Esophagus and Stomach

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The upper gastrointestinal surgery represented one of the first applications of laparoscopy. Since the early 1990s, benign esophageal disorders like gastroesophageal reflux, achalasia, or hiatal hernia became indications for the laparoscopic approach (LA) [1, 2].

During the last two decades, laparoscopy was accepted worldwide as a gold standard approach for the treatment of these diseases surpassing open surgery because of its undisputed advantages as well as less morbidity, faster recovery, and also better cosmetic results [3].

Always in the 1990s, it has been published as the first report of laparoscopic gastrointestinal resections for esophageal or gastric malignancy.

The first minimally invasive esophagectomy was reported by Cuschieri [4] in 1994. Subsequently, many reports have been published focusing on the technical aspect and feasibility of thoraco-laparoscopic esophagectomy.

With the term minimally invasive esophagectomy (MIO), it means a procedure in which both the abdominal and thoracic stages are either fully endoscopic or hand-assisted endoscopic, while hybrid MIO (HMIO) is a procedure in which one stage (abdominal or thoracic) is open and other stage is endoscopic or hand-assisted endoscopic.

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A recent systematic review [5] analyzed the efficacy and safety including mortality, operative complications, recurrence, and quality of life of laparoscopic esophagectomy comparing to open surgery. The authors found 28 comparative studies with no randomized controlled studies (RCTs). They suggest that minimally invasive esophagectomy seems to be safe and effective as well as the open surgery. However, the quality of the researched studies is poor and with many possible bias. So they cannot conclude that minimally invasive techniques are superior to open surgery. They also suggested the best way to analyze the results of MIO in the future underlying that probably a comparative study could be adequate provided that it includes all the countless variables about patients, surgical techniques, and type of cancer.

About gastric resection for benign or malignant disease, the first laparoscopic procedure was carried out by Goh et al. in 1992 [6]. Afterward, in 1999, Azagra et al. described the first series of laparoscopically assisted gastrectomies for malignant diseases [7].

There are two types of laparoscopic procedure, the "laparoscopic assisted" (LAG) and the "totally laparoscopic" (TLG), depending if the reconstructive step is performed by a minilaparotomy (in most cases <10 cm) or fully intracorporeal. A recent meta-analysis on these two different approaches during a distal gastrectomy for an early gastric cancer (EGC) concluded that TLG can significantly reduce bleeding, time to first flatus, and rates of postoperative complications [8]. More generally, these advantages have been found frequently comparing the laparoscopic gastrectomy (LG) with the open one (OG). Another recent meta-analysis [9] demonstrated that LG decreased the frequency of analgesic administration, a shorter hospital stay, but also a longer operative times and the number of harvested lymph nodes lesser as compared to OG. These results are consistent with the conclusion of the recent Consensus Conference on Gastric Cancer of the Italian Society of Surgery [10] in which the participants suggested that a radical gastrectomy in EGC can be performed with a laparoscopic approach, while there are no data that allow to consider safe this approach for cT2 or cT3 tumors. About this issue, Hüscher et al. published the only RCT study with a 5-year follow-up [11], reporting an overall survival and disease-free survival in both groups (OG vs. TLG) of 55.7 % vs. 54.8 % and 58.9 % vs. 57.3 %, respectively. They conclude that TLG is an oncologically safe procedure.

In conclusion, it is important to recommend the use of a laparoscopy for treatment of gastric cancer only by surgeons already highly skilled in gastric surgery and in other advanced laparoscopic interventions.

We suggest to perform the first procedures during a tutoring program because it is a very complicated surgery with a long learning curve [12].

1.1 Hiatal Hernia

The bed is placed in reverse Trendelenburg position with left tilt. First operator stands between patient's legs (Figs. 1.1 and 1.5). Laparoscopic rack is placed behind patient's head.

Specific surgical drapes are used.

