

# Laparoscopic liver resection with an 80-degree articulating advanced bipolar device

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**Abstract:** The video shows the case of a 68-year-old male patient, affected by hemochromatosis, with 3-cm hepatocellular carcinoma in segment 5 on cirrhotic liver. The patient was classified as Child A5, MELD 7, with portal hypertension. An ultrasound-guided laparoscopic resection of segment 5 was planned. Liver resection was carried out by the 80-degree articulating vessel sealer (Aesculap Caiman; B. Braun, Tuttlingen, Germany). The embedded video shows how this device is safe and efficient for laparoscopic liver resection and how its 80-degree articulation jaw may be useful in case of deep or posterior transection planes in order to obtain an adequate oncologic surgical margin.

**Keywords:** Laparoscopic liver resection; articulating advanced bipolar device; surgical margin; transection planes

Received: 25 October 2018; Accepted: 06 November 2018; Published: 28 November 2018.

doi: 10.21037/ls.2018.11.05

View this article at: <http://dx.doi.org/10.21037/ls.2018.11.05>

## Case presentation

This is the case of a 68-year-old male patient, affected by hemochromatosis, with 3-cm hepatocellular carcinoma in segment 5 on cirrhotic liver. The patient was classified as Child A5, MELD 7, with portal hypertension (platelet count:  $86 \times 10^9/L$ ). An ultrasound-guided laparoscopic resection of segment 5 was planned.

## Surgical technique (Figure 1)

Under general anesthesia, the patient was placed in supine position with the surgeon between the legs. Five trocars were usually inserted. The procedure was performed with pressure-controlled CO<sub>2</sub> pneumoperitoneum, maintained at 12 mmHg. The liver was explored visually and by laparoscopic ultrasonography in order to definitely stage the tumor, to evaluate the relationship of the tumor with vascular and biliary pedicles, and to guide the resection. Portal pedicle was encircled with a tape to allow intermittent pedicle clamping if required. Liver resection was carried out by the 80-degree articulating vessel sealer (Aesculap Caiman; B. Braun, Tuttlingen, Germany) and



**Figure 1** Video of laparoscopic hepatic segmentectomy 5 with an 80-degree articulating advanced bipolar device (1).

Available online: <http://www.asvide.com/article/view/28498>

by the ultrasonic dissector (Cavitron Ultrasonic Surgical Aspirator System 200; Valleylab Inc.). Vascular stapler was used to intraparenchymal divide the main branch of the middle hepatic vein and the peripheral portal pedicle to segment 5. The posterior transection plane was easily reached by the 80-degree articulation jaw with lower risk of approaching to the tumor. No blood transfusions were

needed. Postoperative course was uneventful. Pathology confirmed the diagnosis of hepatocellular carcinoma. Minimum surgical margin was 1.5 cm.

## Discussion

The use of intraoperative ultrasound during liver resections is fundamental in order to achieve adequate surgical margins (2). However, the risk to progressively advance toward the center of the resection area, especially in case of multiple transection planes, is well known in liver surgery (3), with the consequent risk to expose the tumor on the cut surface. This risk may be increased during laparoscopic liver resection particularly when there is not a unique linear resection line (4). In such cases, by using straight energy devices, it may be difficult to follow a correct posterior transection plane with the risk of approaching to the tumor. This video shows the efficacy of an 80-degree articulating advanced bipolar device (5,6) during liver resection for hepatocellular carcinoma with multiple transection planes. The 80-degree articulation jaw allows a perpendicular seal, which may be useful in case of deep or posterior transection planes to obtain an adequate oncologic surgical margin.

## Acknowledgments

*Funding:* None.

## Footnote

*Conflicts of Interest:* The authors have completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/ls.2018.11.05>). The authors have no conflicts of interest to declare.

*Ethical Statement:* The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Declaration of Helsinki (as revised in 2013). Written informed consent was obtained

from the patient for publication of this manuscript and any accompanying images.

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doi: 10.21037/ls.2018.11.05

**Cite this article as:** Ardito F, Coppola A, Longo F, Giuliani F. Laparoscopic liver resection with an 80-degree articulating advanced bipolar device. *Laparosc Surg* 2018;2:66.