**Esophageal manometry (high resolution impedance manometry; HRIM)**

**Basics**

Esophageal manometry is an important ambulatory diagnostic test for gastroesophageal reflux disease (GERD). In our lab we combine investigation of pressure topography (high resolution manometry) with the assessment of esophageal transport function (impedance technology). Impedance changes along a catheter indicate the direction (influx, reflux) and quality of transport (complete, incomplete).

The esophagus is a muscular tube for the transport of food. At its upper and lower portions the esophagus harbors 2 valves, the upper and the lower esophageal sphincter (LES), respectively. The muscular tube and the valves exert pressure. Manometry measures the function of the valves (upper and lower esophageal sphincter) and the pressure changes along the esophagus during swallowing. Impedance assesses the transport function of the esophagus.

Gastroesophageal reflux disease (GERD) frequently associates with abnormal esophageal pressure profiles and impaired transport function.

*Manometry uses a catheter and assesses the pressure topography across the esophagus and the lower esophageal sphincter. The function of the lower esophageal sphincter is frequently impaired in persons with reflux and heartburn.*

**Indications**

Prior to any anti reflux operation (magnetic ring, fundoplication) every patient should undergo esophageal manometry to assess:

The dysfunction of the anti reflux mechanism,
The transport function of the esophagus, Contraindications for anti reflux surgery (achalasia, esophageal spasm, nutcracker esophagus). The correlation of gastroscopy and manometry enables us to tailor the anti reflux surgery (magnetic ring, fundoplication)

Technology

The esophageal manometry system combines esophageal high resolution manometry (32 pressure sensors) and intraluminal impedance technology (16 impedance sensors). The technology is also termed: esophageal high resolution impedance manometry; HRIM. The diameter of the manometry/impedance catheter is 12 Fr (4.0 mm). The data are processed via a computer and presented a color plots (red color for high pressures, green for low pressures). The purple color plot indicates the transport along the catheter.

Preparation for manometry

Esophageal manometry is conducted as an ambulatory procedure in fasting state. You are allowed to take the morning medication with a small cup of water.

Performance of manometry

In upright body position the catheter is introduced into the stomach via the anesthetized nostrils. Following the base line measurements you are asked to swallow 10 portions of salty water for the assessment of the transport function of the esophagus. The test does not hurt and lasts 20 minutes.

Manometry report

The manometry report includes data and images (colored manometry tracings). The manometry report describes the function of the anti reflux mechanism in the lower portion of the esophagus (lower esophageal sphincter, LES): length of the pressure zone, amount of pressure along the length of the pressure zone, the location of the pressure zone in relation to the level of the diaphragm (hiatal hernia?). Furthermore the test assesses the contraction waves during swallowing. Finally the impedance part of the test describes the transport function of the esophagus (normal, impaired?).

*esophageal high resolution impedance manometry:*

<table>
<thead>
<tr>
<th>parameter</th>
<th>normal values</th>
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</thead>
<tbody>
<tr>
<td>LES (length)</td>
<td>&gt; 5 cm</td>
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<tr>
<td>LES resting pressure</td>
<td>10-35 mm Hg</td>
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<tr>
<td>LES residual pressure during swallowing</td>
<td>&lt; 8 mm Hg</td>
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<tr>
<td>Effective contraction waves</td>
<td>&gt; 79% of swallows</td>
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LES: lower esophageal sphincter

Relevance of manometry

The results of the esophageal impedance manometry serve for treatment tailoring (life style, medical or surgical therapy). After the manometry we conduct the reflux monitoring.
Expert opinion

Johannes Lenglinger (Physiologist, Vienna):

We offer esophageal high-resolution manometry combined with impedance. Currently this is the best you can get. The pressure profile tells the surgeon where to place the magnetic ring or the fundic wrap. The combination of pressure and impedance defines the transport function of the esophagus. Without transport we are not allowed to recommend anti reflux surgery. This highly sophisticated modern technology helps us to be at the safe side.

Sebastian Schoppmann (Surgeon, Vienna):

We do not offer surgery without esophageal manometry. Otherwise you may potentially miss achalasia and other functional disorders of the esophagus. And if you miss it you gibe the wrong treatment. In addition, the data obtained by manometry help us to tailor the treatment, magnetic ring vs. fundoplication.

Literature