

IN PRACTICE: How to use the ultrasonic dissector in laparoscopic liver surgery



Expert opinion and practical experience

This expert opinion and practical experience has been created by Dr. Dr. habil. Gregor A. Stavrou, Head of Department of General, Visceral and Thoracic Surgery, Surgical Oncology Klinikum Saarbrücken, Germany.



Laparoscopic liver resection, the most impressive development in liver surgery over the past two decades, has become a safe and effective procedure with faster postoperative recovery due to technical innovations and the experience gained over time.¹ Extensive training in both open and minimally invasive surgical technique is essential for performing laparoscopic liver surgery.² Therefore, various consensus groups regularly discuss recent advancements in instrument set-up and procedural approach. This document describes the application of the ultrasonic dissector, an instrument already widely used in open liver surgery, during laparoscopic liver resection.

Experience required to start with ultrasonic dissection in laparoscopic liver surgery

There is also a learning curve associated with the use of the laparoscopic ultrasonic dissector, as with the early learning phase in laparoscopic procedures. This time can be shortened if the practical steps below are followed.

Experience in open liver surgery

1

► Exposure and training with the device and its function in open liver surgery.

Dedicated training at an experienced laparoscopic centre

2

► Expert training on the use of the device and understanding of the principles of function and application.

Start with easy cases in the beginning

3

► Get used to the device's function and possibilities and start with laparoscopic left lateral resections, for example.

Standardisation of the procedure

4

► Use the device as a standard in transection uplevelling precision and speed of the transection phase.

Benefits of ultrasonic dissection technique in laparoscopy

- *Ultrasonic dissection is especially helpful in more difficult cases, e.g. posterior segments, anatomic hepatectomies or major complex parenchyma-sparing surgeries. The idea is to selectively clear vascular structures to render identification and the transection phase easier and safer.*
- *Once a surgeon has gained enough experience, they can choose to operate on straightforward cases with the device.*
- *The dissection works very well in normal and soft livers; it is very helpful in cases where the hilar plate or vascular pedicles must be carefully dissected.*
- *Use of the technique may be suboptimal in cirrhotic livers. Having an in-depth understanding of how to set up the device parameters can help to overcome this issue.³*

“In general, the use of ultrasonic dissection makes challenging laparoscopic liver surgery easier and more comfortable to perform. This is especially true for modern approaches of parenchyma-sparing surgery.”

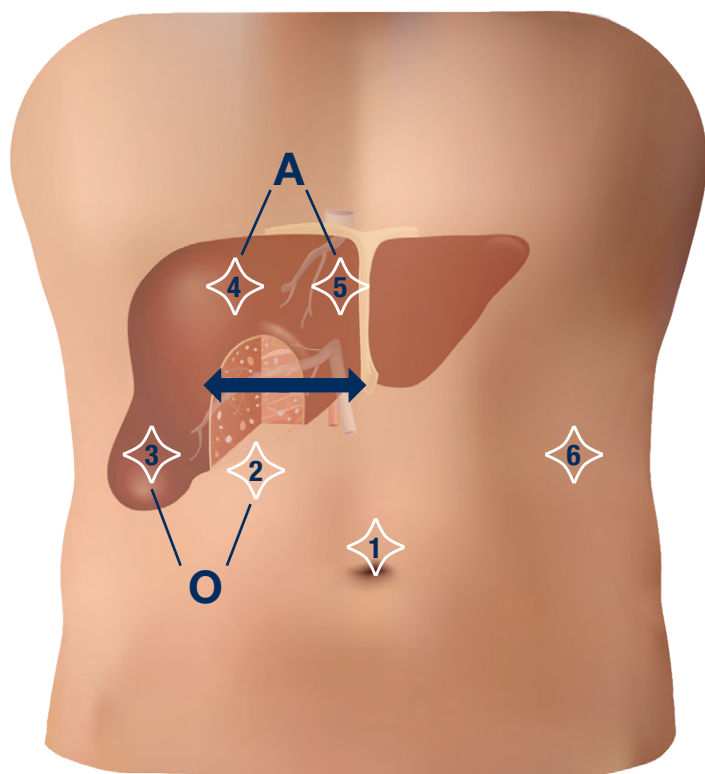
I prefer the following standard laparoscopic instruments:

- *Ultrasonic probe for intraoperative ultrasound (IOUS) (BK Medical BK5000)*
- *Energy device (Medtronic LigaSure™)*
- *Ultrasonic dissector (Sörling HEPACCS)*
- *Bipolar forceps (Erbe BiClamp)*
- *4K imaging and ICG (Arthrex Synergy)*
- *Stapling device (J&J Powered Echelon)*
- *Standard instruments including 90° angle grasper, vascular clamp, bulldog*
- *Retractors (modifiable 3 finger retractor)*
- *Grena clips in 2 sizes*

“Stick to your standard and evolve gradually over time!”