Laparotomic Instrument Table Must Be Always Ready for Use

Surgical Steps

1. Hernia reduction
2. Anatomical landmark recognition
3. Pars flaccida opening
4. Short gastric vessel ligation
5. Retroesophageal tunneling
6. Hiatoplasty
7. Fundusplication

Fig. 1.1 Equipment and patient position during hiatal hernia

Instruments and Cables

- 30, 5, or 10 mm laparoscope
- Cold light source cable
- CO_2 pipe and filter
- Monopolar electrocautery
- Patient return electrode (REM)
- Sterile instrument bag
- Monopolar and bipolar electrocautery cables
- Ultrasonic dissector/radiofrequency cables
- Bladder catheterization set
- 56 Fr Maloney probe

Laparoscopic Instrument Table (Fig. 1.2)

- Sutures: 2-0 braided not absorbable suture, 0 braided absorbable suture, and skin wound closure sutures
- Surgical scalpel blade No. 23
- Laparoscopic gauzes
- Stainless surgical bowl
- Gross-Maier dressing forceps
- Two Bernhard towel forceps
- Veress needle and 10 mL syringe
- Three 10–12 mm trocars
- Two 5 mm trocars
- Needle holder
- Two tissue forceps with teeth
- Anatomical thumb forceps
- Metzenbaum scissors
- Mayo scissors
- Two Klemmer forceps
- Two Kocher forceps
- Two Backhaus forceps
- Two Farabeuf retractors
- Bipolar laparoscopic forceps
- Ultrasonic dissector/radiofrequency dissector
- Laparoscopic scissors
- Laparoscopic needle holder (2–0, 10 cm long, not absorbable braided must be ready on the instrument)
- 5–10 mm Endo Retract
- 5–10 mm clip applier
- Johann forceps without ratchet handle
- Johann forceps with ratchet handle
- 42 cm long Johann forceps without ratchet handle
- Thermos

Fig. 1.2 Instrument table

1.2 Lower Esophagus Neoplastic Diseases

The bed is placed in reverse Trendelenburg position with left tilt. First operator stands between patient's legs. Laparoscopic rack is placed behind patient's head (Fig. 1.3a–d).

Specific surgical drapes are used.

Laparotomic Instrument Table Must Be Always Ready for Use

Surgical Steps

1. Anatomical landmark recognition
2. Esophageal hiatus isolation
3. Posterior mediastinum access
4. Esophageal dissection and lymphadenectomy
5. Azygos vein section (if needed)
6. Gastric tubulization

