
Preoperative Notes of Laparoscopic Lymph Node Dissection for Gastric Cancer

3

3.1 Instruments

3.1.1 Routine Devices

A high-definition camera and display systems, a pneumoperitoneum machine, irrigation and suction devices, and video and image storage devices should be available, as well as routine laparoscopy equipment, such as 5–12-mm trocars, Maryland forceps, noninvasive grasping forceps, intestinal forceps, an aspirator, scissors, a needle holder, vascular clamps, an absorbable clip applier, a titanium clip applier, and small gauzes (Figs. 3.1, 3.2, and 3.3).

3.1.2 Special Devices

Ultracision, LigaSure™ vessel sealing system, bi-active coagulation set, and all varieties of intestinal Endo-GIA and circular staplers should be at the ready.

3.2 Patient's Position

Appropriate patient positioning is important for intraoperative exposure during laparoscopic gastrectomy for gastric cancer. The patient is usually placed in the supine position with legs separated. The surgical table is declined about 10–20° into the reverse Trendelenburg position. Therefore,

the patient's upper body is elevated. This causes the intestine to move toward the lower abdomen, thus helping to expose the upper abdomen (Fig. 3.4). When dissection of the splenic hilar lymph nodes (LNs) is performed, the patient's upper body is elevated about 10–20°, and the left side of the body is tilted up about 20–30° (Fig. 3.5), allowing the intestine and omentum to move toward the right lower abdomen. This helps expose the splenic hilar area.

3.3 Surgeons' Locations

Generally, the surgeon stands on the patient's left side, the assistant is on the right side, and the camera operator is between the patient's legs (Fig. 3.6), while during dissection of the splenic hilar LNs, the surgeon stands between the patient's legs, with the assistant and camera operator both on the patient's right (Fig. 3.7).

3.4 Location of Trocars

The 5-port method is generally used (Figs. 3.8 and 3.9). A 10-mm trocar is inserted 1 cm below the umbilicus as an observation port. Another 12-mm trocar is introduced in the left preaxillary line 2 cm below the costal margin as a major hand port. A 5-mm trocar is then inserted in the left midclavicular line 2 cm above the umbilicus

Fig. 3.1 Small gauzes**Fig. 3.2** An absorbable clip applicator, a titanium clip applicator, Maryland forceps, and a needle holder

as a tractive port. Two 5-mm trocars are severally placed in the right midclavicular line 2 cm above the umbilicus and in the right preaxillary line 2 cm below the costal margin as two accessory ports. The observation port is usually inserted first. For this insertion, an approximately 1.5-cm-long incision is made, and the abdominal wall is raised with towel forceps. When inserting the trocar, the operator should

rotate it left and right and move it forward slowly. The sensation of the breakthrough “pop” indicates that the trocar has entered the abdominal cavity and the puncture sleeve is removed. Pneumoperitoneum should be established after trocar insertion is confirmed by laparoscopy to avoid subcutaneous emphysema. The remaining trocars should be inserted into the ports under the laparoscopic image.

Fig. 3.3 Gastric forceps, intestinal forceps, and an aspirator



Fig. 3.4 The patient is in the supine and reverse Trendelenburg position



The possibility of a poor seal should be routinely checked after placing the trocars, with particular regard to two situations: (a) a broken flap or switch cap on the trocar and (b) the incision that is too large for a good seal. In the former case, the trocar needs to be changed. In the latter case, a skin suture after the placement of trocar can prevent a gas leak.

Sudden movements are unfavorable when inserting the trocars and may injure the mesentery or bowel (Fig. 3.10). Patients with histories of abdominal surgery often have adhesions of the small intestine near the lower part of the incision, which may be injured if the trocar is pushed through the operative scar (Fig. 3.11).