Key points of the preoperative set-up for the laparoscopic ultrasonic dissector:

- Patient positioning in supine position or lateral position with 30°-45° degree elevation with a pillow below the right upper abdomen. The primary surgeon on the right side, the assistant surgeon on the left.
- Trocar placement is crucial. Initial port access in the umbilicus for the camera and 3 - 4 trocars using a rhomboid configuration (mainly using 10 mm trocars).
- The rhomboid can be shifted to each side according to the needed transection plane. The trocars for the primary surgeon are no. 2, 3 and sometimes 4. The assistant surgeons' trocars are no. 5 and 6.
- In principle, the ultrasonic dissector can go everywhere and is mainly used in port no. 2 or 4.

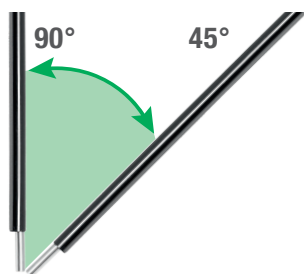


Legend:

- 1 Camera
- 2 Ultrasonic dissector, Ligasure
- 3 Grasper, Biclasp
- 4 Ultrasonic dissector, Grasper, Suction, Ligasure
- 5 Retractor
- 6 Pringle, Suction
- A Assistant surgeon
- O Primary surgeon

Example of trocar placement and the position of the lap. ultrasonic dissector

- It is important to use a 45°-90° angle of the ultrasonic dissector to the target tissue/transection plane.
- Additional trocar for the ultrasonic dissector for the upper part of the dissection if needed. 5 mm trocar compatibility is useful here.
- Tip movement targets both sides, gradually freeing tissue.

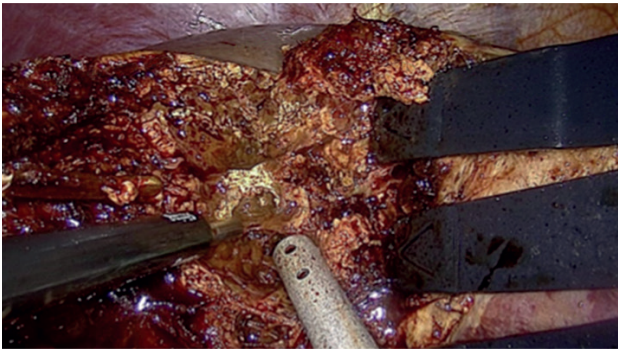


Optimal angle for using the lap. ultrasonic dissector is marked in green

Steps of laparoscopic surgery and transection phase:

The steps of the laparoscopic procedure are the same as in standardised open liver surgery:

- *Perform the routine steps such as liver mobilisation, intraoperative ultrasound (CE-IIOUS), +- pringle, inflow control, parenchymal transection, outflow control*
- *For parenchymal transection use pringle, low central venous pressure (CVP) and a combination of ultrasonic dissector and sealing device as well as bipolar forceps and clips (stapler)*



Parenchymal transection using the lap. ultrasonic dissector²



Scan the QR code for more examples

Advantages of the laparoscopic ultrasonic dissector:

- + *Precise tissue dissection in deeper liver tissue and vascular structures*
- + *Vascular structures like bile ducts and blood vessels are kept intact*
- + *Clear identification of structures in all different parenchyma types*
- + *Vascular structures can be divided or spared as desired*

References:

¹ Jia C. et al. (2018). Laparoscopic liver resection: a review of current indications and surgical techniques. *Hepatobiliary Surg Nutr.* 2018. PMID: 30221155

² Stavrou et al. (2024). Technical aspects and learning curve of complex laparoscopic hepatectomy: how we do it. *Surgical Endoscopy* 2024, PMID: 38951242

³ 03-7106e_R01.01. Söring In Practice: Achieving optimal tissue effects in liver surgery.

For more information about the laparoscopic instruments cited in this text, please contact their respective manufacturers.
For more information about the ultrasonic dissector, please contact Söring GmbH.

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