Indication

Indications for Surgery

- Ulcerative esophagitis, strictures, Barrett esophagus
- Failure or intolerance of drug therapy
- Patient's wish as an alternative to long-term drug therapy
- Volume reflux with chronic bronchitis
- Volume reflux with treatment-resistant regurgitation of food
- An interdisciplinary decision with gastroenterologists should be made.

- Interdisciplinary indication for surgery

Conservative Treatment

- Weight reduction
- Sleep with upper body elevated
- Proton pump inhibitors, in ca. 80% freedom from symptoms, healing of the reflux esophagitis almost without exception; often requires lifelong treatment

- Weight reduction, sleeping with upper body elevated, proton pump inhibitors

Surgical Treatment

- Laparoscopic Nissen–Rosetti **fundoplication**
- Alternatively, hemifundoplication
- **Hiatoplasty:** posterior narrowing of the esophageal hiatus that has been stretched by the sliding hernia; additionally counteracts reflux by increasing the angle at which the esophagus opens into the stomach
- Additional **fundophrenicopexy** indicated only for upside-down stomach
- With very large sliding hiatal hernias or paraesophageal herniation, use of a **plastic mesh** to close the hernia may be necessary.
- Numerous other procedures are not established for use outside of clinical studies. These include, for instance, heating by radiofrequency therapy, intraluminal mucosal plication, and injection of plastic polymers.

- Standard treatment: laparoscopic fundoplication and hiatoplasty

Laparoscopic Fundoplication

Operative Technique

- Position the patient with legs on stirrups and with the buttocks supported.
- Create a pneumoperitoneum and carry out diagnostic laparoscopy (**Fig. 8.2**).
- Then place the patient in semi-seated position with feet lowered and turned slightly to the right side. The surgeon stands between the patient's legs.
- The left lobe of the liver is retracted with a triangle over the trocar from the right costal arch (T5).
- Exposure of the gastroesophageal junction is by incision of the lesser omentum proximal to the accessory left hepatic artery, which is often present.
- Incision of the peritoneal fold over the esophagus
- Dissection of the fundus along the greater curvature of the stomach from adhesions to the spleen (**caution:** short gastric arteries) and in a retroperitoneal direction. Dissection with ultrasonic scissors has proven useful.
- Dissect the esophagus free at the junction with the gastric fundus, protecting the vagal trunks.
- If appropriate, perform dissection of a hiatal hernia in the lower mediastinum.
- Tighten the hiatus, usually by two or three sutures posteriorly using nonabsorbable suture material (hiatus repair; **Fig. 8.3**).
- If appropriate, additional implantation of a plastic mesh after reduction of a large hiatal hernia, paraesophageal hernia or upside-down stomach

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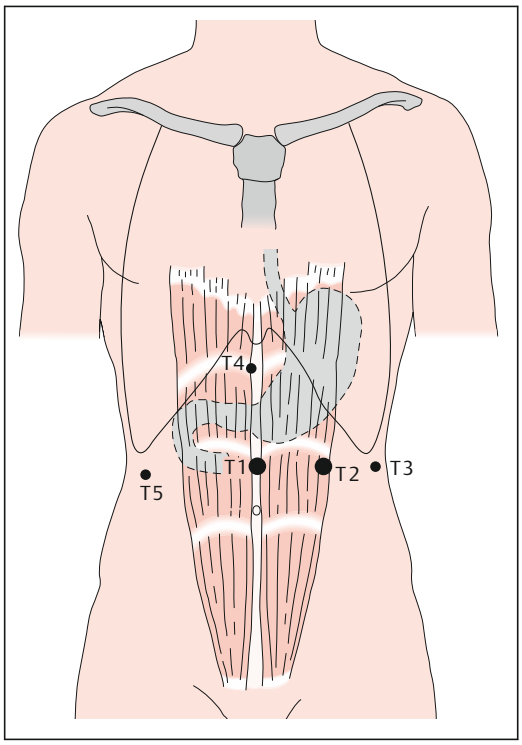

Fig. 8.2 Access routes for laparoscopic fundoplication.
T1: optic trocar
T2: working trocar, surgeon
T3: working trocar, assistant
T4: working trocar, surgeon
T5: working trocar, assistant, for holding the left lobe of the liver (triangle)

- Create a loose fundal cuff around the distal esophagus, drawing the mobilized fundus behind the esophagus.
- Introduction of a large gastric tube to prevent narrowing of the lumen by the fundoplication (this is done only at this time as it would interfere with dissection beforehand)
- Fixation of the cuff by picking up the esophagus with the first suture to prevent the stomach from sliding proximally. Two further sutures are used to form a loose cuff (floppy Nissen; **Fig. 8.4**); all sutures are nonabsorbable.
- Remove the gastric tube and check that the cuff is loose.
- Check for hemostasis, particularly on the spleen and liver.

Postoperative Management

- Removal of the gastric tube while still in the operating room
- Light diet the following day, ensuring that it is well masticated
- Check blood count on postoperative days 1 and 3.
- Discharge on postoperative day 3. Reflux symptoms should be eliminated on the day of surgery.