Fig. 3.5 The patient is in the reverse Trendelenburg and right lateral position



Fig. 3.6 Surgeons' general locations



3.5 Establishment of Pneumoperitoneum

The formation of a visual field and operation space depends on pneumoperitoneum during laparoscopic surgery. CO₂ is commonly used, as it is chemically stable, nonflammable, readily accessible, and nontoxic. Additionally, it can be

exhaled from the lungs through the normal carbonate metabolic pathway after absorption by the body. After establishing pneumoperitoneum, intra-abdominal pressure is maintained between 12 and 15 mmHg, although for elderly patients or patients with pulmonary disease, intra-abdominal pressure should be maintained at a reduced level. Sometimes, to reduce spray produced by

Fig. 3.7 Surgeons' locations during the splenic hilar lymph node dissection

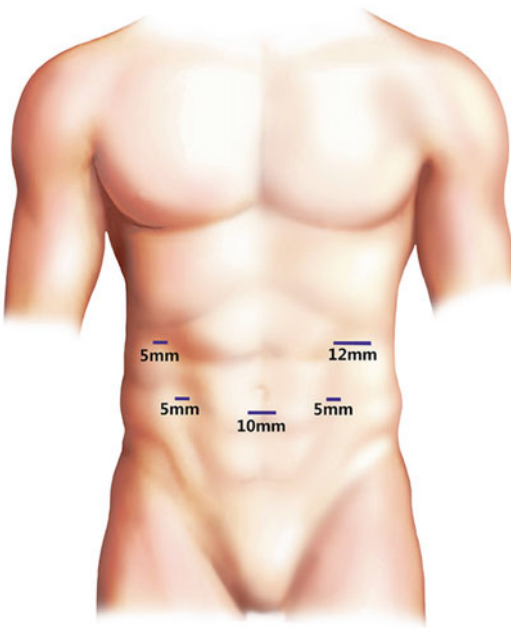


Fig. 3.8 Diagram of the trocars' locations

ultrasonic scalpel during surgery, a small-flow vacuum suction set can be connected to the trocar at the major hand port. In this case, the pneumoperitoneum machine pressure should be raised appropriately to make the spray diffuse quickly to maintain clear vision (Fig. 3.12).

3.6 Preoperative Exploration

As surgery begins, the camera lens may fog from the change in temperature as it enters the abdomen for the first time. This can be solved by soaking the camera lens in warm ($\geq 60^\circ\text{C}$) physiological saline for about 10 s and then wiping it clean with dry lens gauze and inserting it promptly into the abdominal cavity. Meanwhile, room temperature should be regulated to 24°C . When the temperature is too high, the surgeons may feel uncomfortable, whereas a lower temperature would cause the camera lens to fog during insertion.

When a high-volume stomach is found during exploration, the circulating nurse should suction away as much intragastric liquid and gas as possible, so that it is easier to adjust and expose during the surgery.

Accurate preoperative TNM staging guides cancer management decisions. Laparoscopic exploration is used for preoperative staging, especially to assess intra-abdominal metastasis, which can reduce unnecessary laparotomy for gastric cancer. NCCN treatment guidelines also propose using diagnostic laparoscopy to evaluate gastric cancer metastasis and thus improve the

