

# APPROACH TO THE PATIENT WITH DYSPHAGIA: WHEN IT'S NOT EoE . . .

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Medical College of Wisconsin  
Milwaukee, WI




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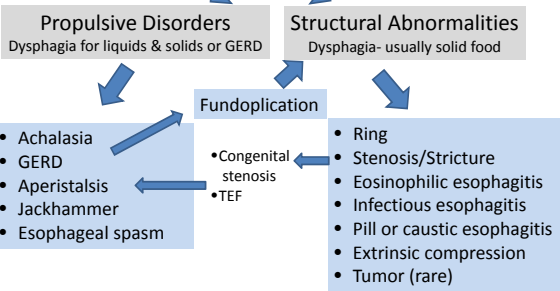
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## Dysphagia




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## Diagnostic Arsenal

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## Case of Dysphagia



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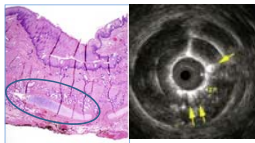
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## Characteristics and management of congenital esophageal stenosis: findings from a multicenter study

Laurent Michaud<sup>1</sup>, Frédéric Couterrier<sup>1</sup>, Guillaume Podevin<sup>2</sup>, Arnaud Bonnard<sup>3</sup>, François Becmeur<sup>4</sup>.

- Incidence 1 in 25,000 to 50,000 live births
- Age at diagnosis: 1 day to 14 yrs. (mean 2.1 yrs.)
- Symptoms :
  - Dysphagia 50%
  - Vomiting 40%
  - Food impaction 50%
  - Respiratory symptoms 42%
- Types:
  - Tracheobronchial remnant
  - Fibromuscular stenosis
  - Membrane stenosis



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## Characteristics and management of congenital esophageal stenosis: findings from a multicenter study

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60% had persistent symptoms despite surgery

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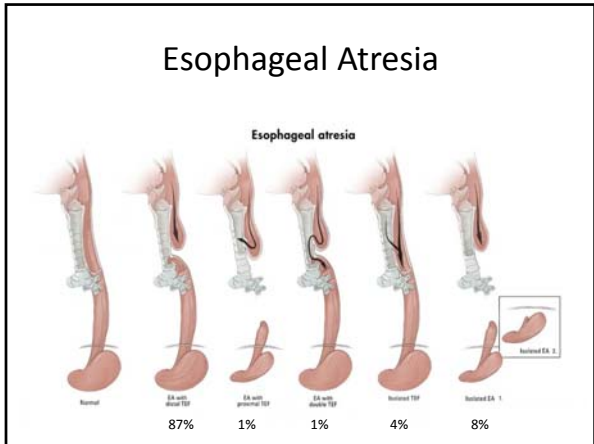
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### Etiology of Dysphagia in Esophageal Atresia

- Primary dysmotility
  - Intrinsic neuronal abnormalities (hypoganglionosis and lack of interstitial cells of Cajal)<sup>1,2</sup>
  - Extrinsic abnormalities of vagal innervation
- Secondary dysmotility
  - Excessive surgical mobilization – myoneural damage
  - Esophagitis due to GERD
- Tertiary
  - Anastomotic stricture or GERD induced stricture

1. Nakazato Y, et al. J Pediatr Surg 1986  
 2. Boleken M, et al. World J Surg 2007

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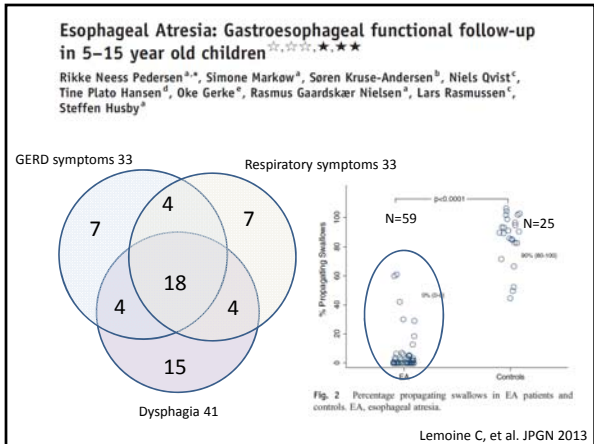
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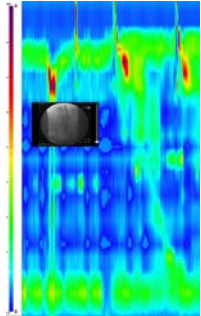
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## Real-time Esophageal Manometry and Video Fluoroscopy



