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Intrahepatic Glissonian approach for robotic left hepatectomy

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Robotic surgery has gained growing acceptance in recent years, expanding to liver resection [1,2]. We have described a standardized technique for intrahepatic Glissonian approach, which, based on small incisions and following specific anatomical landmarks, allows a straightforward control of Glissonian pedicles without hilar dissection for both right and left liver. This technique has been used since 2001 in open and laparoscopic resections [3–5]. The choice between extrahepatic or intrahepatic Glissonian approach depends on the specific characteristics of the patient. Re-hepatectomies usually have previously dissection of the hepatoduodenal ligament that may make hilar dissection difficult and hazardous. Repeat hepatectomy is often required for primary and metastatic tumors. Repeat liver resection offers opportunities for second, third or more hepatectomies. However, surgical maneuvers become technically demanding as the severity of the adhesions increases and may increase operative time, blood loss and complications. Since the development of the robotic platform, the number of robotic-assisted surgeries has significantly increased. This video demonstrates technical aspects of a third hepatectomy that was performed by robotic approach using intrahepatic Glissonian technique. A left hepatectomy was performed in a patient with hard adhesions around the liver surface and around the hepatic hilum that precluded individual dissection of the portal triad. Intrahepatic Glissonian approach [3] was successfully used to gain control of the left portal pedicle. A 59-year-old man with colorectal liver metastasis was referred for treatment. In 2017, he underwent laparoscopic anterior resection followed by neoadjuvant chemotherapy. After objective response, 3 metastases were resected by laparoscopy. One year later, a single recurrence between segment 6 and segment 7 was detected and treated with robotic resection. During follow-up, a new 5 cm metastasis was found in segment 4. Preoperative imaging showed involvement of the middle hepatic vein. The left portal pedicle was also compromised. Multidisciplinary team decided for a left hepatectomy. Robotic approach was proposed, and consent was obtained from the patient. Future liver remnant volumetry was 58%. Xi da Vinci robotic system was used. Abdominal cavity inspection showed adhesions on the hepatic hilum. Liver was rigidly attached to the diaphragm. Intraoperative ultrasound was performed to check for new lesions and assure surgical margins. Operation begins with division of adhesions, using robotic scissors. Cholecystectomy was performed. Two incisions are needed for the intrahepatic Glissonian approach (Fig. 1). The first one was performed at the basis of segment 4b and the second was performed above the Arantius ligament, to preserve the pedicle from caudate lobe. The pedicle was encircled with robotic forceps. Temporary clamping of the left pedicle was performed resulting in ischemic delineation of the left liver. Fluorescence imaging after infusion of indocyanine green confirmed the limits between right and left liver and preservation of the perfusion of the caudate lobe. The left Glissonian pedicle was divided with stapler. After division of the Arantius ligament, the trunk of middle and left hepatic veins was identified and divided with stapler. Liver was then divided with bipolar forceps and robotic scissors, under saline irrigation until completion of left hepatectomy. Pringle maneuver was not necessary. The total operation time was 294 minutes. The docking time was 8 minutes, robotic left hepatectomy time was 280 minutes. Robotic intrahepatic access to the left pedicle took 6 minutes. The postoperative period was uneventful, and patient was discharged on the 4th postoperative day. The final pathological report revealed colorectal metastasis with free surgical margins. In Conclusion, robotic approach may help the completion of liver resection by minimally invasive technique, especially in repeat