Fig. 3.9 Locations of the trocars

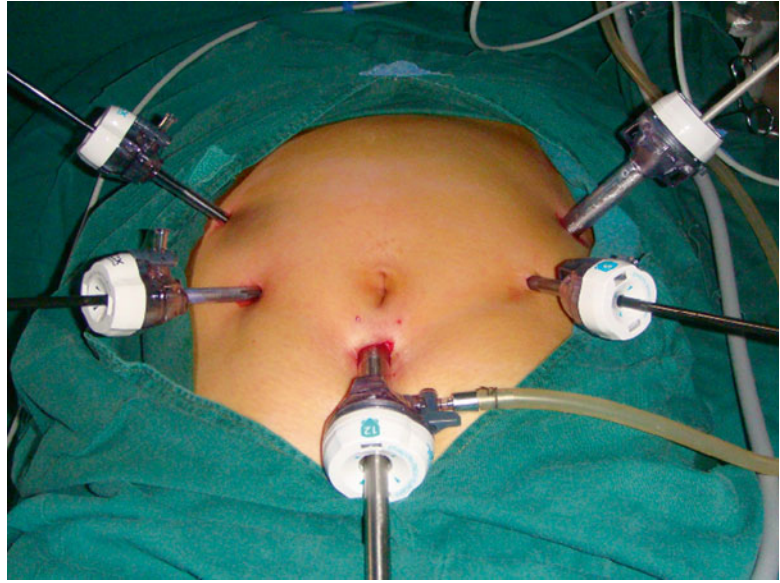
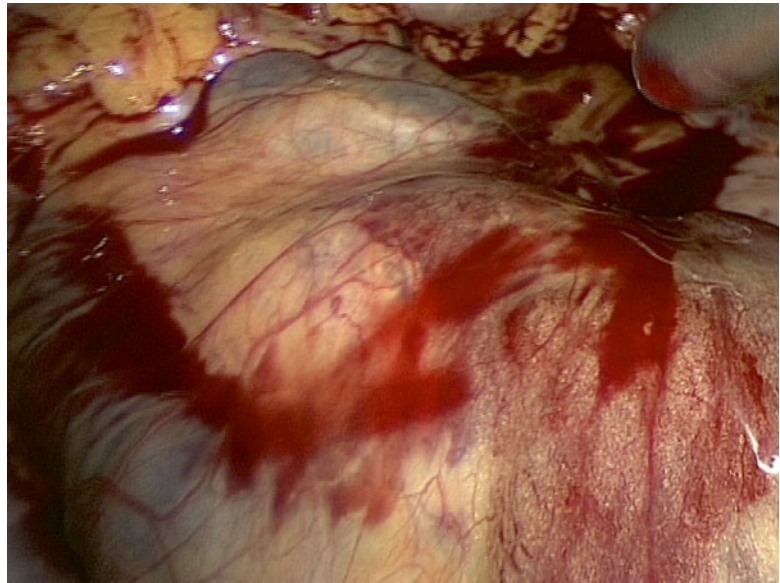


Fig. 3.10 Mesenteric hematoma caused by excessive puncture strength



accuracy of preoperative gastric cancer staging. Preoperative diagnostic laparoscopies can identify the primary tumor's location, extent and depth of invasion, lymph node metastasis (LNM) or abdominal metastasis, ascites, and invasion of adjacent structures (Figs. 3.13, 3.14, 3.15, 3.16, 3.17, 3.18, and 3.19).

3.7 Sequence of a Lymphadenectomy

In principle, the sequence of a lymphadenectomy is from top to bottom, right to left, and greater to lesser curvature, with the duodenum and esophagus resected at the conclusion.

Fig. 3.11 Small intestine adhesion (*a*) in the lower part of the incision is punctured