- Enables simultaneous evaluation of esophageal motor function and bolus propagation
- Downside is radiation exposure

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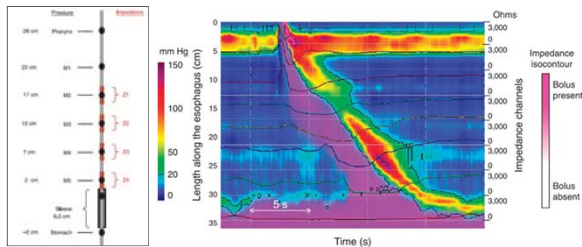
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## Impedance Manometry




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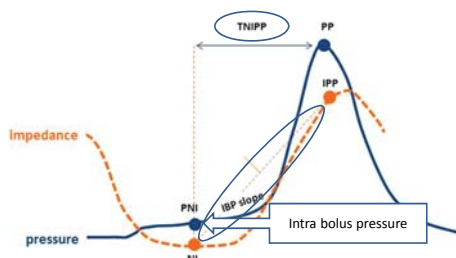
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## Dysphagia in Children with Esophageal Atresia: Current Diagnostic Options

Maissa Rayyan<sup>1</sup> Karel Allegaert<sup>1</sup> Taher Omari<sup>2,3</sup> Nathalie Rommel<sup>2,4</sup>

$$\text{Pressure flow index} = (\text{IBP} \times \text{IBP slope}) / \text{TNIPP}$$




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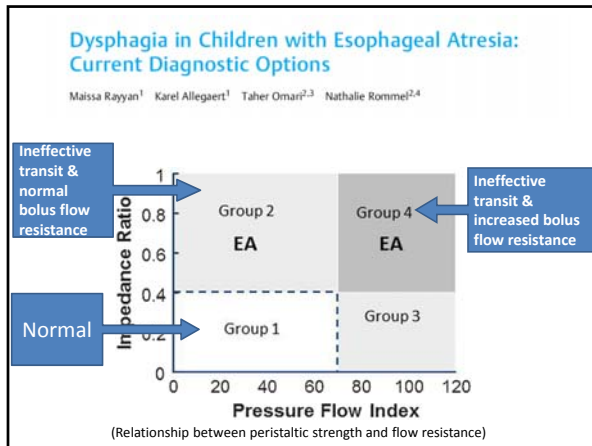
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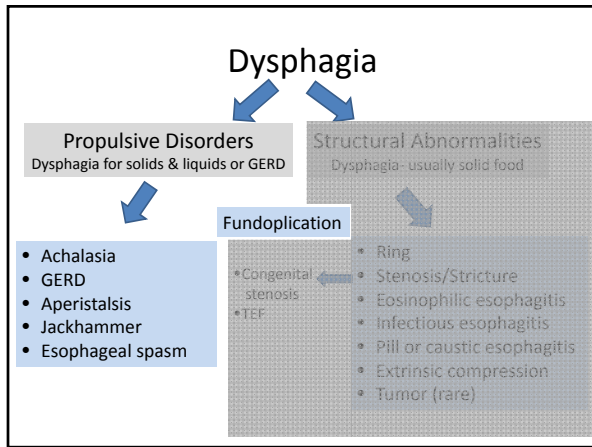
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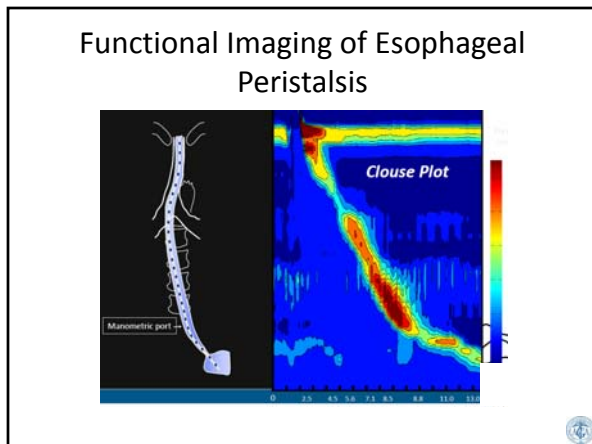
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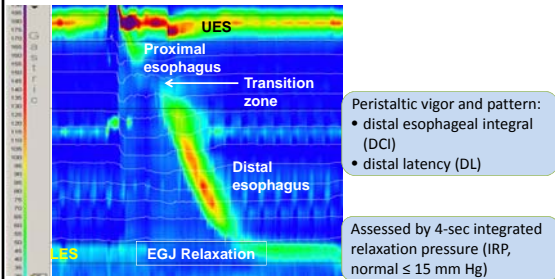
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## Esophageal Pressure Topography