7. Kocher's maneuver
8. Cervicotomy or right thoracotomy (if needed)
9. Specimen extraction
10. Anastomosis

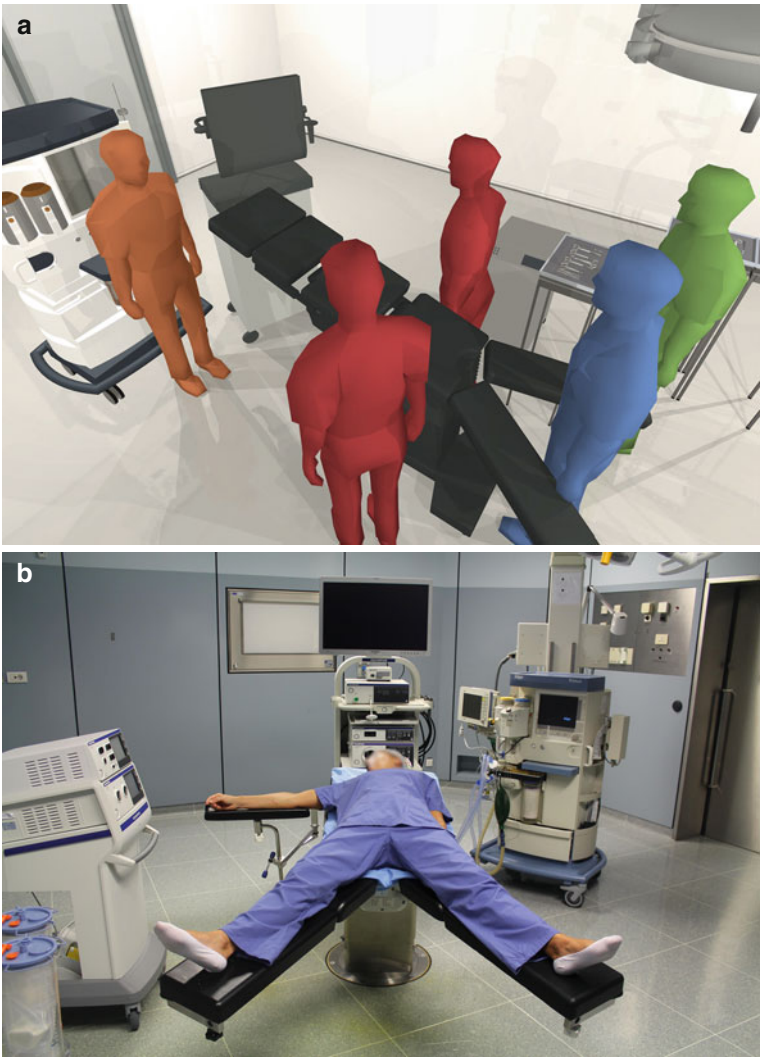

Fig. 1.3 (**a**–**d**) Equipment and patient position during esophagectomy

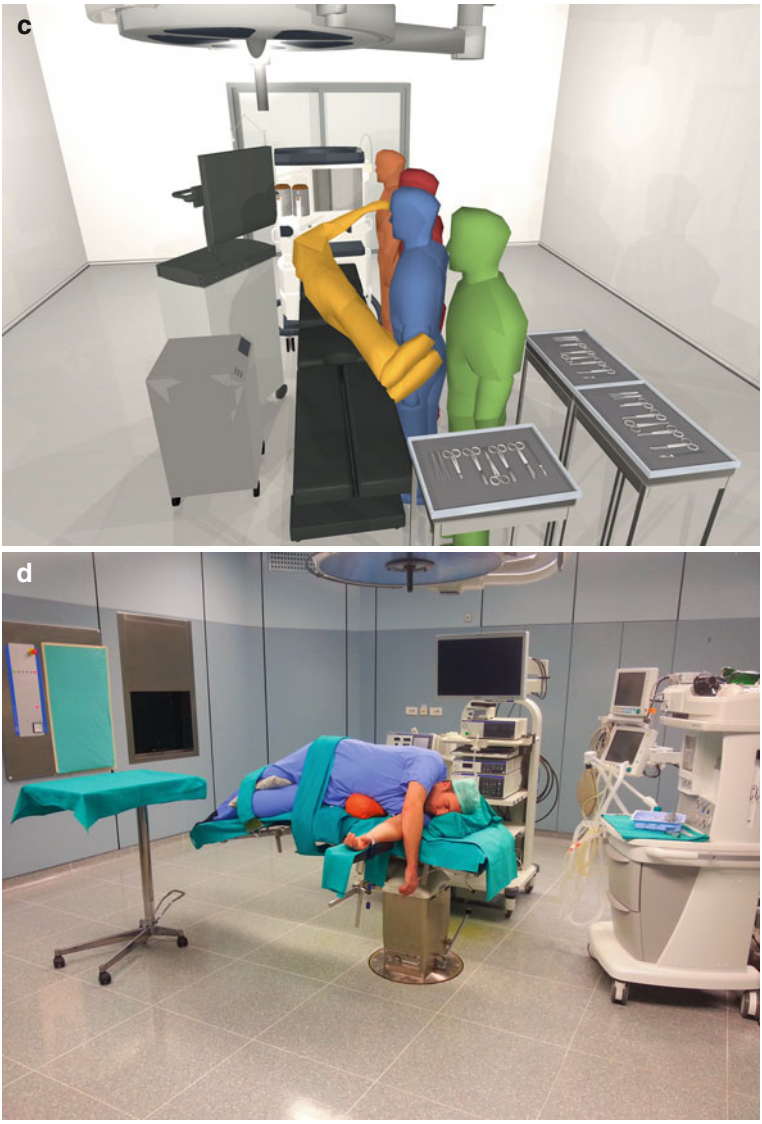

Fig. 1.3 (continued)

Instruments and Cables

- 30, 5, or 10 mm laparoscope
- Cold light source cable
- CO_2 pipe and filter
- Monopolar electrocautery
- Patient return electrode (REM)
- Sterile instrument bag

- Bipolar forceps for open surgery
- Monopolar and bipolar electrocautery cables
- Ultrasonic dissector/radiofrequency cables
- Ultrasonic dissector/radiofrequency dissector with bariatric handle and cables
- Irrigation/suction laparoscopic device
- Bladder catheterization set
- Peridural analgesic catheter and specific set

Laparoscopic Instrument Table (Fig. 1.4)

