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MULTIMEDIA ARTICLE

Robotic Left Trisectionectomy with Glissonian Approach (with Video)

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Abstract

Background Left hepatic trisectionectomy consists of the removal of liver segments 2, 3, 4, 5, and 8. This difficult surgical procedure may be required when the left liver and right anterior sector (segments 5 and 8) are involved. We present a video of a robotic anatomic left trisectionectomy with Glissonian approach to the left and right anterior sector pedicles.

Methods A 77-year-old man presented at a routine ultrasound with a large liver mass. Magnetic resonance imaging showed a bulky hepatocellular carcinoma occupying liver segments 2, 3, 4, 5, and 8, with a portal tumor thrombus in the right anterior sector. The patient had multiple comorbidities, including obesity, diabetes, hypertension, and coronariopathy. The multidisciplinary team decided to use immunotherapy with atezolizumab and bevacizumab. After 12 cycles, the patient showed an objective response, and left trisectionectomy was indicated. A robotic approach was proposed and consent was obtained. The Glissonian approach was used for anatomic control of the left and right anterior sector pedicles.

Results The operative time was 390 min with an estimated blood loss of 410 ml, and no transfusion was required during or after the procedure. Recovery was uneventful and the patient was discharged on postoperative day 8. No bile leak was observed, and the drain was removed on postoperative day 8.

Conclusions Robotic left trisectionectomy is safe and feasible. The Glissonian approach is useful for anatomic left liver trisectionectomy. This video can help gastrointestinal surgeons perform this complex procedure in a minimally invasive manner.

Keywords Trisectionectomy · Left liver · Hepatectomy · Hepatocellular carcinoma · Robotic surgery

Left hepatic trisectionectomy consists of the removal of liver segments 2, 3, 4, 5, and 8. This difficult surgical procedure may be required when the left liver and right anterior sector (segments 5 and 8) are involved. The authors have described an anatomic and standardized method to identify and isolate Glissonian sheaths of the left liver segments along with the portal pedicle from the right anterior sector.[1] This technique allows control of the inflow of the liver parenchyma to be resected.

The number of liver resections performed with a robotic-assisted procedure has increased significantly over the past decade.[2,3] However, robotic-assisted anatomic trisectionectomies have been reported in only a few cases. In a recent systematic review of 2728 robotic liver resections, only 22 robotic trisectionectomy were found in the current literature.[3] Right trisectionectomy usually involves embolization of the right portal vein to obtain an adequate future liver remnant, whereas the future liver remnant is usually sufficient for an anatomic left trisectionectomy, especially in cases of left hepatic atrophy.

We present a video of a robotic anatomic left trisectionectomy with Glissonian approach to the left and right anterior sector pedicles. To our knowledge, there is no detailed technical description of this complex procedure in the current literature. A 77-year-old man presented with a large liver mass during a routine ultrasound. Magnetic resonance imaging showed a voluminous tumor measuring 14 × 9 cm occupying liver segments 2, 3, 4, 5, and 8, with a portal tumor thrombus in the right anterior sector. The liver showed signs of chronic liver disease. Ultrasound-guided percutaneous biopsy confirmed the diagnosis of hepatocellular carcinoma and steatohepatitis. The patient had several comorbidities, including obesity, diabetes, hypertension, and coronariopathy. The multidisciplinary team decided on immunotherapy with atezolizumab

