ACHALASIA

Achalasia

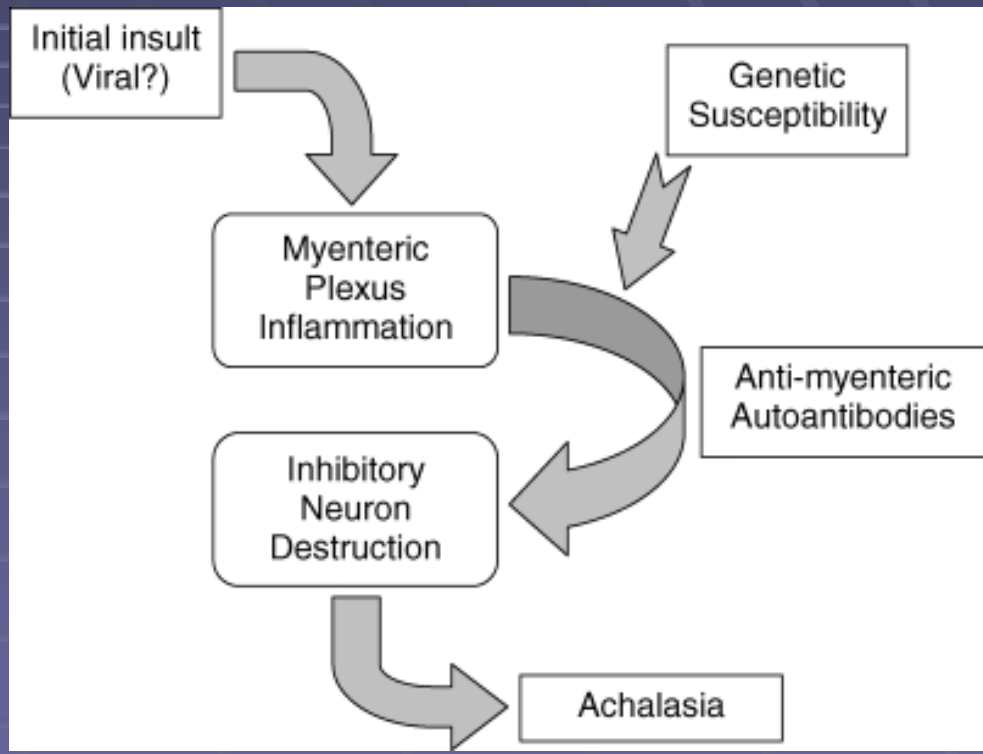
Tom Frazier

Objectives

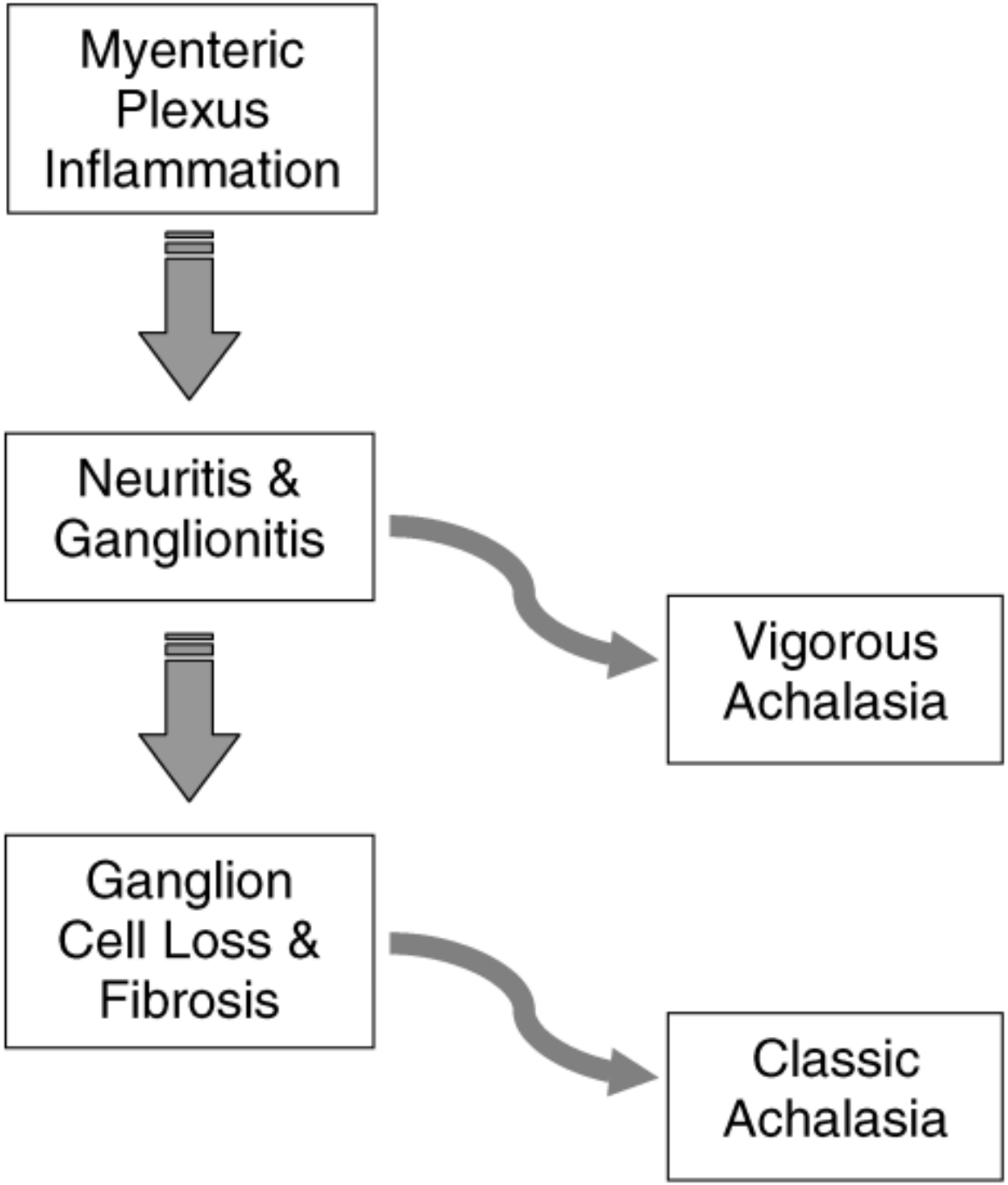
- Achalasia
  - Pathophysiology
  - Epidemiology
  - Symptomatology
  - Diagnosis
  - Complications
  - Treatment
- Everything in ddsep
- Some extras
- Video

Pathophysiology

- degeneration of the myenteric inhibitory neurons
- imbalance between excitatory and inhibitory elements
- Intact cholinergic, excitatory neural function
- ? autoimmune response to a viral insult in genetically susceptible individuals
  - HSV/Zoster/others
  - Circulating autoantibodies
  - Inflammatory infiltrate
  - class II HLA DQw1

