**Fundoplication**

**Basics**

Reflux occurs because of the impaired function of the anti reflux mechanism in the lower part of the esophagus, the lower esophageal sphincter. Medical therapy lowers the acidity of the reflux but it does not eliminate the reflux per se. Surgery wraps the proximal stomach (fundus) around the lower portion of the esophagus and thus creates a functioning anti reflux mechanism. Thus fundoplication restores the lost function of the lower esophageal sphincter.

**Indications for fundoplication (anti reflux surgery)**

Indications for fundoplication (anti reflux surgery) include:
- Reflux impairs your life quality, wellbeing and productivity (sleep disturbance, asthma etc.)
- Medical treatment does not cause adequate reflux symptom relief
- Esophageal manometry and esophageal reflux monitoring verify reflux as the cause for the symptoms
- Reflux symptoms are at least partially sensitive to the administration of proton pump inhibitor
- Reflux symptoms at least partially response to dietary changes (elimination of sweeties, carbonated beverages).

**Preparation & management**

For the operation you are kindly asked to bring the reports your tests (endoscopy, laboratory, radiologic examinations; esophageal manometry, esophageal reflux monitoring; allergy pass, blood group, rhesus factor, blood count and blood clotting data). For fundoplication you are admitted to the hospital for at least one night (admission at the day of the operation, you will stay overnight after the day of the operation).

The experienced members of our team perform fundoplication (anti reflux surgery) in our cooperating hospitals.

**Fundoplication (anti reflux surgery): how it works**

Fundoplication (anti reflux surgery) takes 60-90 min and is conducted as a minimal invasive laparoscopic operation (like the removal of the gall bladder). Five trocars (tubes) are inserted into the upper belly (abdomen), CO2 insufflation elevates the abdominal wall for the creation of the working space. Video camera and instruments are introduced into the abdomen via the trocars. The trocars are introduced through small (0.5 – 1.0 cm) skin incisions.
Image obtained during fundoplication. The esophagus lies within the enlarged hiatal hernia. The diaphragm encircles the hernia.

During the operation the hiatal hernia is reduced by the application of sutures. Care is taken not to constrict the esophagus.
Final situation after Nissen fundoplication. The fundus enwraps the entire circumference of the esophagus.

**Principle of fundoplication**

Where the esophagus runs into the stomach, the stomach has a sack-like, highly expandable excavation. This portion of the stomach is the fundus. It serves for the storage of food. The fundus lies beneath the left side of the diaphragm. Therefore, after a large meal, you feel discomfort in the left upper quadrant of your abdomen. If a very large meal (+carbonated drinks, alcohol) overstretches the fundus, it pressures the diaphragm and hick ups occur.

During the fundoplication (anti reflux surgery) the surgeon wraps the fundus around the lower portion of the esophagus (gullet). This maneuver creates an effective anti reflux mechanism.

**Operation steps**

First the surgeon dissects the connections between the lower portion of the esophagus and the diaphragm. The hiatal hernia becomes visible. Thereafter the fundus of the stomach is mobilized. Using a special instrument for tissue cutting and vessel sealing (ultra sound scissor) the surgeon dissects the vessels between the fundus and the spleen. Now the entire lower esophagus and the fundus is mobilized. The surgeon places 2-4 sutures between the right and the left edge of the diaphragm. This maneuver reduces the size of the hiatal hernia (the hole in the diaphragm). Care is taken to avoid narrowing of the esophagus as it passes through the hiatus. Next the the surgeon wraps the fundus around the lower portion of the esophagus. This step of the operation is crucial to restore the function of the lower esophageal sphincter (anti reflux mechanism). Sutures fix the fundic wrap to the esophagus and to the diaphragm. This is important to prevent displacement (slipping, sliding, herniation) of the fundoplication. The positioning of the fundic wrap defines the type of the fundoplication (anti reflux surgery).

Nissen fundoplication: the fundus enwraps the entire circumference of the esophagus
Toupet fundoplication: the fundus enwraps the dorsal 270° portion of the circumference of the esophagus.
Dor fundoplication: the fundus enwraps the anterior aspect of the esophagus.

**Prognosis**

In experienced hands anti reflux surgery offers excellent outcome and prognosis. After 5-10 years fundoplication works in 80% to 90% of the cases. Nissen and Toupet fundoplication are equally effective to eliminate reflux symptoms (heartburn, coughing, asthma). There is no need for medical anti reflux therapy. During the first 4-5 weeks after the operation swallowing difficulties are more frequently perceived after Nissen vs. Toupet fundoplication. Thereafter both operations provide comparable outcome.

**Eating behavior after anti reflux surgery (fundoplication)**

During the first 10 days after the operation we recommend liquid and crème diet. Take your time for the meals and drink frequent small amounts of water and tea. Avoid large meals and the consumption of carbonated beverages, alcohol and sweet food, because these nutrients impair the esophageal transport and the function of the fundoplication.

**Complications**

When performed in experienced centers laparoscopic anti reflux surgery (fundoplication) is a save procedure. Intraoperative complications occur in less than 2.5% of the cases (injury to esophagus, liver, spleen, stomach, gut) and can be managed successfully. Reoperation due to slipping and displacement of the fundic wrap may be necessary in 10% of the cases during the subsequent 5-10 years.

**Expert opinion**

**Sebastian Schoppmann (Surgeon, Vienna):**

Anti reflux surgery should only be offered to those who need it. We establish the indication for the surgery by gastroscopy, esophageal manometry and reflux monitoring. If the tests assess reflux and reflux as the cause of the symptoms we offer anti reflux surgery. The operation should be conducted in centers with experience in the diagnosis of reflux and fundoplication.

**Martin Riegler (Surgeon, Vienna):**

Both Nissen and Toupet fundoplication are equally effective to eliminate reflux. Both types of operation restore the life quality of the patients. After the anti reflux surgery it is important that the patients avoid to over eat. This would over stretch the fundic wrap and facilitate slipping. After the operation we offer regular consultations for life style tuning. There is no place for Dor fundoplication for treatment of reflux. It is only applied after Heller myotomy of the lower portion of the esophagus for the treatment of achalasia. Here Dor fundoplication prevents reflux after the myotomy.

**Johannes Lenglinger (Physiologist, Vienna):**

2 things are important for successful anti reflux surgery. First, the patient has to have proven reflux as the cause of the symptoms. This is why we perform esophageal manometry and reflux monitoring prior to every anti reflux operation. Second, experienced surgeons should do the operation. This is the advantage of institutes focused on the diagnosis and treatment of reflux.
Literature