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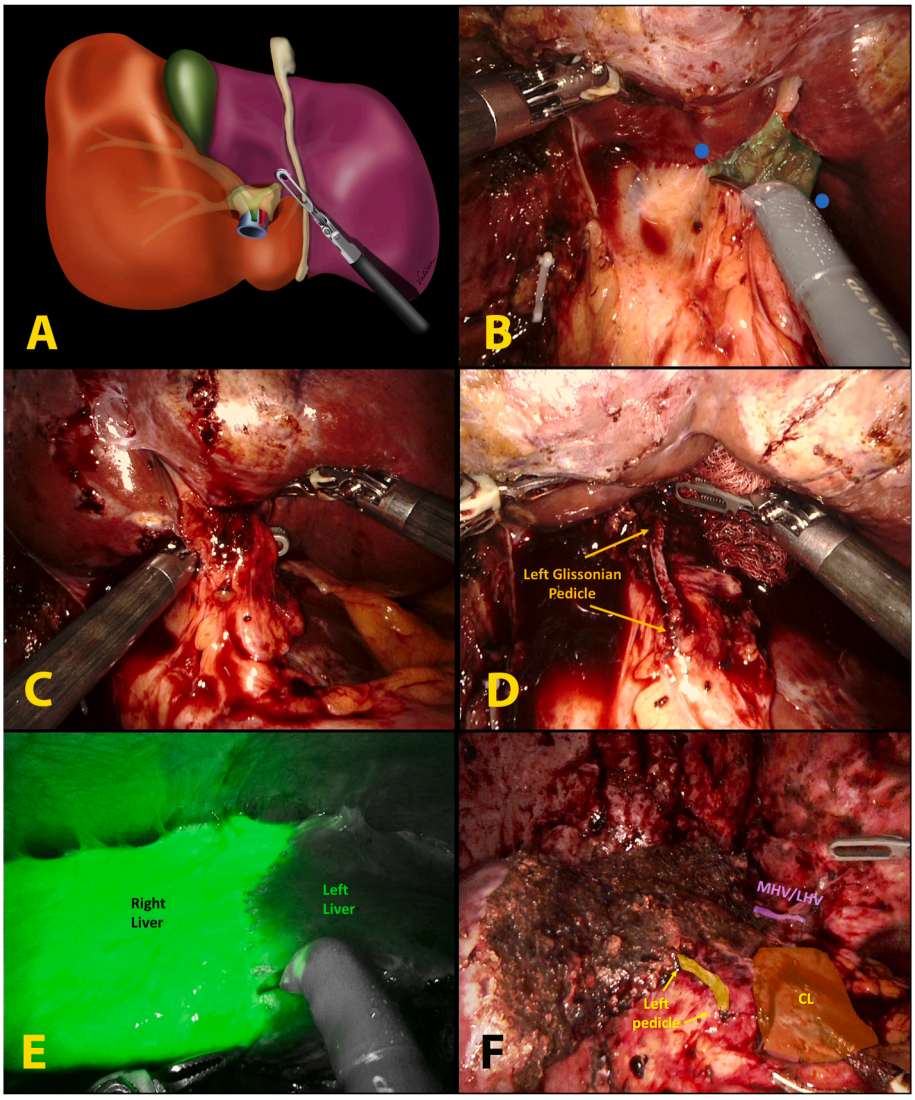

Fig. 1. Glissonian approach for robotic repeat left hepatectomy.
A. Schematic drawing of Glissonian approach for left hepatectomy.
B. Intraoperative view showing the left pedicle (green shadow) and the site for the incisions (blue spheres) used for Glissonian approach.
C. Intraoperative view: The left Glissonian pedicle is encircled using the Cadière forceps.
D. Intraoperative view after the division of the left Glissonian pedicle by stapler.
E. Intraoperative fluorescence imaging of the liver after injection of the indocyanine green shows complete devascularization of the left liver.
F. Intraoperative view after left hepatectomy shows the left Glissonian pedicle divided. Caudate lobe (CL) is preserved. Stump of the common trunk is highlighted. Left hepatic vein (LHV); middle hepatic vein (MHV).

hepatectomies. Intrahepatic access of liver pedicles can be achieved using small incisions around hilar plate, following specific anatomical landmarks. The division of the liver following the ischemic area results in less bleeding, precluding the Pringle maneuver. This video shows the different steps (Fig. 1) necessary to perform this complex operation.

Disclosure

Drs. Machado, Mattos, Lobo Filho and Makdissi have no conflicts of interest or financial ties to disclose.

Authorship statement

All authors have made substantial contributions to all of the following: (1) the conception and design of the study, or acquisition of data, or analysis and interpretation of data, (2) drafting the article or revising it critically for important intellectual content, (3) final approval of the version to be submitted.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.suronc.2021.101601.

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