- Sutures: 2-0 braided not absorbable suture, 2-0 braided absorbable suture, and skin wound closure sutures
- Surgical scalpel blade No. 23
- Gauzes
- Laparoscopic gauzes
- Stainless surgical bowl
- Gross-Maier dressing forceps
- Two Bernhard towel forceps
- Veress needle and 10 mL syringe
- Two/one 10/12 mm trocar
- Two/three 5 mm trocars
- Needle holder
- Two tissue forceps with teeth
- Anatomical thumb forceps
- Metzenbaum scissors
- Mayo scissors
- Two Klemmer forceps
- Two Kocher forceps
- Two Backhaus forceps
- Two Farabeuf retractors
- Bipolar laparoscopic forceps
- Ultrasonic dissector/radiofrequency dissector
- Laparoscopic scissors
- Laparoscopic needle holder (2–0, 10 cm long, not absorbable braided must be ready on the instrument)
- 5–10 mm Endo Retract
- 5–10 mm clip applier
- Johann forceps without ratchet handle
- Johan forceps with ratchet handle
- 42 cm long Johan forceps without ratchet handle
- Endo GIA 45–60 mm (with cartridges)
- CEEA 25 mm
- Thermos

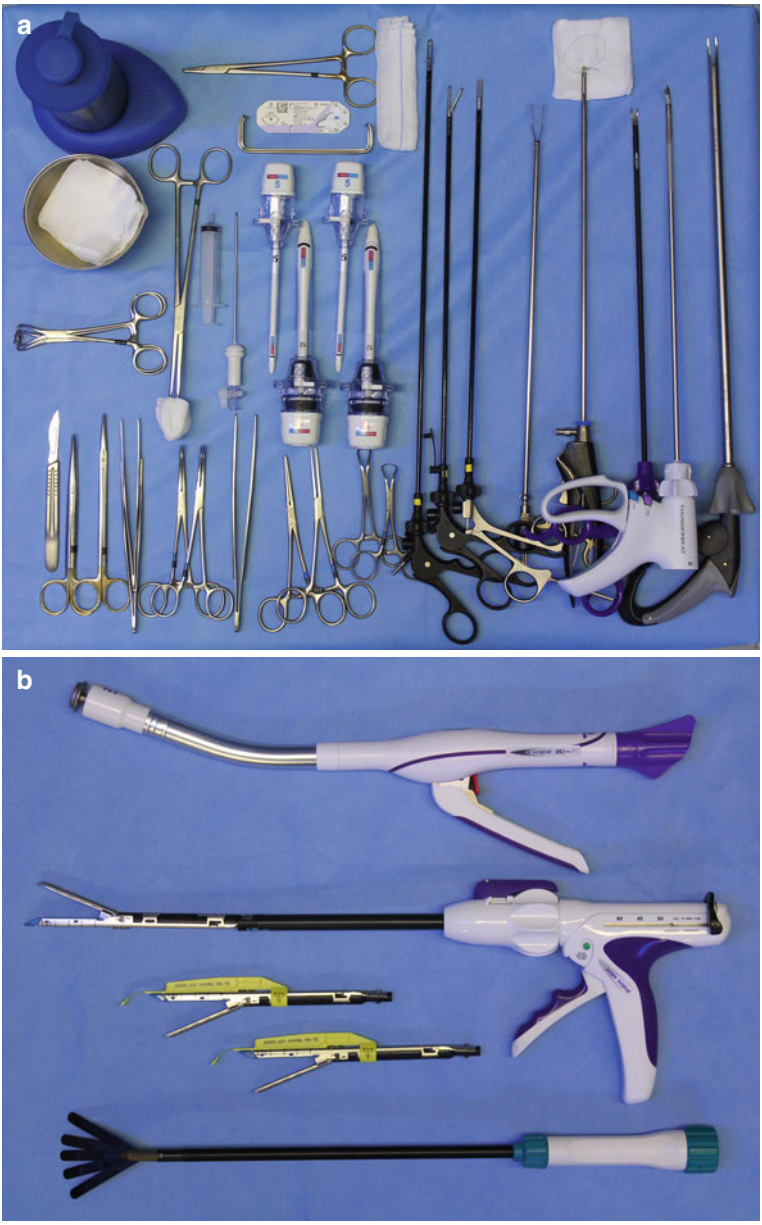

Fig. 1.4 (**a**–**c**) Instrument table

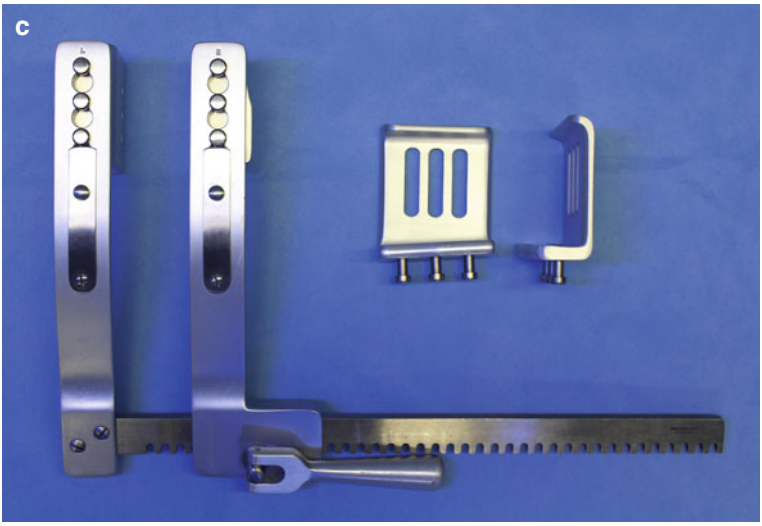

Fig. 1.4 (continued)

1.3 Gastrectomy: Gastric Resection

The bed is placed in reverse Trendelenburg position. First operator stands between patient's legs (Fig. 1.5). Laparoscopic rack is placed behind patient's head.