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## Pressure Topography of Esophageal Motility

### Chicago classification

IRP $\geq$ upper limit of normal <b>AND</b> absent peristalsis	yes	Achalasia Subtypes I,II,III
IRP $\geq$ upper limit of normal <b>AND</b> some instances of intact or weak peristalsis	yes	EGJ outflow obstruction (achalasia variant)
IRP is normal <b>AND</b> absent peristalsis <b>OR</b> reduced distal latency <b>OR</b> DCI $> 8,000$ mmHg-cm-s	yes	<ul style="list-style-type: none"> <li>Absent Peristalsis</li> <li>Diffuse esophageal spasm reduced DL(<math>&lt;4.5s</math>)</li> <li>Jackhammer esophagus</li> </ul>
IRP is normal <b>AND</b> Minor Peristaltic Abnormalities	yes	<ul style="list-style-type: none"> <li>Rapid contraction</li> <li>Hypertensive Peristalsis</li> <li>Weak Peristalsis</li> <li>Frequent Failed Peristalsis</li> </ul>

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## Applying the Chicago Classification criteria of esophageal motility to a pediatric cohort: effects of patient age and size

M. M. I. SINGENDONK,<sup>1,2</sup> S. KRITAS,<sup>1,2</sup> C. COCK,<sup>2</sup> L. FERRO,<sup>1</sup> L. MCCALL,<sup>1</sup> N. RÖHMEL,<sup>1</sup> M. P. VAN WIL,<sup>1</sup> M. A. BENNINGA,<sup>1,2</sup> D. BODDEP & T. I. OMARIF,<sup>1,2</sup>

	Adult CC (%)	Age modified CC (%)
I - Achalasia	2.6	2.6
II – EGJ outflow	17.1	6.6
III – Absent or hyper contractile peristalsis	17.1	3.9
IV – Non specific abnormalities	28.9	31.5

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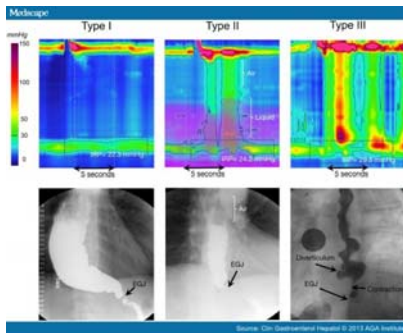
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## Types of Achalasia




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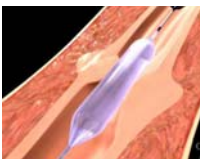
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## Achalasia -Treatment



- Laparoscopic Heller myotomy
- Esophageal Dilatation – Efficacy 32% to 98%
- Botox injection of EGJ
- Medication: isosorbide dinitrate or nifedipine




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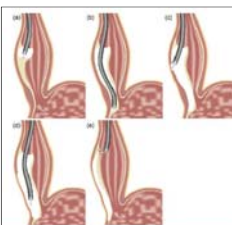
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## Per Oral Endoscopic Myotomy (POEM)



26 patients  
Mean age 13.8 yrs.  
Range 6 to 17 yrs.)