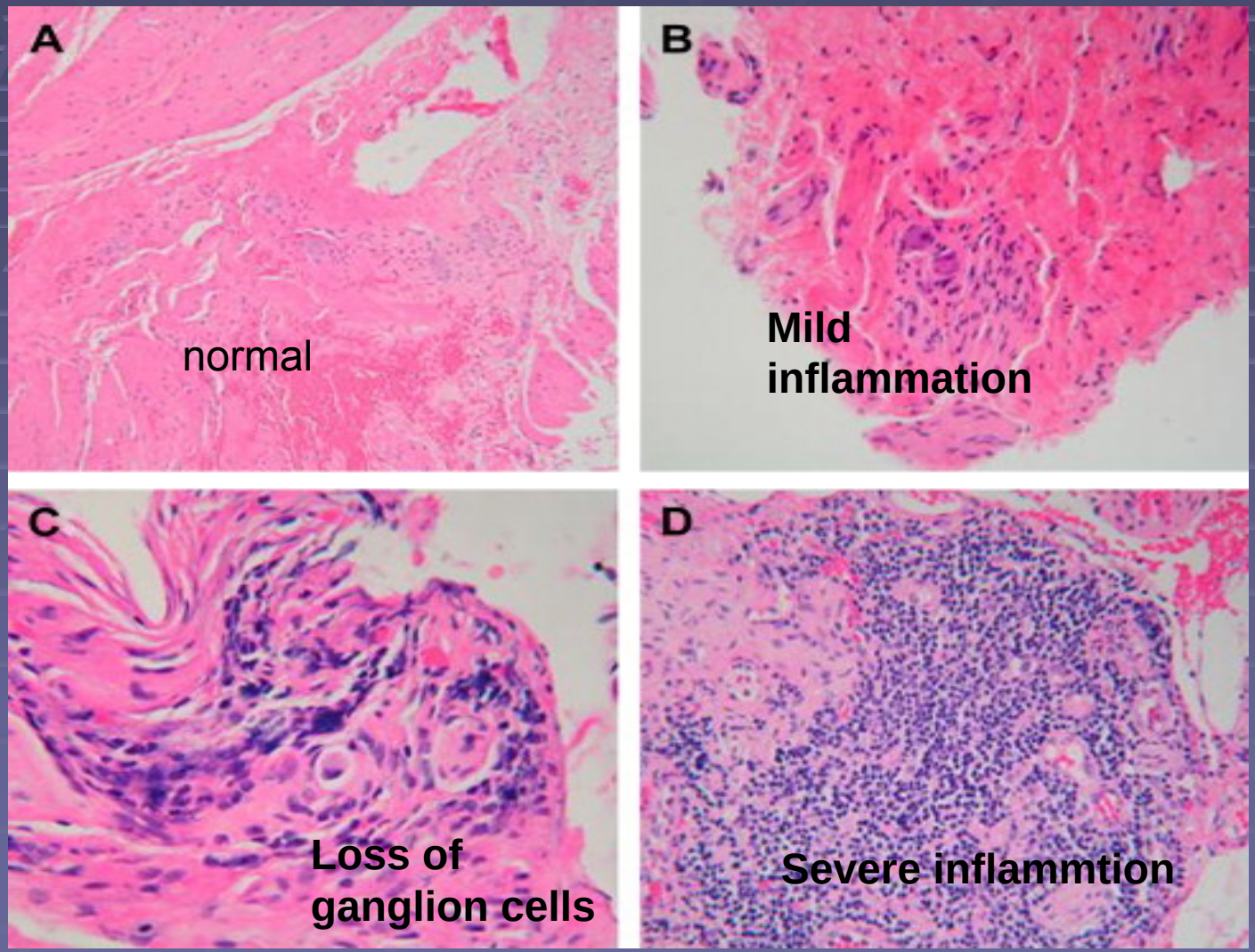


The American Journal of Gastroenterology Vol. 100, 6 Pages: 1404-1414



The American Journal of Gastroenterology Vol. 100, 6 Pages: 1404-1414

Histopathology of Achalasia



Walzer N, Hirano I. Gastroenterology Clinics - Volume 37, Issue 4 (December 2008)

Secondary forms of achalasia

- **Achalasia**
  Postoperative (antireflux fundoplication, bariatric gastric banding)
  Allgrove's syndrome (AAA syndrome)
  Eosinophilic esophagitis
  Hereditary cerebellar ataxia
  Familial achalasia
  Sjogren's syndrome
  Sarcoidosis
  Post vagotomy
  Autoimmune polyglandular syndrome type II

- **Achalasia with generalized motility disorder**
  Chagas' disease (*Trypanosoma cruzi*)
  Multiple endocrine neoplasia, type IIb (Sipple's syndrome)
  Neurofibromatosis (von Recklinghausen's disease)
  Paraneoplastic syndrome (anti-Hu antibody)
  Parkinson's disease
  Amyloidosis
  Fabry's disease
  Hereditary cerebellar ataxia
  Achalasia with associated Hirschsprung's disease
  Hereditary hollow visceral myopathy

- **Achalasia secondary to cancer (pseudoachalasia)**
  Squamous cell carcinoma of the esophagus
  Adenocarcinoma of the esophagus
  Gastric adenocarcinoma
  Lung carcinoma
  Leiomyoma
  Lymphoma
  Breast adenocarcinoma
  Hepatocellular carcinoma
  Reticulum cell sarcoma
  Lymphangioma
  Metastatic renal cell carcinoma
  Mesothelioma
  Metastatic prostate carcinoma
  Pancreatic adenocarcinoma

Who gets it?

- Incidence 1/100,000
- Prevalence 1/10,000
- Male = female, all ages
- most commonly presents in patients between the ages of 25 and 60 years

Symptomatology

- Dysphagia to solids and liquids is the most common presenting symptom
- Regurgitation is the second most common symptom
- Nocturnal regurgitation of esophageal contents can lead to nighttime cough and aspiration
- Difficulty belching is reported in a large proportion of patients

Symptomatology

- absent belch reflex ~ upper airway obstruction secondary to a massively dilated esophagus that extrinsically compresses the posterior aspect of the trachea.
- Weight loss occurs in end-stage disease and usually does not exceed 5 to 10 kg before patients seek medical attention
- Chest pain is reported in 20% to 60% of patients.
  - Improvement in pain does not necessarily accompany improvement in dysphagia after either pneumatic dilation or Heller myotomy
- Heartburn is reported in a large number of patients with achalasia (counterintuitive)

Symptomatology

- Progressive symptoms < 6 months in patients > 60 years with weight loss and difficult passage of the endoscope across the esophagogastric junction increase the likelihood of a patient having cancer-associated achalasia

Diagnosis

- EGD
  - endoscopy normal ~ 44% of patients with achalasia
  - Difficulty traversing the esophagogastric junction should raise suspicion for pseudoachalasia due to neoplastic infiltration of the distal esophagus or gastric cardia.

distended with retained food and saliva

stasis esophagitis

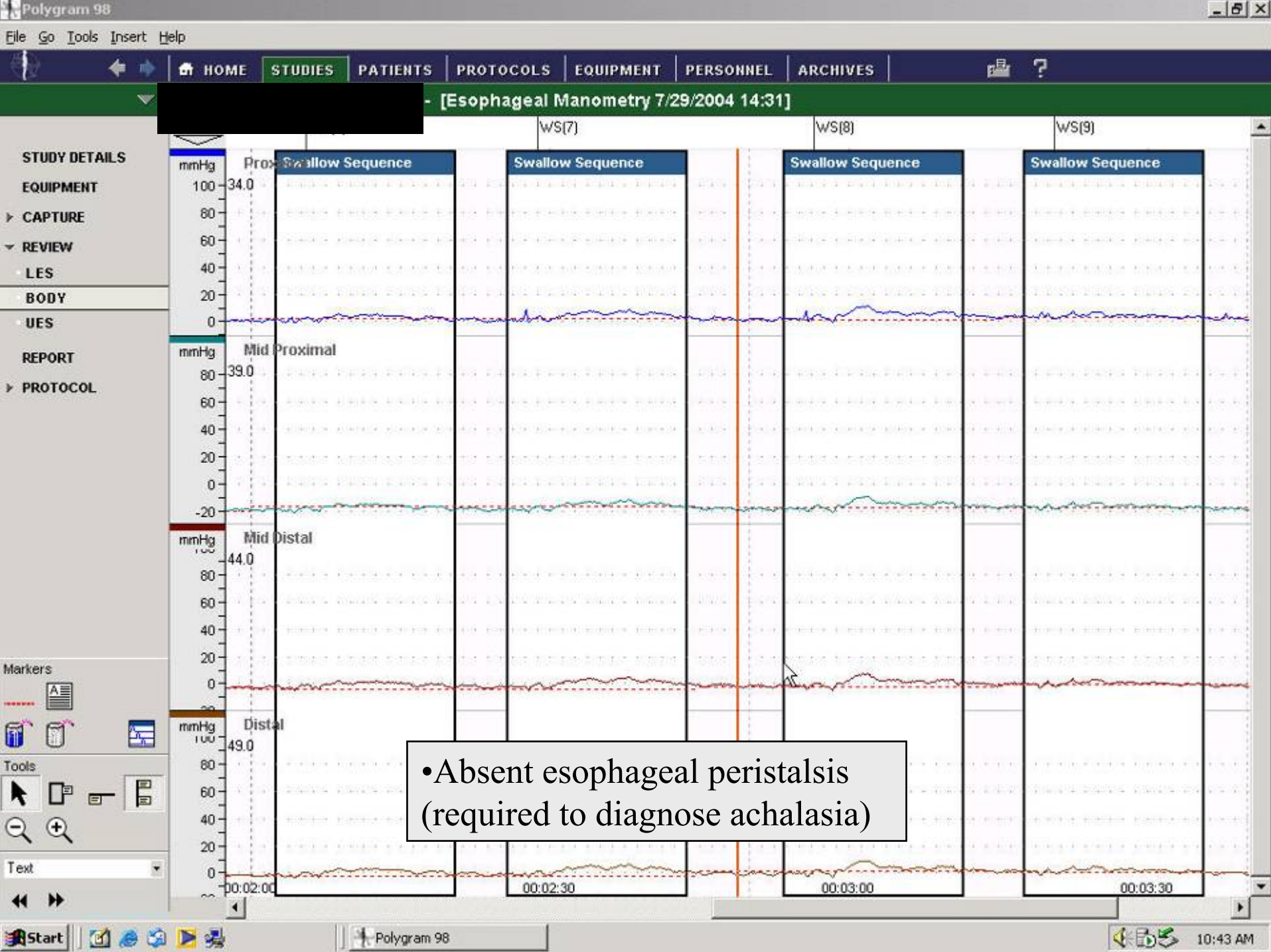
Walzer N, Hirano I. **Gastroenterology Clinics** - Volume 37, Issue 4 (December 2008)