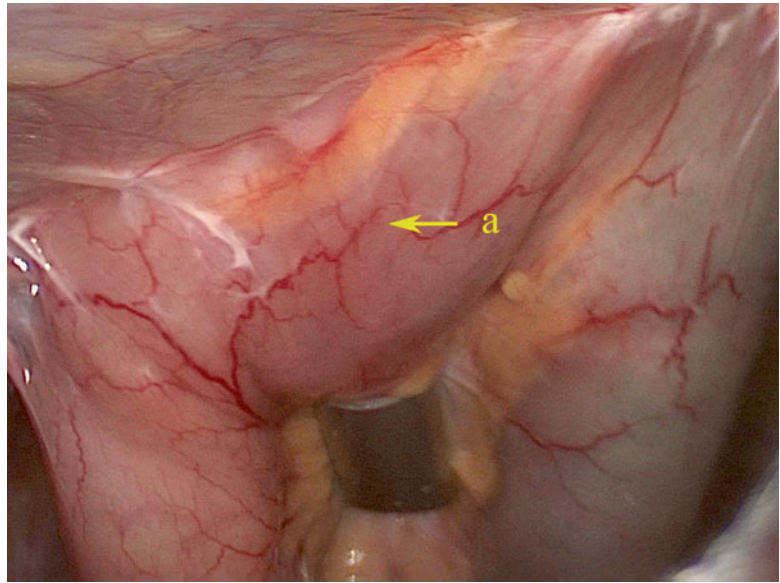
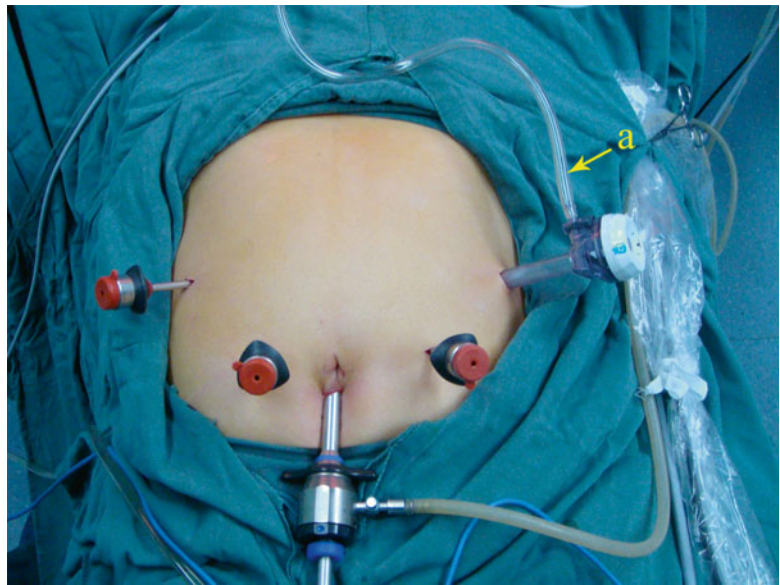


Fig. 3.12 Major hand port is connected to a small-flow vacuum suction set (*a*)



The specific steps are as follows: (1) distal gastrectomy, No. 6 → No. 7, 9, 11p → No. 3, 1 → No. 8a, 12a, 5 → No. 4sb (Fig. 3.20), and (2) total gastrectomy, No. 6 → No. 7, 9, 11p → No. 8a, 12a, 5 → No. 1 → No. 4sb → No. 10, 11d → No. 2 (Fig. 3.21).

The advantages of this sequence are (a) the operative position does not need to change, (b) the clamping of lesion tissue on the gastric wall is less frequent, (c) the surgery field exposure is better, and (d) the tissue to be resected can be connected from top to bottom and, to the extent possible, resected en bloc.