Specific surgical drapes are used.

Laparotomic Instrument Table Must Be Always Ready for Use

Surgical Steps

1. Anatomical landmark recognition
2. Epiploon cavity opening
3. Right gastroepiploic vessel section
4. Duodenal isolation and section
5. Pars flaccida opening
6. Hepatic pedicle lymphadenectomy and cholecystectomy (if indicated)
7. Celiac lymphadenectomy
8. Left gastric artery section
9. Small gastric vessel section
10. Gastric section (gastric resection and subtotal gastrectomy)
11. Gastric fundus and lower esophagus dissection (total gastrectomy)
12. Small intestinal loop isolation and section
13. Small bowel anastomosis
14. Gastro-digiunal anastomosis or esophagus-digiunal anastomosis

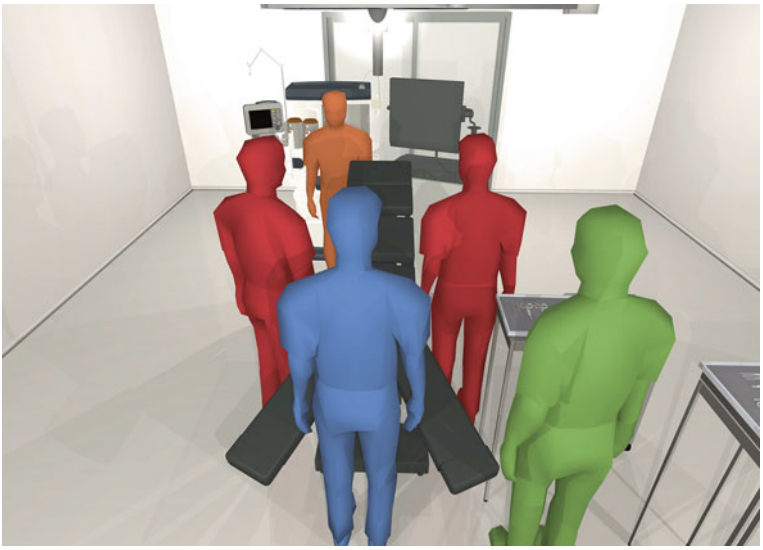

Fig. 1.5 Equipment position during gastrectomy

Instruments and Cables

- 30, 5, or 10 mm laparoscope
- Cold light source cable
- CO_2 pipe and filter
- Monopolar electrocautery
- Patient return electrode (REM)
- Two sterile instrument bags
- Bipolar forceps for open surgery
- Monopolar and bipolar electrocautery cables
- Ultrasonic dissector/radiofrequency cables
- Irrigation/suction laparoscopic device
- Bladder catheterization set

Peridural analgesic catheter and specific set

Laparoscopic Instrument Table (Fig. 1.6)