Diagnosis

- BE
  - esophageal dilatation with retained food and barium and a
  - smooth tapered constriction of the gastroesophageal junction
  - the diagnosis of achalasia was suggested in only 64% of barium examinations

Diagnosis

- Manometry
  - Required for diagnosis
    - **No peristalsis**
  - Often seen but not required for diagnosis
    - Incomplete LES relaxation
    - Elevated LES pressure
    - Higher intraesophageal baseline than gastric baseline
  - Can’t distinguish 1º from 2º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•Absent esophageal peristalsis
(required to diagnose achalasia)
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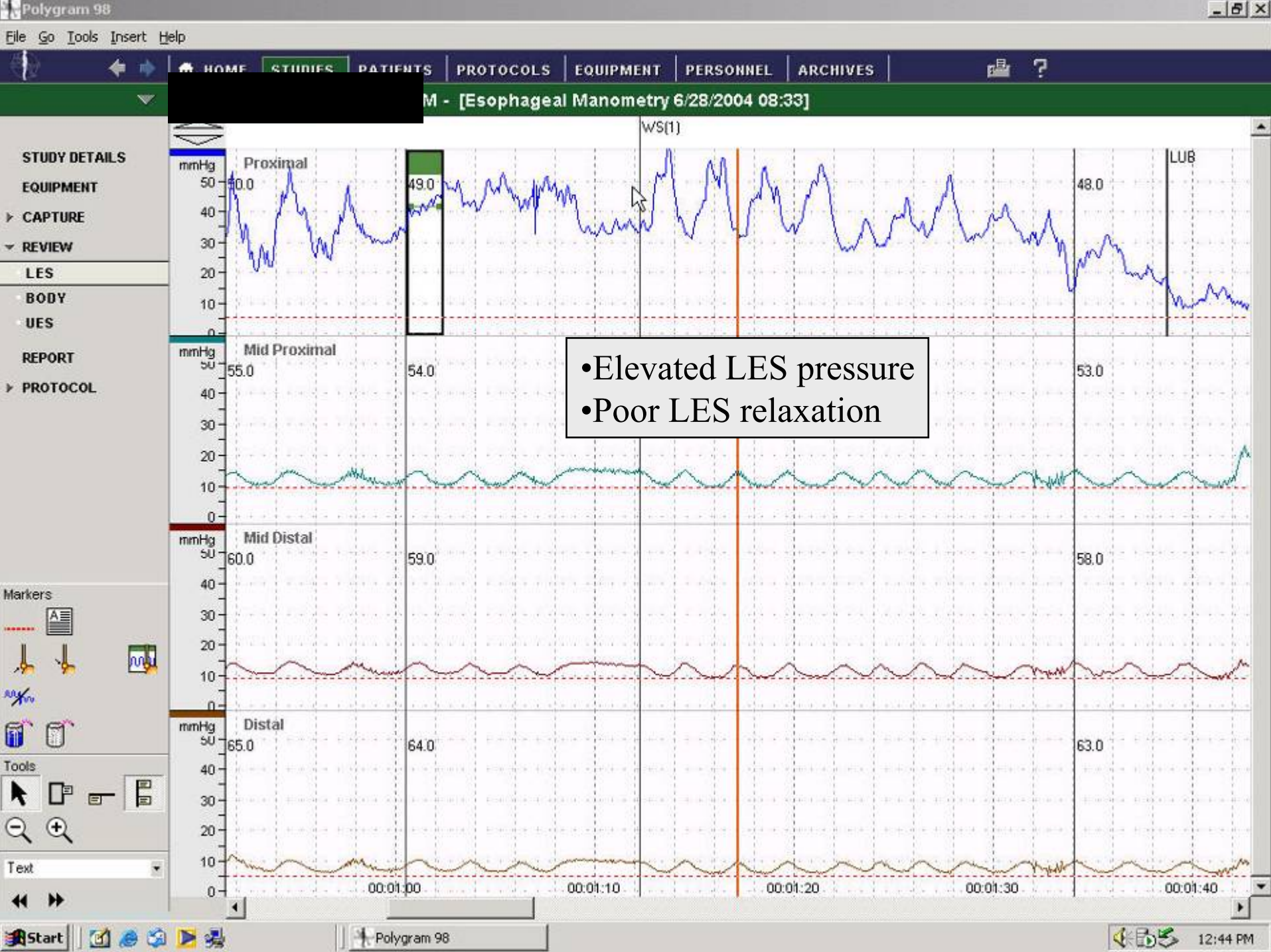
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•Elevated LES pressure
•Poor LES relaxation
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Vigorous Achalasia

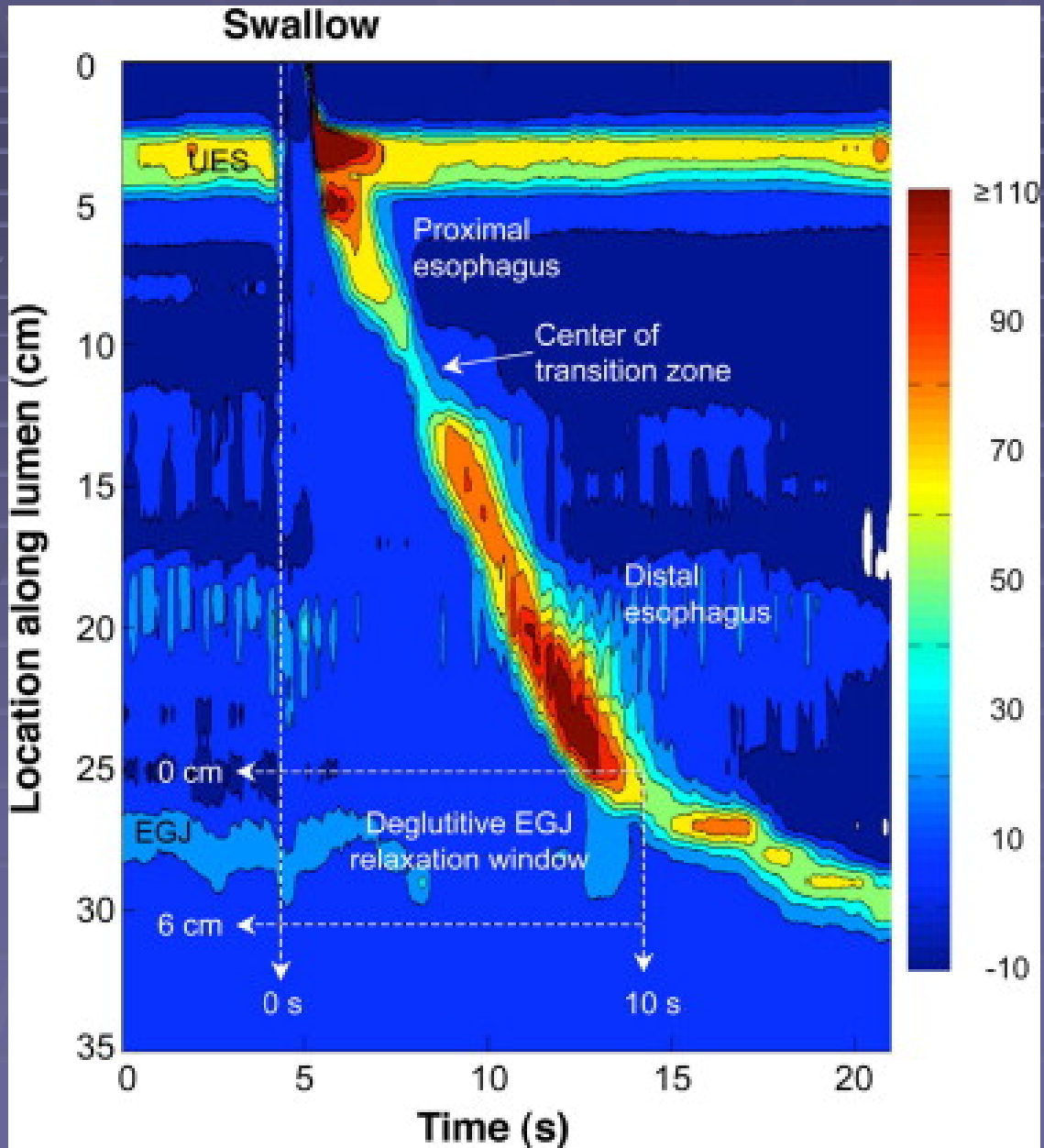
- defined by the presence of normal to high amplitude esophageal body contractions in the presence of a nonrelaxing LES.
- esophageal contractile waves with amplitudes in excess of 40 mm Hg
- Previously thought to be the early form and more amendable to treatment