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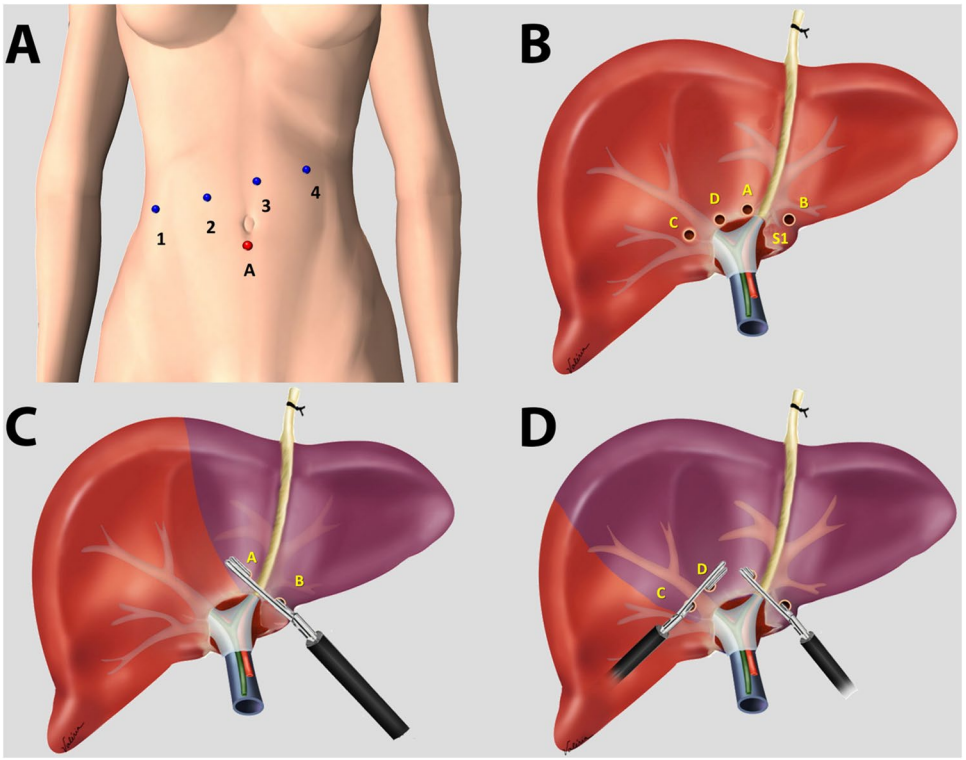

Fig. 1 Robotic anatomic left trisectionectomy. **A** Diagram of trocar placement. 1–4 robotic arm ports (camera on 2 or 3). A, Assistant port. **B** Schematic diagram of Machado points for Glissonian approach in left trisectionectomy. S1, segment 1. **C** Schematic drawing of Machado points for Glissonian approach. **A** to **B** Glissonian approach for control of the left main pedicle (segments 2, 3, and 4). Note that this approach spares the pedicle of segment 1 (S1). **D** Schematic drawing showing the Machado points for the Glissonian approach. **C** to **D** Glissonian approach to control the right anterior pedicle (segments 5 and 8). The combination of the two maneuvers resulted in an ischemic delineation for anatomic left trisectomy

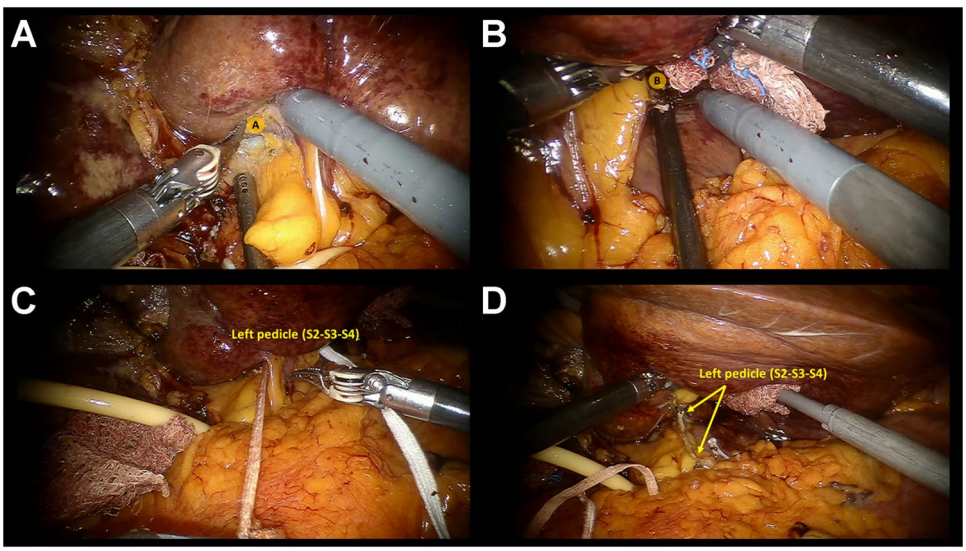

Fig. 2 Robotic anatomic left trisectionectomy. Glissonian approach to the left pedicle (liver segments 2, 3, and 4). **A** Intraoperative view. The first incision (**A**) required to gain access to the Glissonian pedicle from the left liver is made at the base of segment 4. **B** Intraoperative view. The second incision (**B**) required to gain access to the Glissonian pedicle from the left liver is made above the Arantius ligament. **C** Intraoperative view. A robotic grasper is carefully passed around the left Glisson's pedicle from A to B through these incisions. An umbilical tape is used to encircle the pedicle and facilitate the insertion of the stapler. **D** Intraoperative view after transection of the left pedicle with the endoscopic stapler