Fig. 3.13 Tumor located on the posterior gastric wall invades the serosal layer

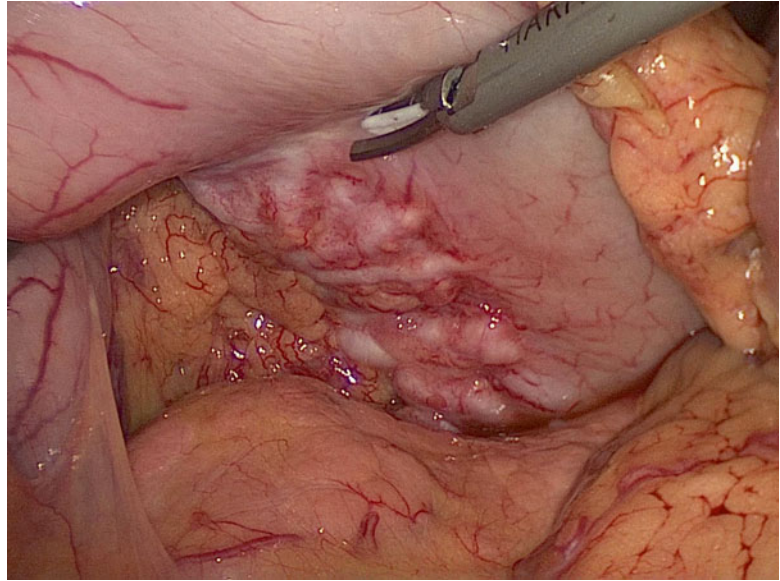
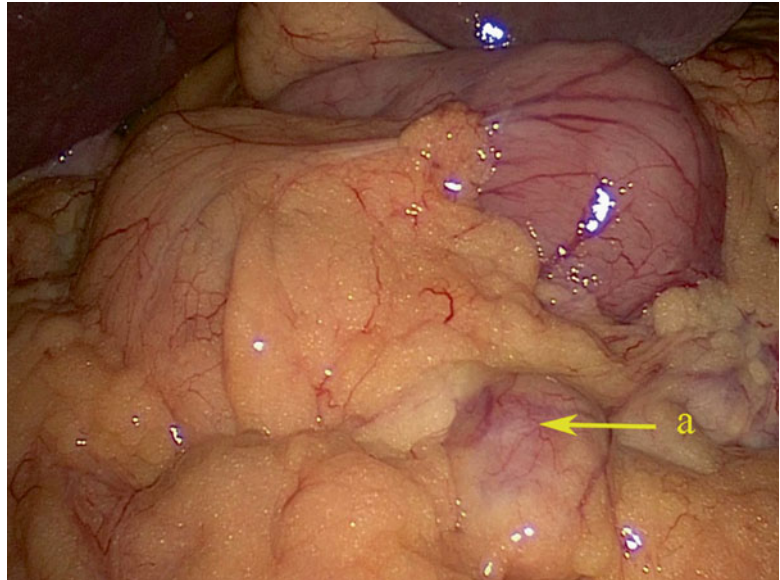


Fig. 3.14 LNM (a) of gastric greater curvature



3.8 Nursing Cooperation

Laparoscopic gastrectomy should be performed with close cooperation between surgeons and nurses because of its diverse surgical methods, various surgical instruments, and complex operative

process. Adequate preoperative preparation, familiarity with the operative procedure and surgeon's operation habits, and a high reaction capability are required for nursing staff members. All of these factors help to ensure the successful performance of laparoscopic surgery with shorter operation times.