HRM

- High resolution esophageal manometry (HRM) improves the accuracy of esophageal manometry.
- Manometric variants of achalasia exist.
  - **achalasia with minimal esophageal pressurization (type I, classic),**
  - **achalasia with esophageal compression (type II),**
  - **achalasia with spasm (type III), and**

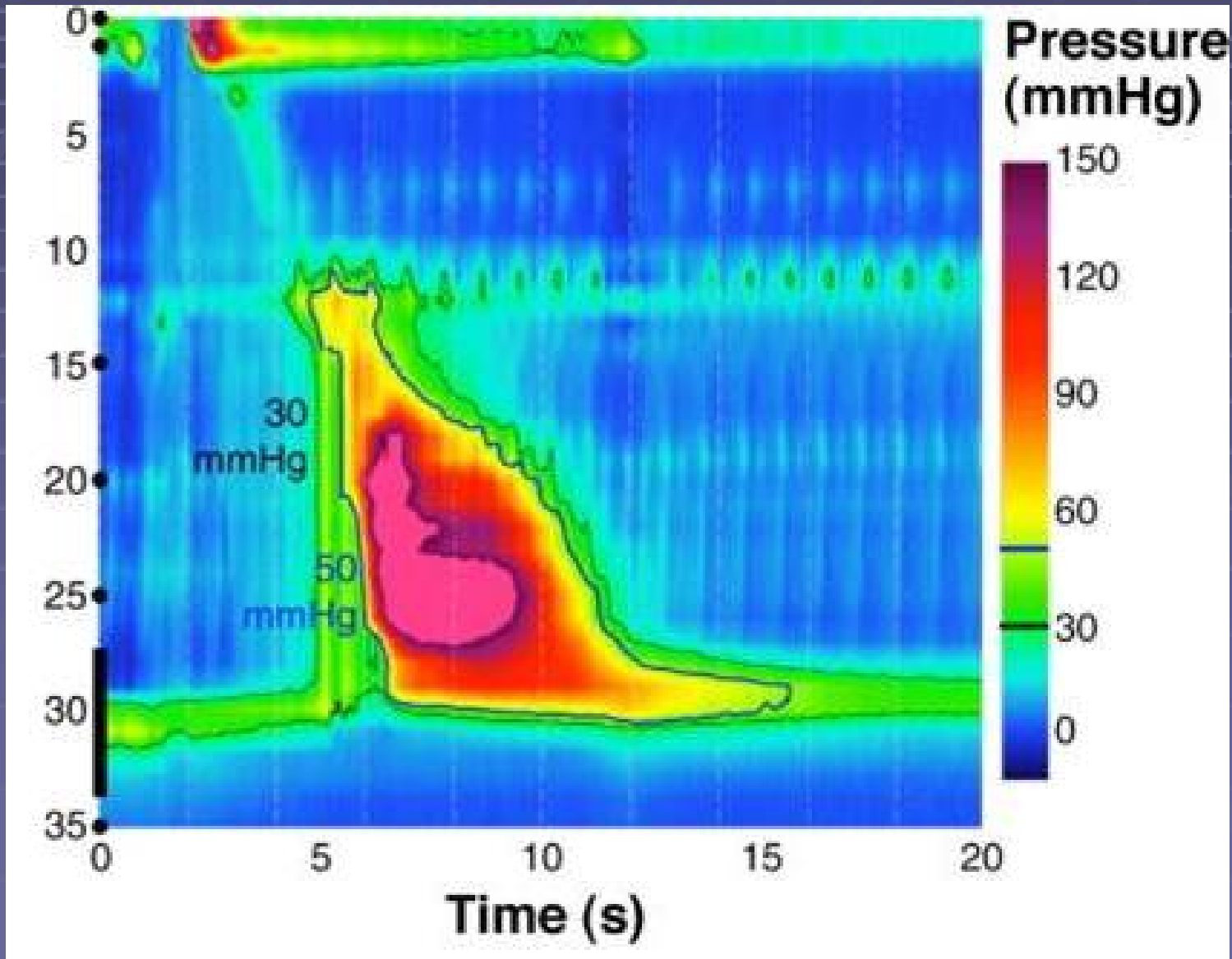
  ******type II and III = "Vigorous Achalasia"**
- they are distinct in terms of their responsiveness to medical or surgical therapies.
  - type II = strong positive predictor of response
  - type III= strong negative predictor of response

HRM



Gastroenterology. 2008 Sep;135(3):756-69.

HRM



Gastroenterology. 2008 Sep;135(3):756-69.

Complications associated with Achalasia

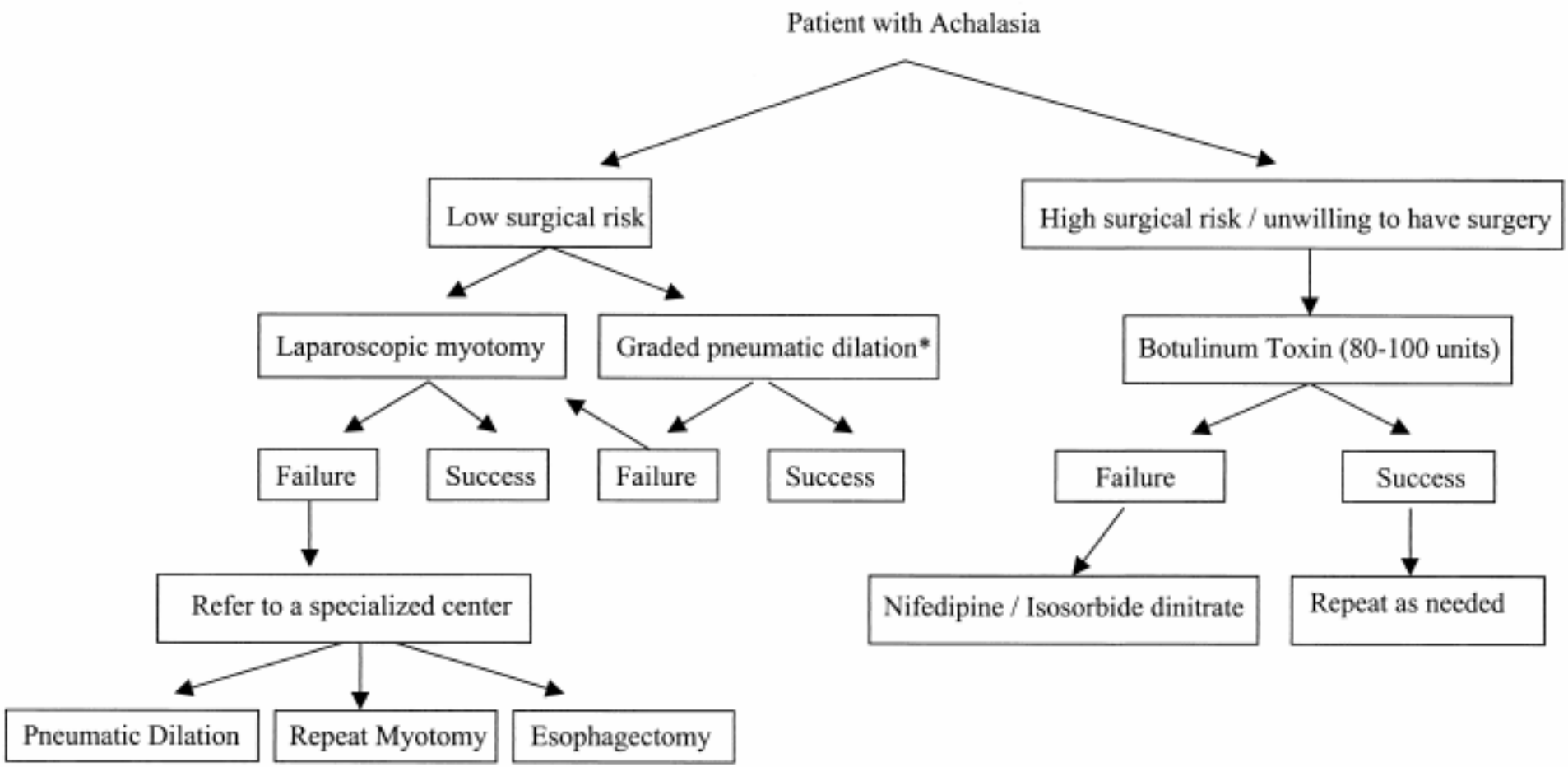
- progressive malnutrition
- aspiration pna
- epiphrenic diverticula
  - immediately proximal to the LES
  - potential therapeutic technical challenges and perforation risks.
- esophageal cancer
  - SCC > adeno
  - No difference in treatment groups
  - 16-fold increased risk during years 1 to 24 after initial diagnosis
  - ↓ LES pressure places = ↑ risk for esophageal acid exposure and development of Barrett's esophagus.