- 5 patients had mucosal injury or perforation
- 100% patients reported symptomatic improvement (Eckardt score <3) at 24m follow
- 19% had GERD symptoms and/or esophagitis

Chen WF, Clinical Endoscopy, 2015

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**JNM** Journal of Neurogastroenterology and Motility Volume 15, Number 2, April 2013 How to Interpret a Functional or Abnormal Test

### How to Perform and Interpret Timed Barium Esophagogram

Editor: Nayak<sup>1,2</sup>, Baheti<sup>3</sup> and Soley<sup>4</sup> © Ghoshal<sup>5</sup>

- Measured amount of low density Ba paste ingested in 15-20 sec.
- Images: 1, 2 and 5 min.

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### GERD and Dysphagia

- Resting EGJ pressure is normal in majority of adults with GERD
- tLESRs cannot be assessed during brief esophageal manometry studies
- Ineffective distal esophageal motility has been reported but correlation with acid reflux events and acid clearance is controversial

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### Causes of feeding problems post-fundoplication

Mousa H, et al. Pediatric Research 2005

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## Post-fundoplication dysphagia

- Prevalence 10% to 28% in studies reporting long outcomes<sup>1,2</sup>
- Early dysphagia:
  - postsurgical edema or transient esophageal hypomotility
- Persistent dysphagia<sup>3</sup>:
  - “Tight wrap”
  - New para-esophageal hernia
  - Secondary achalasia (esophageal vagal denervation)

1. Kubiak R, et al. J Pediatr Surg 2014

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## Complete Versus Partial Fundoplication in Children with Gastroesophageal Reflux Disease: Results of a Systematic Review and Meta-analysis

F. A. Mauritz • B. A. Blomberg • R. K. Stellato • D. C. van der Zee • P. D. Siersema • M. Y. A. van Herwaarden-Lindeboom

- 8 clinical trials were included 7 were retrospective
- Long term GER control was similar for the two procedures
- Relative risk of post-operative dysphagia with complete wrap was 2.1 compared to partial ( $p=n.s.$ )
- Complete fundoplication required significantly more dilatations for dysphagia (RR 7.26,  $p=0.007$ ) than partial fundoplication

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## New Insights in Gastroesophageal Reflux, Esophageal Function and Gastric Emptying in Relation to Dysphagia Before and After Anti-Reflux Surgery in Children

M. J. Smits • C. M. Loots • M. A. Benninga • T. I. Omari • M. P. van Wijk

- 10 patients
- 4 patients developed postoperative dysphagia
  - 2 patients the dysphagia resolved within 4 months
  - 2 patients had persisting dysphagia
- Conventional manometry and pH impedance measure not different
- Dysphagia risk index was significantly different and predicted post operative risk of developing dysphagia

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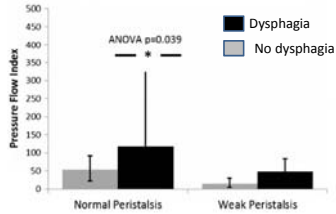
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**High-resolution manometry combined with impedance measurements discriminates the cause of dysphagia in children**

Nathalie Rommel<sup>1,2,3</sup>, Taher I. Omani<sup>4,5,6</sup>, Margot Seifedaghi<sup>3,7</sup>, Stamati Kritika<sup>1</sup>, Charles Cook<sup>6,8</sup>, Rachel Rosan<sup>7,8</sup>, Leonel Rodriguez<sup>7,8</sup>, Samuel Narka<sup>7,8</sup>

35 children with esophageal dysphagia (GERD, post-fundoplication & idiopathic)




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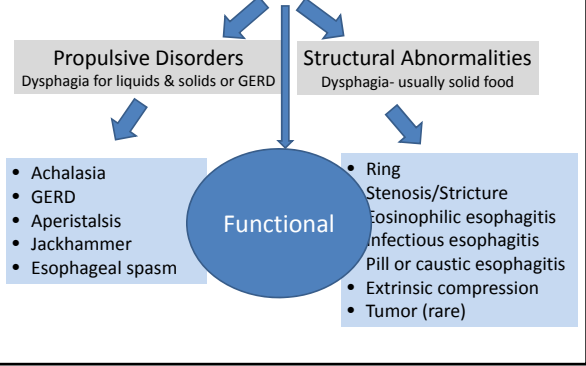
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**Dysphagia**