and bevacizumab. After 12 cycles, the patient showed an objective response, and he was referred for surgical treatment. Computed tomography showed marked reduction of the tumor and atrophy of the right anterior sector. The tumor had a close relationship to a right hepatic vein branch. Based on the initial situation, the multidisciplinary

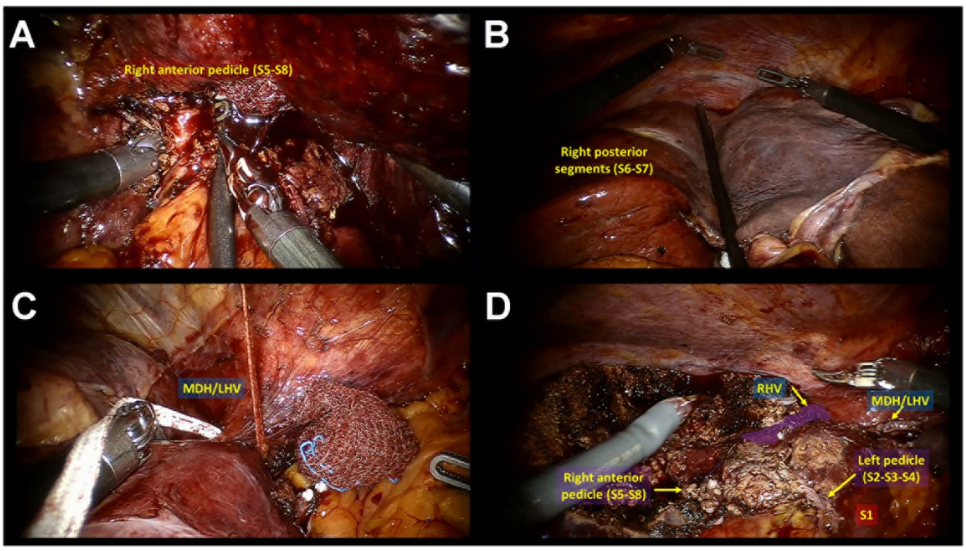

Fig. 3 Robotic anatomic left trisectionectomy. **A** Intraoperative view. The right anterior Glissonian pedicle is identified and encircled with the robotic grasper. **B** Intraoperative view. Ischemic delineation of the future liver resection. **C** Intraoperative view showing an umbilical tape carefully placed around the common trunk consisting of the middle (MHV) and left hepatic veins (LHV). **D** Final intraoperative view after robotic left trisectionectomy. The pedicle of segment 1 was spared and the caudate lobe (S1) is well perfused. We see the stump of the left pedicle, the right anterior pedicle, the common trunk (MDH/LHV), and the right hepatic vein (RHV) preserved and visible on the surface of the raw liver area (highlighted)

team decided to perform a left trisectionectomy. A robotic approach was proposed, and consent was obtained.

The operative time was 390 min with an estimated blood loss of 410 ml, and no transfusion was required during or after the procedure (Figs. 1, 2, and 3). Recovery was uneventful and the patient was discharged on postoperative day 8. No bile leak was observed, and the drain was removed on postoperative day 8. Pathology confirmed moderately differentiated hepatocellular carcinoma (Edmondson Steiner grade 3) with free margins and a tumor regression grade of 3. Control computed tomography showed good regeneration of the liver remnant.

Robotic left trisectionectomy is safe and feasible. The Glissonian approach is useful for anatomic left liver trisectionectomy.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s11605-023-05587-y.

Declarations

Informed Consent The patient has given full consent for the publication of his case.

Conflict of Interest The authors declare no competing interests.

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