Achalasia and SCC

Walzer N, Hirano I. Gastroenterology Clinics - Volume 37, Issue 4 (December 2008)

Treatment

- Primary objective = reduce the LES basal pressure
  - medical therapy
  - botulinum toxin injection
  - pneumatic dilation
  - surgical myotomy



American Journal of Gastroenterology Vol. 94, 12 Pages: 3406-3412

Treatment

- Measuring Treatment Goals
- Objective measures
  - measurements of LES pressure and esophageal emptying
    - barium radiographs,
    - nuclear scintigraphy,
    - possibly esophageal impedance.
    - timed barium esophagram
  - LES pressure < 10 mm Hg has been shown to be a significant predictor of long-term response to pneumatic dilation

Medical Therapy

- patients who are awaiting or unable to tolerate more invasive treatment modalities.
- Nitrates
- calcium channel antagonists
- sildenafil
- All are limited by efficacy and side effects

Botulinum Toxin

- targets the excitatory, acetylcholine-releasing neurons that generate LES basal muscle tone.
- A total of 80 to 100 U of the toxin is injected in divided doses into the four quadrants of the LES
- The effect of intermittent versus scheduled dosing of botulinum toxin on clinical efficacy has not been studied.

Botulinum Toxin

- 15 prospective studies ~ 450 patients
- Response rates at 1 month average 78% (range, 63% to 90%).
- 6 months, rate drops to 58% (range, 25% to 78%)
- 12 months to 49% (range, 15% to 64%).
- ? Protective antibodies (additional injections are =/<)
- Predictors of response to botulinum toxin
  - age > 50 years
  - presence of vigorous achalasia

Botulinum Toxin

- residual LES pressure post botulinum toxin has averaged approximately 20 mm Hg. (need <10mHg)
- Side effects: transient chest pain (~20%) and heartburn (5-10%)
- ? increased risk of intraoperative esophageal perforation and myotomy failure (affect surgical planes)

Pneumatic dilation

- e.ach.ooo.ooo.dil.1ro.ra060411.mp4

Pneumatic Dilation

- The polyethylene balloon comes in three sizes that inflate to fixed diameters of 3, 3.5, or 4 cm.
- Stepwise approach 3.0 cm → 3.5 → 4.0 cm balloon
- The overall response rates defined by good-to-excellent relief of symptoms avg 85% (70% - 92%), with a mean follow-up period of 20 months.

- factors that negatively affect the treatment response:
  - Age <37.5 years
  - Admission LESP ≥30.5 mmHg
  - LESP after first balloon ≥17.5 mmHg
  - Balloon number >2

Recommended Technique for Pneumatic Dilation Using the Graded Balloons

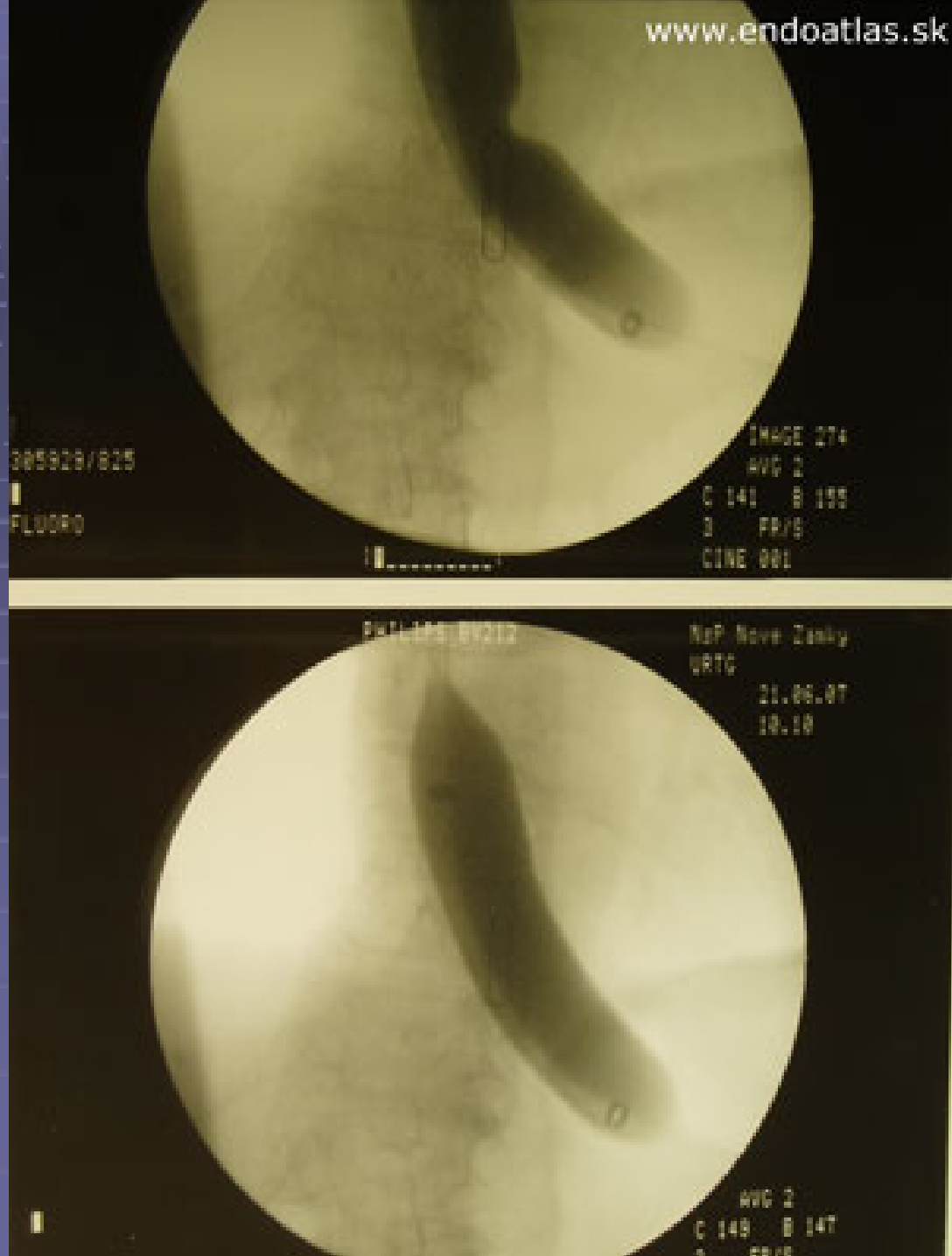
1. Fasting ≥ 12 h before procedure.
2. Esophageal lavage with a large-bore tube (if needed).
3. Sedation and endoscopy in lld position.
4. Guidewire positioned in stomach and balloon passed over the guidewire.
5. Initial dilation with 3-cm diameter balloon; subsequent progression to 3.5-cm and 4-cm balloons may be required at separate sessions.
6. Accurate placement of balloon across gastroesophageal junction fluoroscopically.

Recommended Technique for Pneumatic Dilation Using the Graded Balloons

7. Balloon distention to obliterate the waist, which usually requires 7–10 psi (this is the key to a successful dilation).
8. Gastrografin study followed by barium swallow to exclude esophageal perforation.
9. Observation for 4 h for chest pain and fever.
10. Discharge with follow-up in 1 mo.

