TECNICHE DIAGNOSTICHE CONVENZIONALI NELLO STUDIO DELLA DISFAGIA

LA MANOMETRIA ESOFAGEA

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STATIONARY ESOPHAGEAL MANOMETRY

Pharynx
Body
LES
NORMAL ESOPHAGEAL MANOMETRY

UES

Esophageal body

LES

LES
ESOPHAGEAL MANOMETRY: INDICATIONS

To establish the diagnosis of Major Motility Disorders (e.g. achalasia or distal esophageal spasm)
To support the diagnosis of functional dysphagia by excluding abnormal esophageal motility

To identify an esophageal involvement in case of Systemic Disease

Non-cardiac chest-pain
To establish the diagnosis of Major Motility Disorders (e.g. distal esophageal spasm or jackhammer esophagus)
To support the diagnosis of functional chest pain by excluding abnormal esophageal motility
To identify an esophageal involvement in case of Systemic Disease

Reflux symptoms (heartburn/regurgitation)
Before reflux monitoring for placement of intraluminal devices (e.g. pH-impedance probes)
Before anti-reflux surgery for excluding/identifying Major Motility Disorders (e.g. achalasia)
To support the diagnosis of functional heartburn by excluding abnormal esophageal motility
To establish the diagnosis of rumination syndrome in refractory GERD

Achalasia
To establish the best therapeutic approach based on manometric pattern (e.g. Pneumatic Dilation for Type I and II achalasia, Heller Myotomy/POEM for all type of achalasia)

Potential indications for manometry
Before bariatric surgery for excluding/identifying Major Motility Disorders (e.g. achalasia)
Before anti-reflux surgery for selecting the most tailored surgical intervention (e.g. Toupet Fundoplication in case of ineffective esophageal motility with abnormal MRS)
To assess the presence and size of hiatal hernia in order to consider its impact on potentially reflux related symptoms (e.g. to be performed concomitantly with reflux monitoring)

Non indications for manometry
To establish the diagnosis of GERD
As first-line diagnostic approach in case of dysphagia or chest-pain (e.g. low specificity)

Savarino E, et al. DLD 2016
LIMITS OF STATIONARY ESOPHAGEAL MANOMETRY:
- PHARINGEAL ASYMMETRIC STRUCTURE -

UES STATIONARY ESOPHAGEAL MANOMETRY - LIMITS -

- UES pressure is influenced by recording methodology
- Intraluminal catheters stimulate sphincter contraction
- Contractile rate exceeds performance of perfused systems
- UES presents an asymmetric structure
- UES is characterized by axial movement during swallowing
DIFFUSE ESOPHAGEAL SPASM IN PARKINSON’S DISEASE
SIMULTANEOUS WAVES IN PARKINSON’S DISEASE

Pharinx
UES

Esophageal body

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Image of a graph showing simultaneous waves in the esophageal body under normal conditions and in Parkinson's disease.
NUTCRACKER ESOPHAGUS IN PARKINSON’S DISEASE

Pharynx

UES

Esophageal body
UES
Stomach
LES
Esophageal body

DILATED ESOPHAGUS IN PARKINSON’S DISEASE
Each sensor has 12 pressure sensitive segments that add to the signal at that location.
HIGH-RESOLUTION SOLID-STATE ESOPHAGEAL MANOMETRY
Assenza di peristalsi

Deglutizione Tempo (sec)

0 5 10

Pressione (mmHg)

Faringe Sfintere esofageo superiore
Corpo esofageo
Giuizione esofago-gastrica Stomaco
Spasmo Esofageo Diffuso
SOLID-STATE HIGH-RESOLUTION MANOMETRY

Nutcracker esophagus

Jackhammer esophagus
JACKHAMMER ESOPHAGUS: X-RAY EVALUATION
SOLID-STATE HIGH-RESOLUTION MANOMETRY

Sclerodermic esophagus
### HR MANOMETRY AND HIATUS ERNIA

<table>
<thead>
<tr>
<th>Type 1</th>
<th>no separation between the LES and the crural diaphragm (CD)</th>
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<tbody>
<tr>
<td>Type 2</td>
<td>minimal separation (&lt;2–3 cm) making for a double peaked-pressure profile</td>
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</table>
| Type 3 | more than 2–3 cm separation between the LES and the CD at inspiration so that two high-pressure zones can be clearly identified. The proximal high-pressure zone represents the LES and the distal high-pressure zone represents the diaphragm.  
3a: respiratory inversion point distal to the LES  
3b: respiratory inversion point proximal to the LES |

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Keller J. Visc Med 2018
Achalasic patient with aperistalsis and normal integrated relaxation pressure

Sanagapalli S et al, *Curr Opin Gastroenterol* 2022
**EGJOO patient with normal single water swallows**

**Single water swallows: normal and ineffective LES pressure and motility**

- **Solid meal**
  - Impaired LES relaxation
  - Impaired pressurization

- **MRS**
  - Impaired LES relaxation
  - Impaired pressurization

- **Solid meal**
  - Impaired LES relaxation
  - Spasm and hypercontractility

Sanagapalli S et al, *Curr Opin Gastroenterol* 2022
PROVOCATIVE TESTS AND HRM: SOLID MEAL AND MRS

Hypomotility disorder with normal single water swallows

Single water swallows
Ineffective or failed swallows

Multiple rapid swallows
Normal contraction reserve

Single wet swallows
Ineffective or failed swallows

Solid test meal
Normal contraction reserve

Sanagapalli S et al, Curr Opin Gastroenterol 2022
HIGH RESOLUTION PHARYNGEAL MANOMETRY

Taira K et al, Clin Neurol Neurosurg 2021
INTRALUMINAL IMPEDANCE IN GERD

Non Acidic Reflux Episode

IMPEDANCE

Proximal esophagus

Distal esophagus

pH esophagus stomach

stomach
HIGH RESOLUTION IMPEDANCE MANOMETRY

UES
Esophageal Body
LES
Pharynx
UES
Esophageal Body
LES

Intraluminal Impedance
Intraluminal Pressure
HR IMPEDANCE MANOMETRY AND TLESRs

TLESR in a GERD patient

Impedance during TLESR

Keller J. Visc Med 2018
HR IMPEDANCE MANOMETRY AND PHARYNGEAL TRANSIT
HR IMPEDANCE MANOMETRY AND PHARYNGEAL TRANSIT
**DISTENSION-CONTRACTION PLOTS OF ESOPHAGEAL PERISTALSIS**

**Distention-Contraction plot of esophageal peristalsis**

**M-mode US of esophageal peristalsis 5 cm above LES**

DISTENSION-CONTRACTION PLOTS OF PRESSURE AND IMPEDANCE MEASUREMENT

Muta K et al, *PlosOne* 2022
THANK YOU FOR YOUR ATTENTION