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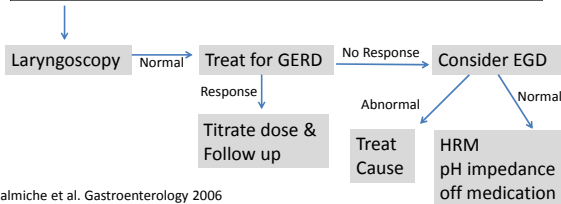
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**“Pseudodysphagia” or Globus sensation**

- Persistent or intermittent, non-painful sensation of a lump or foreign body in the throat
- Occurrence of the sensation between meals and absence of dysphagia or odynophagia



Galmiche et al. Gastroenterology 2006  
J Laryngo Oto 2004

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## Summary

### Key take home messages

- Dysphagia can have number of overlapping etiologies
  - Structural
  - Disorders of bolus propulsion
  - Functional
- Selecting diagnostic tests carefully and understand their limitations
- Diagnose and treat in parallel

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## Causes of Dysphagia

- High or Oropharyngeal Dysphagia
  - Neurological or skeletal muscle problems
- Lower or Esophageal Dysphagia
  - Anatomical or physiological esophageal obstruction
  - Mucosal inflammation

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## Results from the French National Esophageal Atresia register: one-year outcome

Anne Schneider<sup>1,2\*</sup>, Sébastien Blanc<sup>2</sup>, Amaud Bonnard<sup>3</sup>, Nazha Khem-Dunlop<sup>4</sup>, Frédéric Auber<sup>5</sup>, Anne Breton<sup>6</sup>, Guillaume Podelvin<sup>7</sup>, Rony Sfeir<sup>8</sup>, Virginie Fouquet<sup>9</sup>, Catherine Jacquier<sup>9</sup>, Jean-Louis Lemelle<sup>10</sup>, Frédéric Lavrand<sup>11</sup>

- Out of 301 patients data on 275 patients was available
- 1/3 of the patients had medical complications:
  - GERD (10%-20% required anti-reflux surgery)
  - Respiratory symptoms 37%
  - Respiratory disease 9%
  - Malnutrition 15%
- Multidisciplinary team approach is needed in infancy

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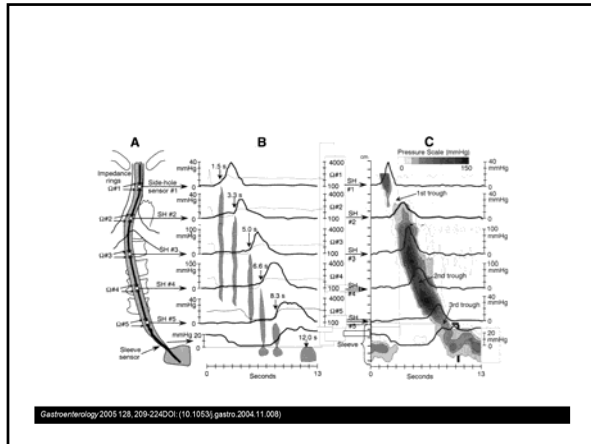
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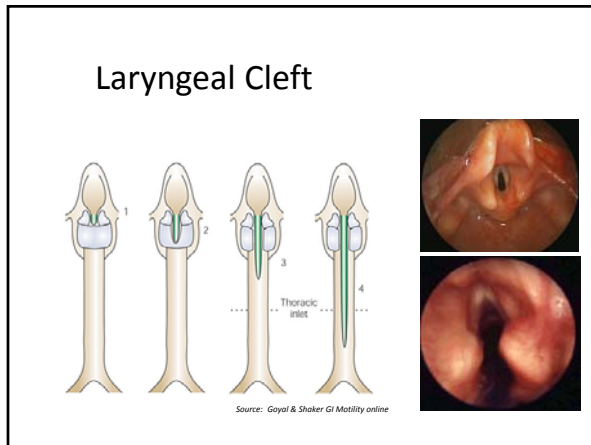
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### Dysphagia in Esophageal Atresia: Anatomical vs Functional