Complications

- Dysphagia
- Gas bloat syndrome
- Stenosis
- Recurrence

- Dysphagia and gas bloat syndrome (result of an excessively tight cuff)
- Telescope phenomenon if cuff is not fixed to the esophagus
- Denervation syndrome as a result of injury to vagal branches or vagus trunk
- Reflux recurrence if the cuff loosens
- Cicatricial stenosis at the esophageal hiatus with symptoms of narrowing

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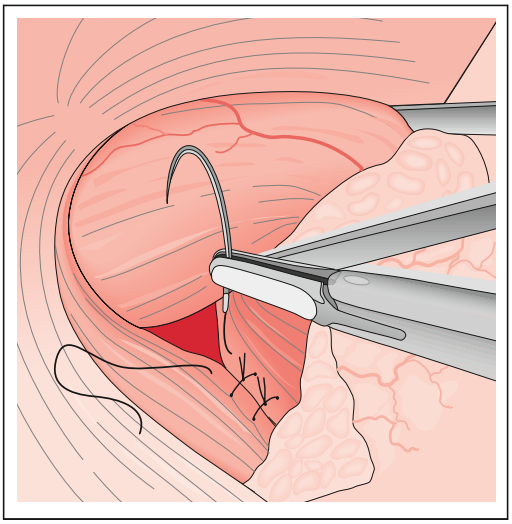

Fig. 8.3 Hiatal repair

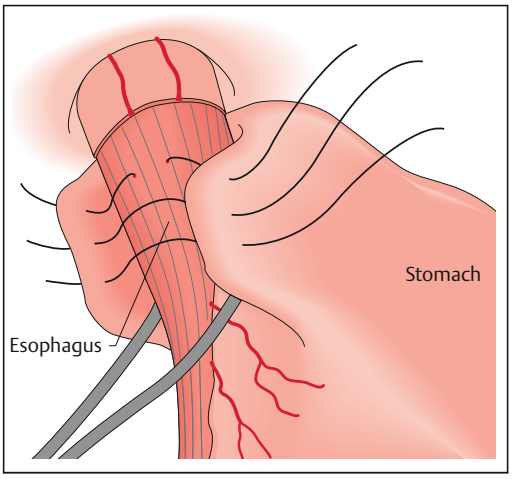

Fig. 8.4 Nissen fundoplication

Esophageal Carcinoma

Epidemiology

- Incidence about 10 per 100 000 population/year
- Predominantly **squamous epithelial carcinomas,** followed by **adenocarcinomas;** incidence of adenocarcinomas of the distal esophagus and gastroesophageal junction has been increasing in recent years.
- Ratio of men to women is 5 : 1.

Etiology

- Rapid metastasis to the local lymph nodes and extensive intramural growth (mucosal margin of the tumor often does not correspond to the tumor margin in the esophageal wall)

- Intramural growth
- Early lymphatogenous metastasis
- Lung and liver metastases
- Peritoneal carcinomatosis

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- Distant metastases from proximal tumors especially to the lung and from distal tumors to the liver; skeletal metastases only occur later; with locally advanced distal tumors there is often peritoneal carcinomatosis
- Tumor localization is very important because of the different treatment approaches

Risk Factors

- Smoking
- Alcohol
- Thermal injury (hot foods)
- Cicatricial strictures, for example after acid or alkali corrosive injury, radiation
- Barrett esophagus: precancerous condition for adenocarcinoma of the esophagus

Classification

- Assessment of lymph nodes crucial for staging, prognosis and treatment

- **Squamous epithelial carcinoma:** distinction between cervical, supra- and infrabifurcation
- **Adenocarcinoma** of the distal esophagus is classified with proximal gastric carcinoma as adenocarcinoma of the esophagogastric junction (AEG):
  - ► Type I: distal esophagus (Barrett carcinoma)
  - ► Type II: cardia carcinoma, at the gastroesophageal junction
  - ► Type III: subcardiac gastric carcinoma, infiltrating the cardia from below
- AEG type I tumors are classified as esophageal carcinomas in the TNM classification, and AEG type II and III tumors are classified as gastric carcinomas (**Tables 8.2** and **8.3**).

Table 8.2 TNM classification

Tx		Primary tumor not assessable
T0		No evidence of primary tumor
Tis		Carcinoma in situ
T1		Infiltration of the lamina propria, muscularis mucosae, or submucosa
T2		Infiltration of the muscularis propria
T3		Infiltration of the adventitia
T4		Infiltration of neighboring structures
Nx		Regional lymph nodes not assessable
N0		No regional lymph node metastases
N1		Regional lymph node metastases
M0		No distant metastases
M1		Distant metastases and **nonregional lymph node metastases**
	Tumor in the upper thoracic esophagus	
	M1a	Metastases in cervical lymph nodes
	M1b	Nonregional lymph nodes and/or other distant metastases
	Tumor in the middle thoracic esophagus	
	M1a	not possible
	M1b	Nonregional lymph nodes and/or other distant metastases
	Tumor in the lower thoracic esophagus	
	M1a	Celiac lymph nodes
	M1b	Nonregional lymph nodes and/or other distant metastases

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