measures such as pneumatic dilatation and surgical myotomy, while type 3 achalasia appears to respond better to initial treatment with peroral endoscopic myomectomy (POEM).

Points of concern that must be looked before proceeding are: (a) Prolonged esophageal pH monitoring to rule out gastroesophageal reflux disease and determine if the treatment causes abnormal reflux; (b) EGD to rule out any cancer of the gastroesophageal junction or fundus, and (c) concomitant endoscopic ultrasonography if a tumor is suspected. Differential diagnosis of achalasia should be done with the following situations: Diffuse esophageal spasm, scleroderma, gastroesophageal reflux disease, stricture, Schatzki ring, hiatal hernia, paraesophageal hernia.

Treatment for primary idiopathic achalasia is non-surgical or surgical. Non-surgical options are pharmacotherapy (nitrates, calcium channel blockers, and phosphodiesterase-5 inhibitors to reduce the LES pressure), endoscopic botulinum toxin injection –derived from Clostridium botulinum, is a potent biological neurotoxin known to block the release of acetylcholine at the level of the lower esophageal sphincter–, or pneumatic dilatation of the esophagus via endoscopy is the most cost-effective non-surgical therapy for achalasia. Symptoms improve in 50–93% of patients; however, 30% of patients have symptom recurrence at five years. Surgical options are laparoscopic Heller myotomy (LHM) and peroral endoscopic myotomy (POEM). The recommended step for reducing pressure across the LES is surgical myotomy, which can be done laparoscopically. LHM can potentially cause uncontrolled gastroesophageal reflux, so it typically pairs with an anti-reflux procedure such as Nissen, the posterior (Toupet), or the anterior (Dor) partial fundoplication. LHM with partial fundoplication is the surgical procedure of choice. POEM is an effective minimally invasive alternative to LHM to treat achalasia at limited centers. Dissection of the circular fibers of the LES is achieved endoscopically, leading to relaxation of the LES; however, the risk of gastroesophageal reflux is high because it does not include an anti-reflux procedure. Esophagectomy is the last option.

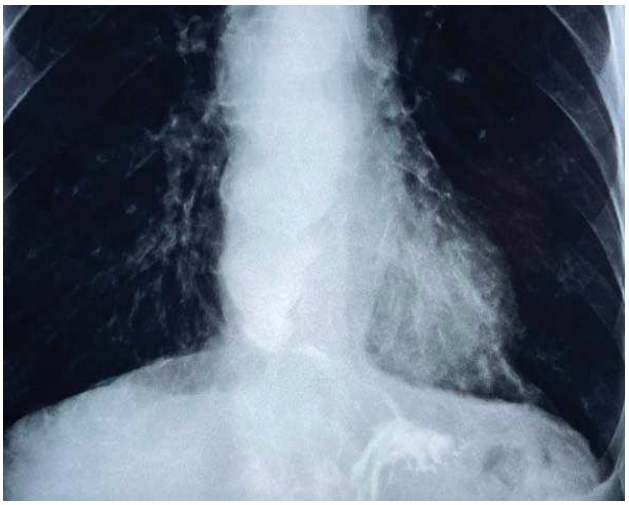

Figure 2.

References

1. ACHEM SR, CRITTENDEN J, KOLTS B, BURTON L. Long-term clinical and manometric follow-up of patients with nonspecific esophageal motor disorders. *Am J Gastroenterol* 1992, 87:825–830
2. CASSELLA RR, ELLIS FH Jr, BROWN AL Jr. Fine-structure changes in achalasia of esophagus. II. Esophageal smooth muscle. *Am J Pathol* 1965, 46:467–475
3. FISICHELLA PM, RAZ D, PALAZZO F, NIPONMICK I, PATTI MG. Clinical, radiological, and manometric profile in 145 patients with untreated achalasia. *World J Surg* 2008, 32:1974–1979
4. CASSELLA RR, ELLIS FH Jr, BROWN AL Jr. Fine-structure changes in achalasia of the esophagus. I. Vagus nerves. *Am J Pathol* 1965, 46:279–288
5. FRANCIS DL, KATZKA DA. Achalasia: Update on the disease and

its treatment. *Gastroenterology* 2010, 139:369–374
6. MISIEWICZ JJ, WALLER SL, ANTHONY PP, GUMMER JW. Achalasia of the cardia: Pharmacology and histopathology of isolated cardiac sphincteric muscle from patients with and without achalasia. *Q J Med* 1969, 38:17–30
7. SINGH R, GHOSHAL UC, MISRA A, MITTAL B. Achalasia is associated with *eNOS4a4a*, *iNOS22GA*, and *nNOS29TT* genotypes: A case-control study. *J Neurogastroenterol Motil* 2015, 21:380–389
8. RAYMOND L, LACH B, SHAMJI FM. Inflammatory aetiology of primary oesophageal achalasia: An immunohistochemical and ultrastructural study of Auerbach's plexus. *Histopathology* 1999, 35:445–453
9. LAURINO-NETO RM, HERBELLA F, SCHLOTTMANN F, PATTI M. Evaluation of esophageal achalasia: From symptoms to the Chicago classification. *Arq Bras Cir Dig* 2018, 31:e1376
10. TORRESAN F, IOANNOU A, AZZAROLI F, BAZZOLI F. Treatment of achalasia in the era of high-resolution manometry. *Ann Gastroenterol* 2015, 28:301–308
11. BONAVINA L, NOSADINI A, BARDINI R, BAESSATO M, PERACCHIA A. Primary treatment of esophageal achalasia. Long-term results of myotomy and Dor fundoplication. *Arch Surg* 1992, 127:222–226
12. VON RENTELN D, INOUE H, MINAMI H, WERNER YB, PACE A, KERSTEN JF ET AL. Peroral endoscopic myotomy for the treatment of achalasia: A prospective single center study. *Am J Gastroenterol* 2012, 107:411–417

Corresponding author:

A. Skarpas, Department of Surgery, General Hospital of Amfissa, 331 00 Amfissa, Fokis, Greece
e-mail: andrewskarpas@gmail.com

Diagnosis: *Achalasia of esophagus*