*must have ct surgeon available.

Get Rid of Waist!

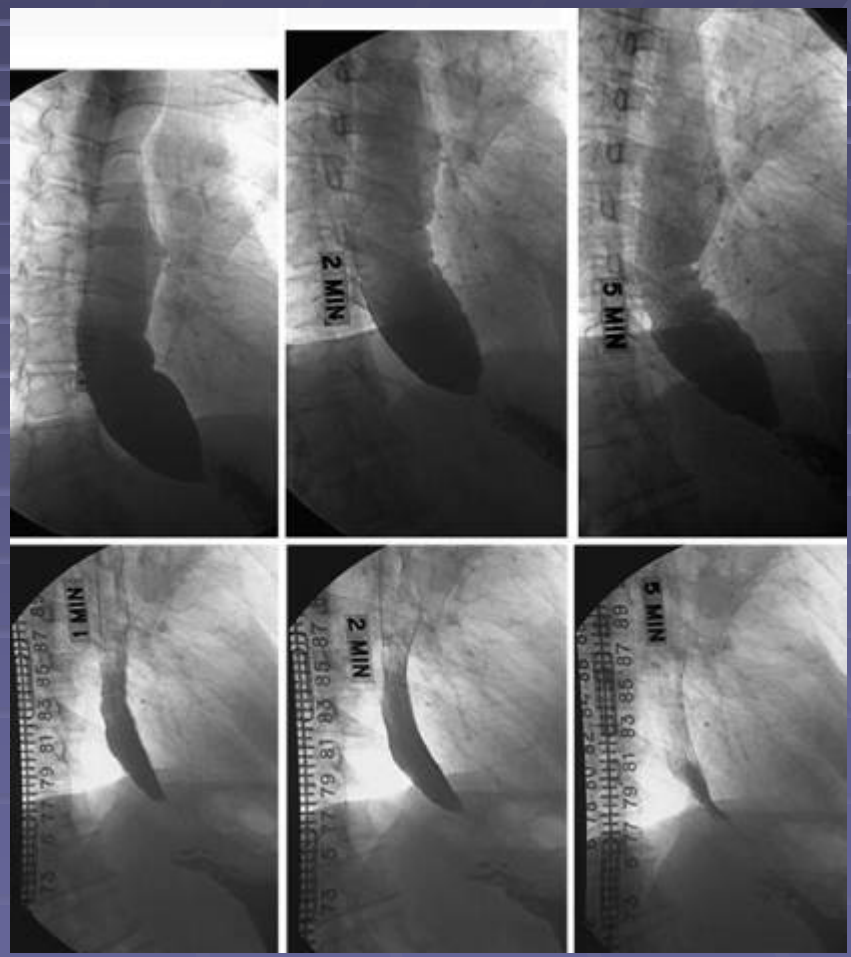


Pneumatic Dilation: How to assess success

- Post dilation LES pressure
  - < 10 mm Hg = 100% 2-year remission rate
  - 10-20 = 71%
  - > 20= 23% patients with no improvement in esophageal emptying of barium had a 90% failure rate at 1 year.

Timed Barium Esophagram

- fixed aliquot of barium
- serial radiographs obtained at 1, 2, and 5 minutes following ingestion
- comparisons in height and surface area of the barium column
- SA @ 5 min had the most significant correlation with LES pressure before and 1 month after treatment



Pneumatic Dilation Complications

- transient chest pain, gastrointestinal bleeding, esophageal hematoma formation, and symptomatic esophageal mucosal tears.
- Gastroesophageal reflux (~30%), emperic PPI should be considered.

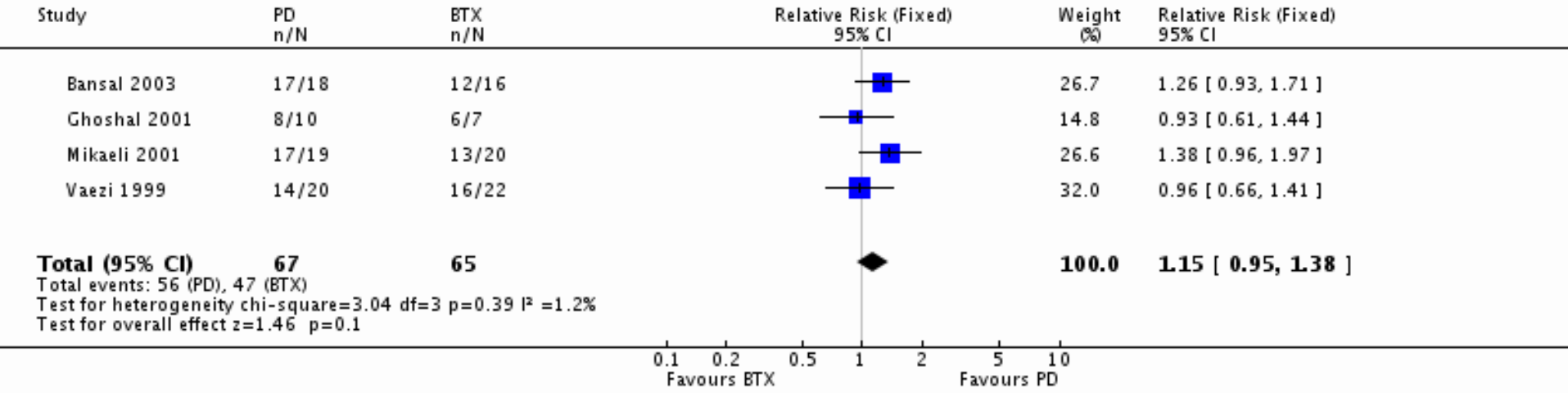
Pneumatic Dilation Complications

- Perforation rates of 0% to 8% with a mean rate of 2.6%.
- The graded approach = lower perforation risk.
- epiphrenic diverticula, hiatal hernias, the presence of esophagitis, prior esophagomyotomy, or vigorous achalasia are often thought to increase the risk for perforation, there are limited data to support or refute these concerns.

Table I. Frequency and symptoms of esophageal tears after pneumatic dilation for achalasia.

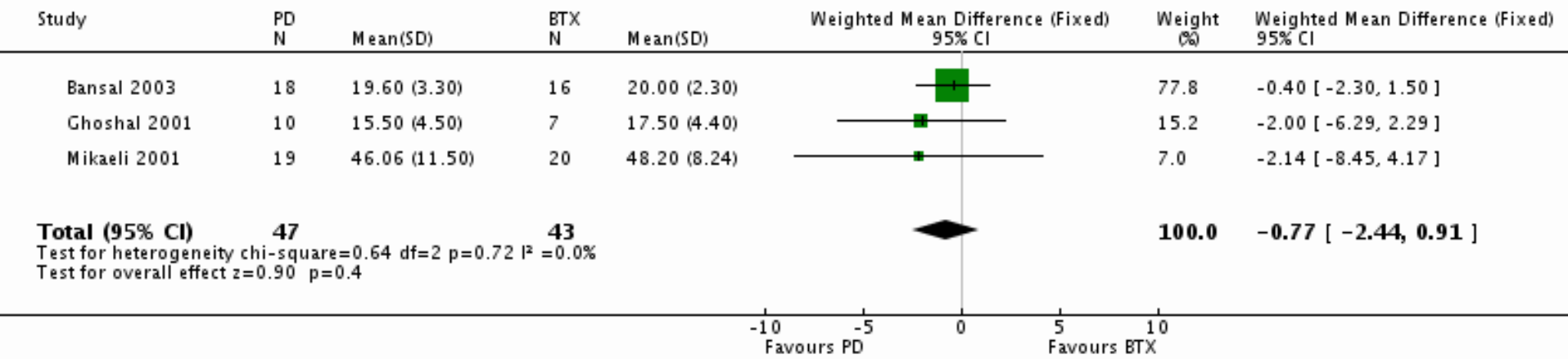
Year	Author	N° of patients	Non transmural tear	Transmural tear	Non transmural tear - symptomatic	Non transmural tear - asymptomatic
1987	Ott et al. [1]	42	5 (12%)	4 (9%)	0	5
1989	Adams *et al.* [2]	58	7 (12%)	2 (4%)	4	3
1991	Ott *et al.* [3]	34	1 (3%)	1 (3%)	–	–
1996	Barkin *et al.* [4]	50	4 (8%)	2 (4%)	3	1

Review: Endoscopic pneumatic dilation versus botulinum toxin injection in the management of primary achalasia
Comparison: 01 Pneumatic Dilation versus Botulinum Toxin Injection
Outcome: 01 Initial remission



