



Laparoscopic Wedge Liver Resection

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Introduction

Laparoscopic liver resection was introduced as a surgical technique more than two decades ago. The initial successful laparoscopic anatomical hepatectomy was reported in 1996 by Azagra et al., who performed a left-lateral segmentectomy in a patient with a benign adenoma of segments II and III [1, 2]. The technique has grown from a novel procedure to an essential component of the highly specialised hepatobiliary unit armamentarium. Amongst the advantages of laparoscopic liver surgery are: reduced hospital stay, reduced postoperative pain, lowered risk of peritoneal adhesions, better cosmetic outcomes, and much shorter convalescence [3].

Laparoscopic wedge liver resection is often selected as the starting point for most hepatobiliary surgeons during their laparoscopic liver surgery endeavour. It is commonly a nonanatomical resection performed for benign or malignant indication [1].

Indications for Laparoscopic Wedge Liver Resection [1, 3]

1. Superficial lesion of 5 cm or less in diameter.
2. Small peripherally located lesions [left-lateral segments, segment VI, or the anterior segment of the right liver (segment V)].
3. Lesions of 3 cm or less in diameter in other segments.

Peripherally located lesions are desirable for laparoscopic resection as they are often devoid of large venous structures, require less mobilisation and dissection, and easily controlled should bleeding occur [4]. Nonetheless, sound oncologic principles as in open surgery must be observed during laparoscopic wedge resection for malignancy which are radical resection, and at least 1 cm free surgical margin. Owing to the lack of digital palpation during laparoscopic wedge resection, routine use of intraoperative ultrasonography to precisely locate the tumour and to plan the division of liver parenchyma has become mandatory [4].

Contraindications

These are mainly related to the anatomy, size, and location of the lesions. (Some could be of relative contraindication in a good, high-volume center) [1, 4].

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- A large tumour (>5 cm in diameter).
- Lesions at the superior aspect of the liver, i.e., segments VII and VIII.
- Lesions near the major hepatic veins, inferior vena cava, and hepatic hilum.
- Evidence of severe portal hypertension.
- Presence of coagulopathy and thrombocytopenia.

Preoperative Assessment

Please refer to the previous text in the manual.

OT Setup

Instrumentations

- Laparoscopic trocars and cannula (2 × 12 mm, 1 × 10 mm, 2 × 5 mm).
- Hand-assisted port GelPort→ (optional).
- 10 mm 30°telescope
- Laparoscopic intraoperative ultrasound.
- Energy devices (Harmonic, Ligasure, Monopolar diathermy).
- Cotton tape, silicone snigger (For Pringle's manoeuvre—optional).
- Topical haemostatic agent (Surgicel→—optional).
- Endoscopic vascular stapler (optional).
- Endoscopic retrieval bag.

Patient's Position

- Supine position with both lower limbs in the abduction.
- The surgeon stands in between the patient's legs.
- Left-lateral position may be used for limited resection of segment VI.

Technique

(shown here is the technique for laparoscopic hand-assisted nonanatomical liver resection of segment VI tumour)

Access and Port Position

- Place a 10 mm supraumbilical port for the telescope.
- Place two 12 mm working ports in both right and left flanks. The 12 mm right flank port may be replaced with Gelport→ for hand-assisted surgery.
- Insert another 5 mm assistant port in the epigastrium or the right or left subcostal along the mid-clavicular line depending on the site of the lesion.

Scope and Pneumoperitoneum

- Use a 30° and 10mm laparoscope.
- Set CO2 pressure at 12 mmHg with medium flow at 10 L/min.

Exploration

Assess the liver by intraoperative laparoscopic ultrasound to determine the size and location of the lesion, to identify additional lesions, and to determine the feasibility of laparoscopic resection.

Mobilization

- Divide the attaching ligaments of the liver (the round, falciform, and triangular ligaments) (Fig. 1).
- Divide both the right and left triangular, and coronary ligaments according to the site of the lesion.