- 45 patients with EA
  - 62% needed dilatation
  - 42% received >3 dilatations
  - Stricture resolution occurred after median of 5 dilatations
- Esophageal anastomotic stricture index (EASI)
- Patients with L-EASI  $\leq 0.03$  required multiple dilatations and L-EASI  $\geq 0.70$  required no dilatations

Parolini F, et al. Pediatric Surgery International 2015

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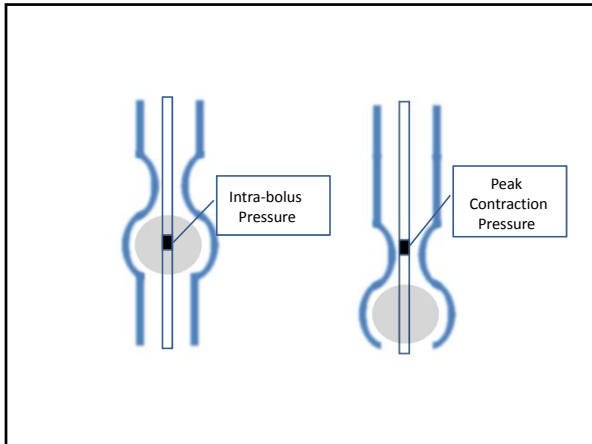
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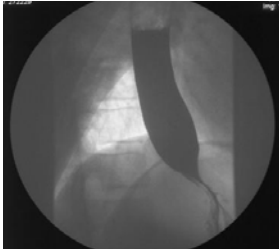
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### Achalasia



First line investigation in a child with dysphagia is an esophagogram

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Liquid swallows	GERD N=9	Post-fundoplication dysphagia N=5	Idiopathic dysphagia N=16
Whole esophagus			
ICD (cm)	4±1	2±1	5±1
PP (mmHg)	47 [36, 71]	54 [45, 83]	43 [36, 63]
PNI (mmHg)	2±1	3±1	3±1
IBP mmHg	5±1	5±2	5±1
IBP slope (mmHg/s)	5 [3, 7]	10 [4, 20]	7 [5, 9]
TNIPP (s)	3.7±0.2	2.8±0.3*	3.3±0.2
PFI	60 [23, 71]	102 [14, 238]	55 [23, 140]

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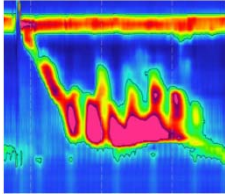
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## Jackhammer esophagus



- Occurrence of at least one swallow with a DCI greater than 8,000 mmHg-s-cm
  - Heterogeneous disorder and might occur in the context of other esophageal abnormalities, such as EGJ outflow obstruction, GERD or EOE
- Therapy focused at
  - Reducing peristaltic amplitude
  - Many patients respond to therapy targeting visceral hypersensitivity

Gastroenterology 2005;128:209-224

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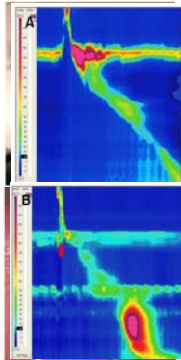
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## Cricopharyngeal Achalasia



- Barium swallow shows a bar in the region of cricopharyngeal (CP) muscle
- Transcervical CP myotomy
- Endoscopic myotomy, botox injection or balloon distension

Huoh K, Curr Opin Otolaryngol Head Neck Surg 2013

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## A comprehensive review of laparoscopic redo fundoplication

Darren B. van Beek · Edward D. Anyang ·  
Nathaniel J. Soper  
Surg Endosc 2013

**Table 2** Indications for reoperation when only a single cause is reported

Primary indication for reoperation	No. of occurrences (% of cases reported)
Recurrent GERD	377 (59.4)
Dysphagia	194 (30.6)
Gas bloat	29 (4.6)
Hiatal hernia	14 (2.2)
Other	21 (3.2)

The analysis included 635 cases  
GERD gastroesophageal reflux disease

- Weighted average success rate 81% (range 65% to 100%)
- 74% of patients were satisfied with the procedure and would have it again

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