Fig. 3.15 Gastric cancer with intra-abdominal extensive metastasis and ascites

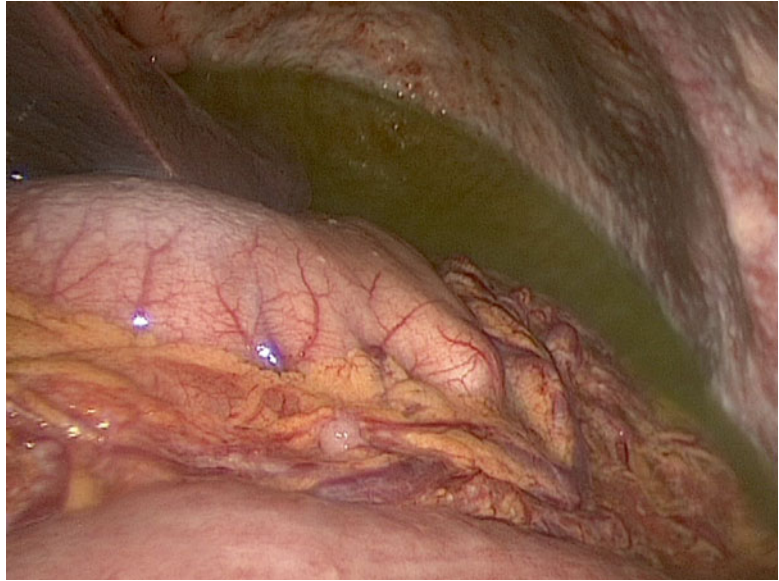
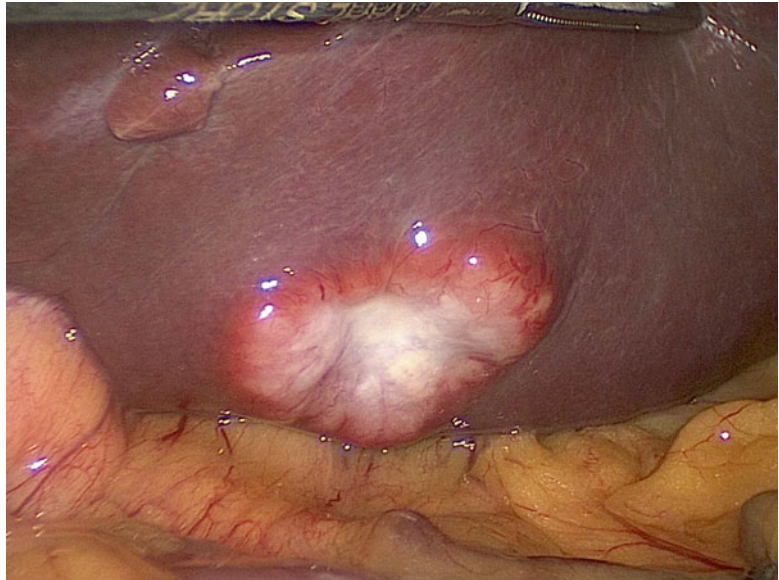


Fig. 3.16 Gastric cancer with liver metastasis



3.8.1 Preoperative Visit

After receiving notification of surgery, a circulating nurse should visit the patient in the ward, introduce the surgical methods, and explain the advantages of laparoscopic surgery the day before

the surgery. The nurse should also help the patient and his or her relatives to relieve mental stress and enhance confidence. This allows the patients to face the surgery under optimal conditions. The conditions of diseases should be kept secret to the patients if they are not suitable to know.

Fig. 3.17 Gastric cancer invades the transverse mesocolon (*a*) and transverse colon (*b*)

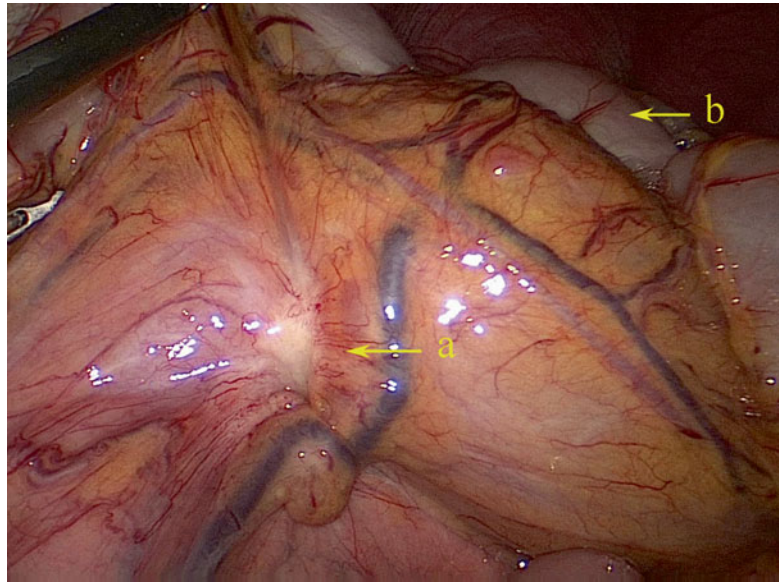
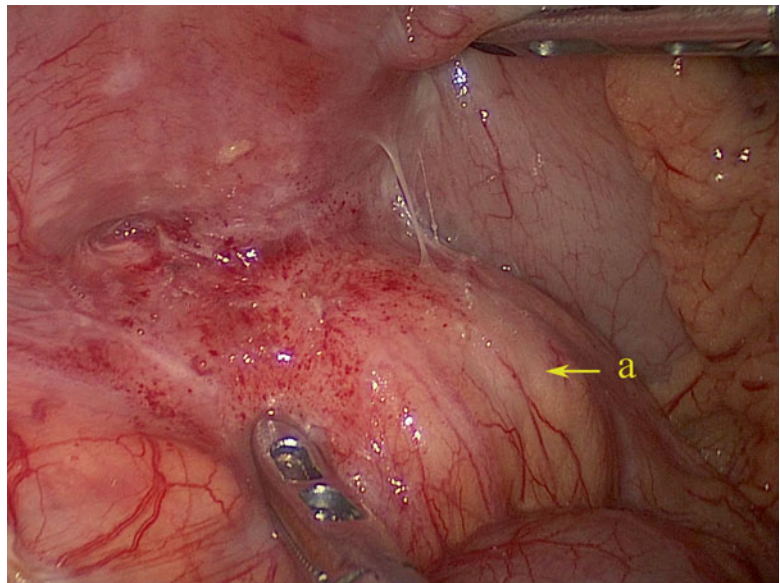