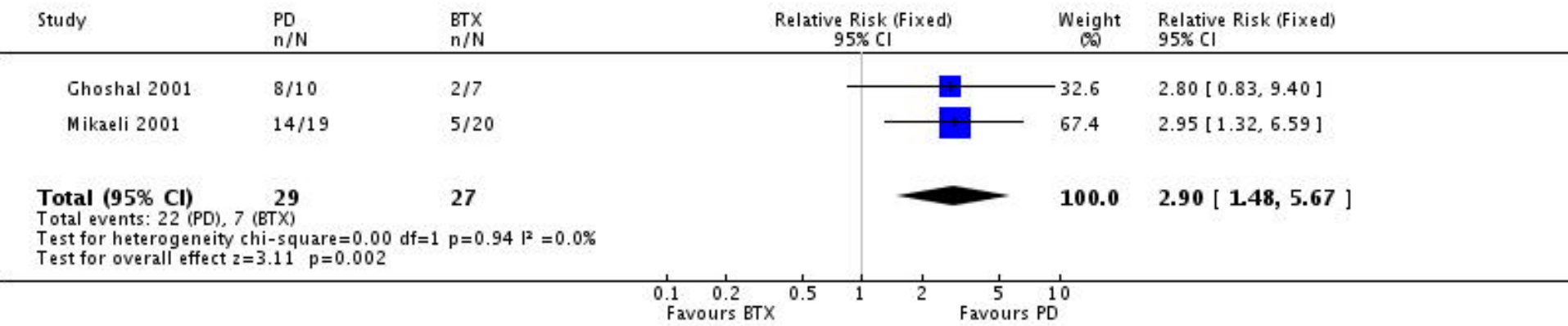
Leyden, JE; Moss, AC; MacMathuna, P. Cochrane Database Syst Rev. 2006 Oct 18

Review: Endoscopic pneumatic dilation versus botulinum toxin injection in the management of primary achalasia
Comparison: 01 Pneumatic Dilation versus Botulinum Toxin Injection
Outcome: 02 Mean oesophageal pressure within first four weeks



Leyden, JE; Moss, AC; MacMathuna, P. Cochrane Database Syst Rev. 2006 Oct 18

Review: Endoscopic pneumatic dilation versus botulinum toxin injection in the management of primary achalasia
Comparison: 01 Pneumatic Dilation versus Botulinum Toxin Injection
Outcome: 03 Remission at six months



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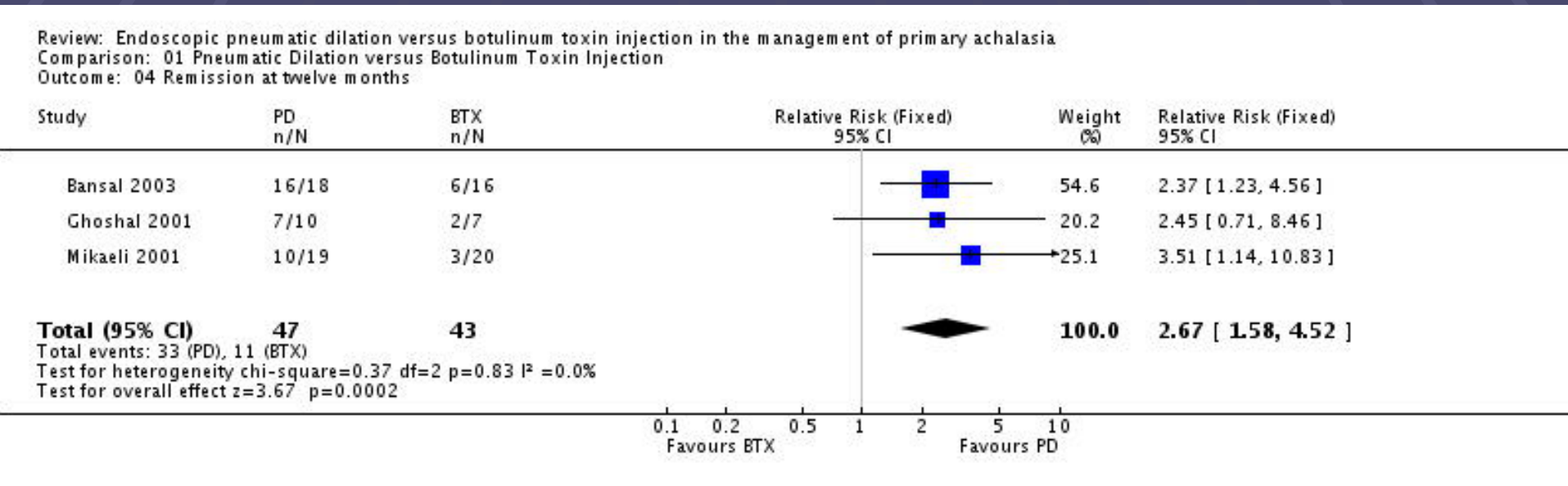
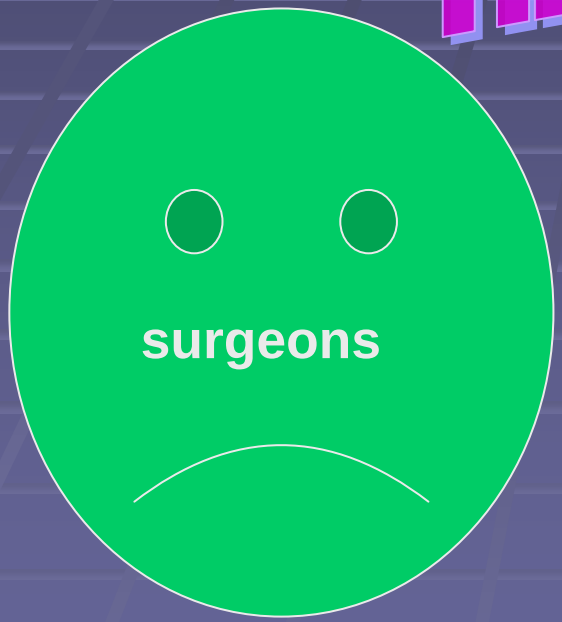


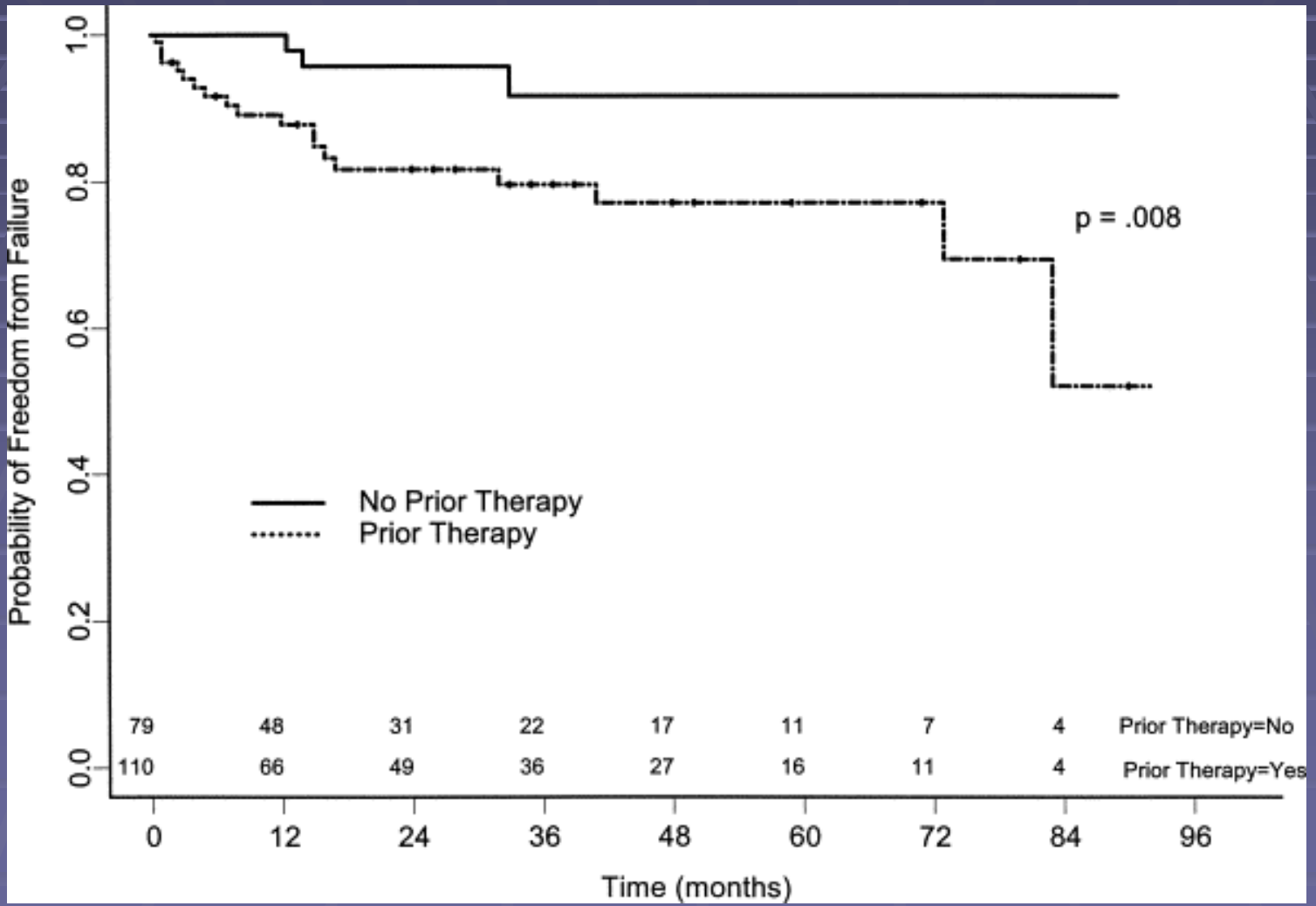
Leyden, JE; Moss, AC; MacMathuna, P. Cochrane Database Syst Rev. 2006 Oct 18