- Sutures: 2-0 braided not absorbable suture, 2-0 braided absorbable suture, 2-0 braided absorbable suture with different colors, 3-0 barbed suture, and skin wound closure sutures
- Surgical scalpel blade No. 23
- Gauzes
- Laparoscopic gauzes
- Stainless surgical bowl
- Gross-Maier dressing forceps
- Two Bernhard towel forceps
- Veress needle and 10 mL syringe
- Three/two 10/12 mm trocars
- One/two 5 mm trocars
- Needle holders
- Two tissue forceps with teeth
- Anatomical thumb forceps
- Metzenbaum scissors
- Mayo scissors
- Two Klemmer forceps
- Two Kocher forceps
- Two Backhaus forceps
- Two Farabeuf retractors
- Bipolar laparoscopic forceps
- Ultrasonic dissector/radiofrequency dissector
- Laparoscopic scissors
- Crochet hook
- Laparoscopic needle holder (2–0, 10 cm long, not absorbable braided must be ready on the instrument)
- 5–10 mm Endo Retract
- 5–10 mm clip applier
- Johann forceps without ratchet handle
- Johan forceps with ratchet handle
- 42 cm long Johan forceps without ratchet handle
- Colored (red, white, blue) rubber loops
- Endo GIA 45/60 mm (blue cartridge for the stomach and anastomosis, white cartridge for small bowel)
- 15 mm Endobag/wound protector
- Thermos

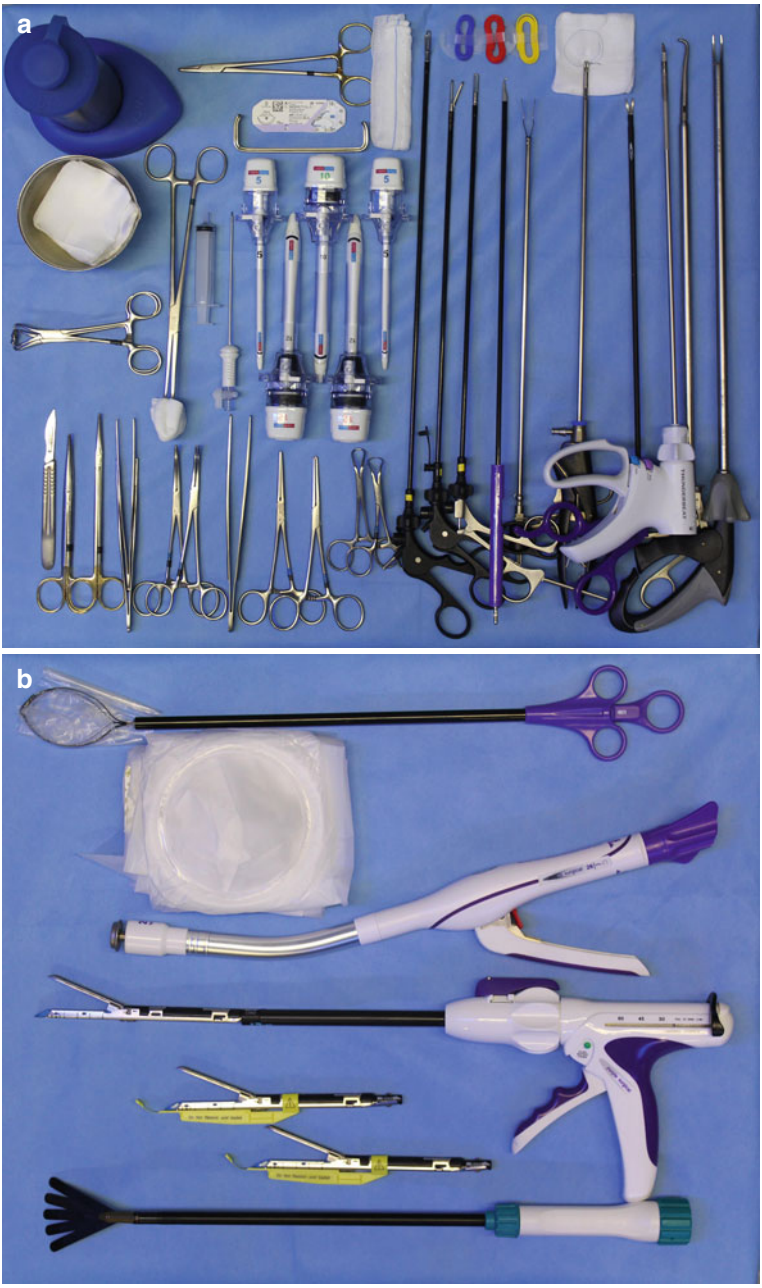

Fig. 1.6 Instrument table

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