Fig. 3.18 The pancreas is invaded by a tumor located on the gastric posterior wall (*a*)



3.8.2 Preparation of Instruments

The surgical instruments used for laparoscopic gastrectomy include a basic package for open surgery, laparoscopic camera systems, routine laparoscopic equipment, and the instruments used for reconstruction of the digestive tract.

3.8.3 Preparation of Operating Room

The surgery should be performed in a clean laminar flow operating room; visitors and staff should be restricted from frequently walking in and out of the operating room. The relative humidity and

Fig. 3.19 Left external lobe of the liver (*a*) is invaded by gastric cancer

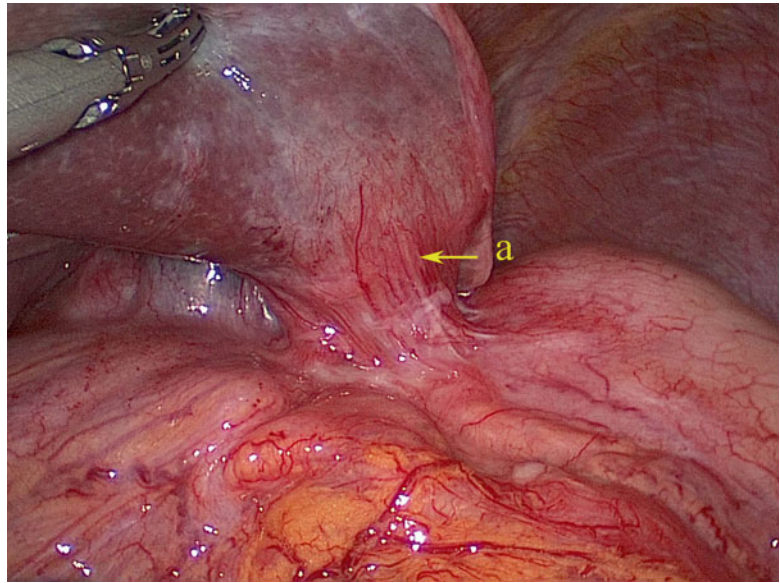
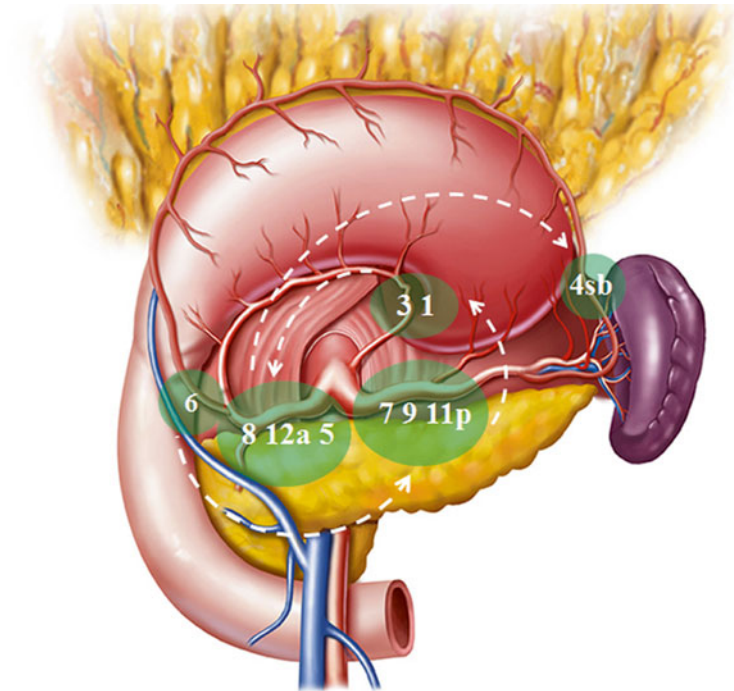