THE MAIN EVENT



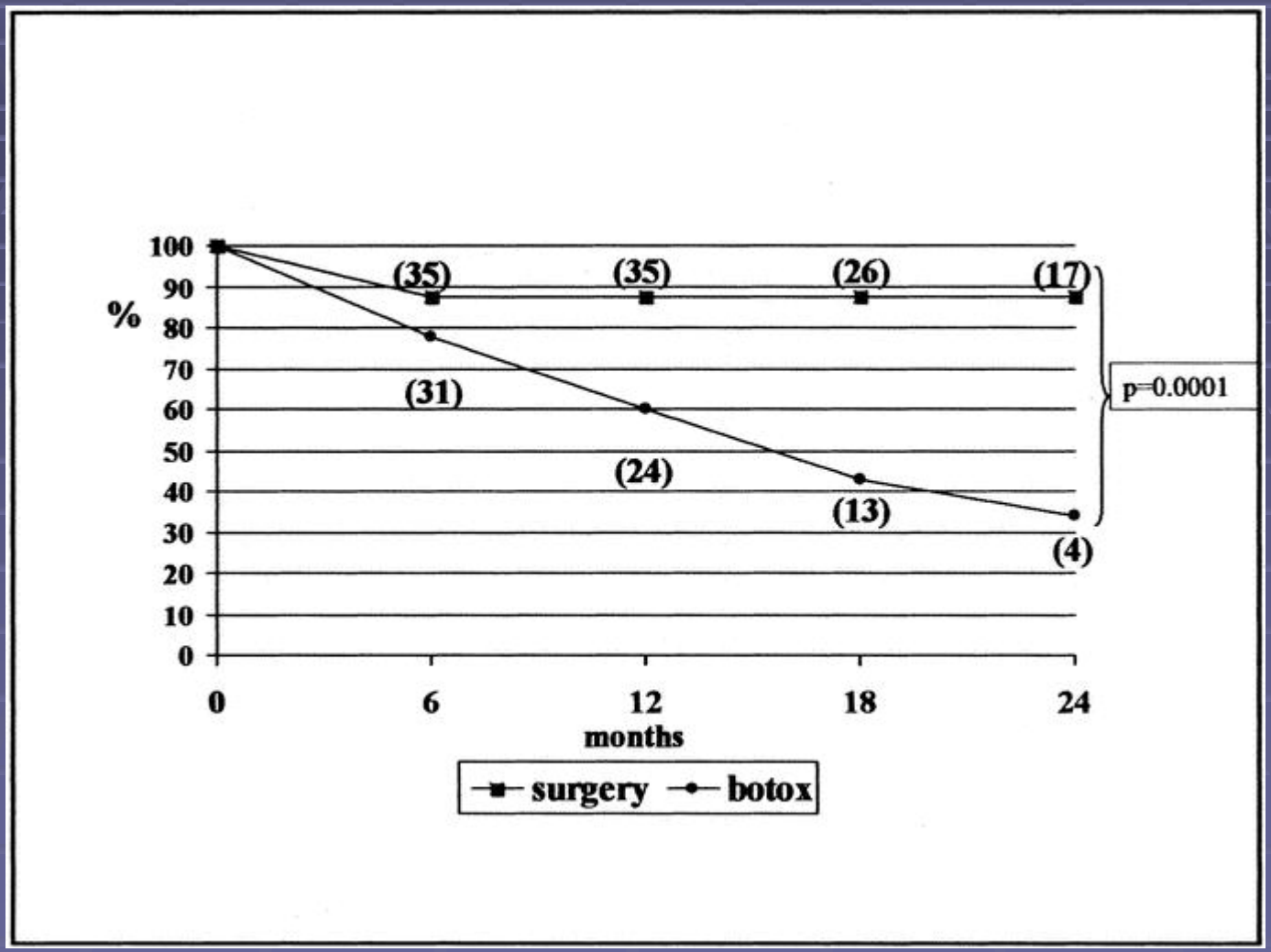
VS

Endoscopic Therapy Prior to Myotomy



Ann Thorac Surg. 2008 May;85(5):1729-34.

Probability of remaining asymptomatic after treatment



Zaninotto: Ann Surg, Volume 239(3).March 2004.364-370

The disappointing finale

- Lots of “expert opinion”
- No large-scale, head-to-head randomized trial comparing PD to HM.
- The choice between the two procedures depends on institutional preference and experience.
- In patients unresponsive to graded pneumatic dilation, laparoscopic myotomy should be performed.
- In myotomy failures, repeat pneumatic dilation can be attempted.
- Those with a megaesophagus (sigmoid esophagus and diameter >8 cm), or those with low LES pressure with persistent symptoms may require esophagectomy.

Two morbidities to know

- Reflux
  - Reduced by performing fundoplication
- Dysphagia
  - WORSE with nissen, so partial wraps are utilized.

A little about HM with fundoplication

There is debate among surgeons on how to wrap patients following myotomy.

- Nissen vs Dor (anterior) vs Toupet (posterior)
- Not much data comparing two partial wraps

Nissen

Toupet

Surgical Therapy

- Early postoperative dysphagia
  - caused by incomplete myotomy,
  - periesophageal inflammation,
  - underlying esophageal dysmotility,
  - esophageal enlargement with sigmoid deformity, or
  - mechanical obstruction by a fundoplication, paraesophageal hernia, or crural diaphragmatic hiatus repair.

Delayed recurrence of postoperative dysphagia

- development of a recurrent high pressure zone at the LES
- peptic stricture complicating acid reflux.
- an obstructed or slipped fundoplication,
- progressive megaesophagus with sigmoid deformity, or
- esophageal cancer can manifest.

➢ In cases of postoperative dysphagia due to an incomplete myotomy or a recurrent high pressure zone, pneumatic dilation can be employed as an alternative to redo surgery.

“Take Home” Points

- **Aperistalsis** is all that’s required
- Cancer and specifically SCC is associated with achalasia
  - Failure to pass scope
  - Old people
  - Progressive
  - Wt loss!!!!
- Post PD LES pressure < 10 = awesome

A 32-year-old man presents to his primary care physician for evaluation of dysphagia to both solids and iquids. He reports that he has had this problem for several years, but symptoms have been worsening. He often leaves the table to regurgitate food that he cannot swallow. On several recent occasions, he has awakened at night to find undigested food on his pillow.

What is the most likely underlying diagnosis in this patient?

(A) Achalasia
(B) Esophageal adenocarcinoma
(C) Esophageal squamous cell carcinoma
(D) Schatzki's ring
(E) Zenker's diverticulum

- **Given the underlying diagnosis, the patient is at increased**
- **risk for which of the following conditions?**

(A) Esophageal gastrointestinal stromal tumor (GIST)

(B) Esophageal squamous cell carcinoma

(C) Gastric adenocarcinoma

(D) Gastric GIST

(E) Gastroesophageal reflux disease

Questions