Fig. 1 Division of falciform ligament for liver mobilization

- Prepare Pringle's manoeuvre, although this is not routine for wedge resection; it is good to prepare for one in case of bleeding. Place tape around the porta hepatis and pass it into a silicone drain and secure it on the outside of the abdomen through an assistant port.
- For suitable cases, divide any pedunculated lesions with an endoscopic linear stapler.
- Pack or apply the topical haemostatic agent to the parenchymal defect or use bipolar cautery or clips to secure haemostasis (Figs. 5 and 6).

Parenchymal Transection

- Mark the surface of the liver parenchyma for transection by electrocautery, taking into account the 1 cm margin for a malignant lesion.
- Use hook electrocautery for parenchymal transection (Fig. 2).
- Alternatively, the harmonic scalpel (Ethicon, US) can be used for more convenient resection and simultaneous haemostasis (Figs. 3 and 4).

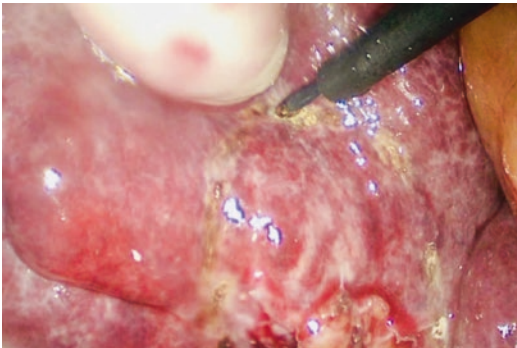


Fig. 2 Marking the area for tumour dissection with 1 cm margin using hook diathermy



Fig. 3 Initial tumour dissection with Harmonic scalpel

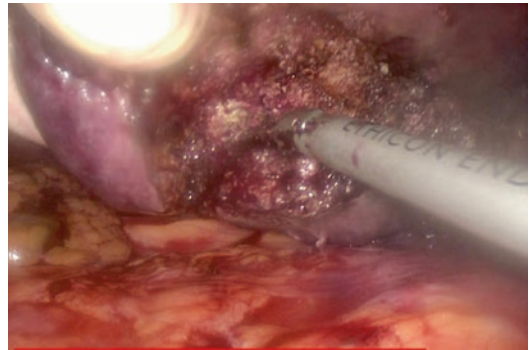


Fig. 4 Deeper parenchymal dissection with Harmonic scalpel



Fig. 5 Appearance of the cavity in segment VI of liver after nonanatomical resection of the tumour

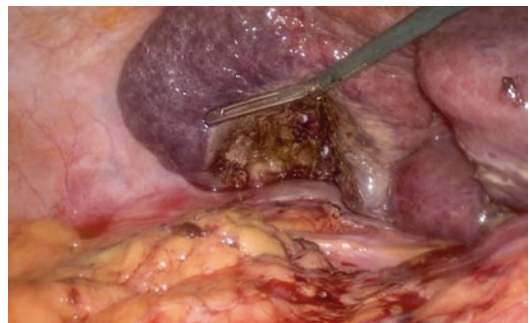


Fig. 6 The cavity left after the resection is packed with haemostatic agent

Extraction

- For small specimen, use an endopouch to retrieve it from either one of the 12 mm flank ports.
- For larger specimen, replace the 12 mm port with a 15 mm trocar for insertion of a larger endopouch. Place the specimen in the bag and extract it out with the 15 mm trocar.
- Stop the CO₂ insufflation, and incise the skin and fascia at the 15 mm trocar site to retrieve the bag and the specimen.
- Close the fascia carefully with an absorbable suture.

Late

- Biloma.
- Subphrenic abscess.
- Incisional hernia.

Postoperative Management

- Early feeding.
- Adequate analgesia.
- Early ambulation.
- Placement of a subhepatic drain (optional).
- Deep venous thrombosis prophylaxis.

Complication of Laparoscopic Wedge Liver Resection

Although uncommon as this is considered minor hepatic resection, potential complications include;

Early

- Intra-abdominal haemorrhage especially in cirrhotic liver.
- Bile leak.
- Bowel ileus.
- Wound infection.

References

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4. Gigot J-F, Glineur D, Azagra JS, Goergen M, Ceuterick M, Morino M, et al. Laparoscopic liver resection for malignant liver tumours: preliminary results of a multicenter European study. *Ann Surg.* 2002;236(1):90.

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