Fig. 3.20 Sequence of a lymphadenectomy for laparoscopic distal gastrectomy



temperature should generally be maintained at 40.0–60.0 % and 24 °C, respectively. Light music can be played to help the patient relax.

The main laparoscopic system should be placed on the left side of the patient, while two

monitors are placed at the patient’s head part. The monitors should be adjusted to obtain the proper angle to prevent reflection of light and allow for the best operating view for both the chief surgeon and assistant. Also, the camera system,

insufflation machine, and Ultracision should be correctly connected.

The scrub nurse stands on the left side of the patient, and the instrument table should be placed at the distal one-third of the left leg board

(Fig. 3.22). The surgeon should wear an additional sterile waistcoat, or pad a sterile towel on his/her back over the surgical gown to keep the instruments clean and the instrument table sterilized during the process of passing the instruments.

Fig. 3.21 Sequence of a lymphadenectomy for laparoscopic total gastrectomy

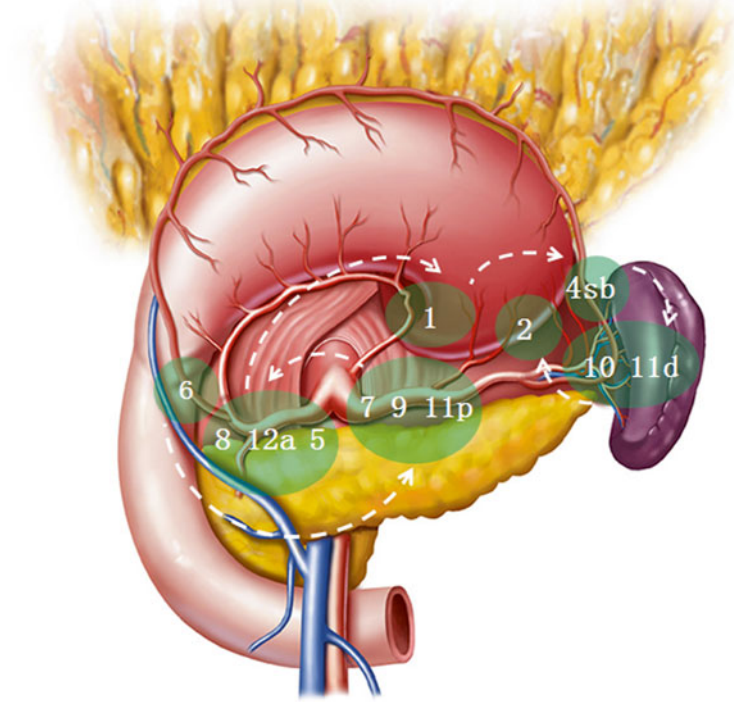


Fig. 3.22 Positions of the instrument table (*a*) and scrub nurse (*b*)