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Research Communication

Robotic left trisectionectomy with lymphadenectomy and Roux-en-Y hepaticojejunostomy for intrahepatic cholangiocarcinoma (with video)

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Intrahepatic cholangiocarcinoma (ICC) is a rare but aggressive malignancy that accounts for approximately 10% to 15% of all primary liver tumors [1]. Owing to the often late diagnosis and limited therapeutic options, it is associated with a poor prognosis. Surgical resection remains the cornerstone of curative treatment of ICC and offers the best chance of long-term survival [1].

Liver resection remains one of the most complex and technically demanding procedures in hepatobiliary surgery [2]. Left trisectionectomy, in which the left liver is removed together with segments 5 and 8, is a challenging operation that is often indicated for large or centrally located tumors, including ICCs. This procedure becomes even more complicated when bile duct reconstruction is required, such as in cases in which the bile ducts are involved.

The advent of minimally invasive techniques has transformed the field of liver surgery, offering patients less postoperative pain, shorter hospital stays, and faster recovery than traditional open procedures [2,3]. Among these techniques, robotic-assisted surgery has gained increasing attention owing to its unique advantages, such as improved 3-dimensional visualization, better articulation of instruments, and improved ergonomics for the surgeon [2]. These features are particularly beneficial in complex procedures such as left trisectionectomy, in which precise dissection, vascular control, and bile duct reconstruction are critical [2,3].

We present a Video (available online at XXX) of a robotic left trisectionectomy with lymphadenectomy and Roux-en-Y hepaticojejunostomy for an ICC. A 54-year-old woman presented with abdominal pain. Magnetic resonance imaging revealed a 7.6 cm single ICC occupying the central liver (Fig. 1). Positron emission tomography–computed tomography (PET-CT) showed a tumor confined to the liver with no evidence of spread. The tumor was deemed unresectable and neoadjuvant treatment with durvalumab plus gemcitabine and cisplatin was initiated. After 6 months of treatment, the tumor showed a clear response with a reduction in size and reduced activity on PET-CT. Despite infiltration of the hilar plate, the tumor spared the right posterior pedicle. The multidisciplinary team decided for liver resection. Based on the liver volumetry and

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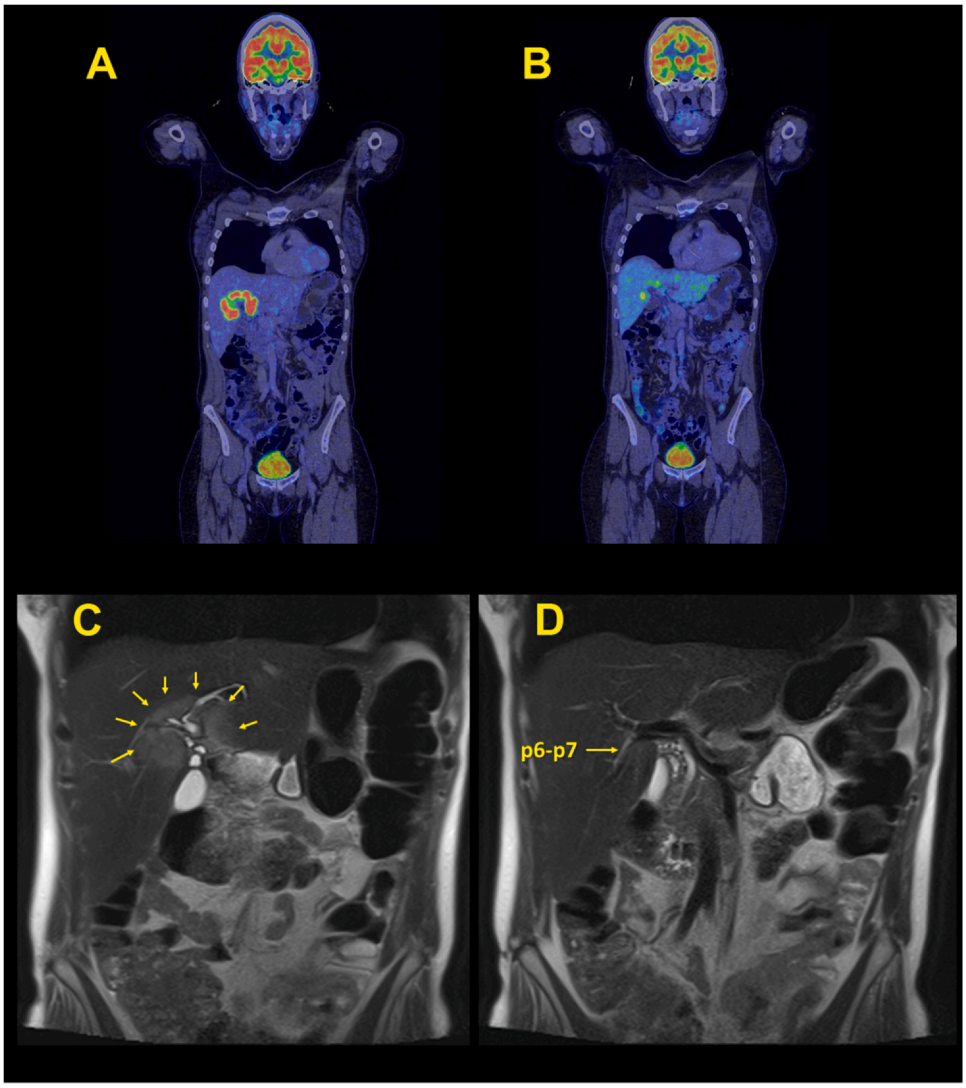

Figure 1. Robotic left trisectionectomy. Preoperative imaging examination. A, PET-CT before neoadjuvant treatment. Imaging shows a single tumor confined to the liver. B, PET-CT after neoadjuvant treatment. Imaging shows a significant decrease in tumor activity. C, MRI showed a unique and large tumor encompassing the hilar plate. D, MRI shows that the posterior pedicle is preserved. MRI, magnetic resonance imaging; PET-CT, positron emission tomography–computed tomography.

preoperative images, a left trisectionectomy was chosen. A robotic approach was suggested, and a consent was obtained.

Supplementary material related to this article can be found online at doi:10.1016/j.gassur.2025.102074.

Robotic left trisectionectomy was performed by complete dissection of the hepatic hilum, including the right anterior hepatic artery, portal vein, and bile duct. A lymphadenectomy was also performed, resulting in skeletonization of the hilar plate. The left hepatic artery, which originated from the gastric artery, was ligated separately from the hepatoduodenal ligament (Fig. 2). During the liver transection, we found that the common bile duct was in close contact with the tumor and could not be spared. Therefore, a Roux-en-Y hepaticojejunostomy was necessary for technical and oncologic reasons (Fig. 3). However, the jejunal loop was brought up to the right upper quadrant under moderate tension, and we decided to fix the jejunal loop. We had previously experienced bile leaks in

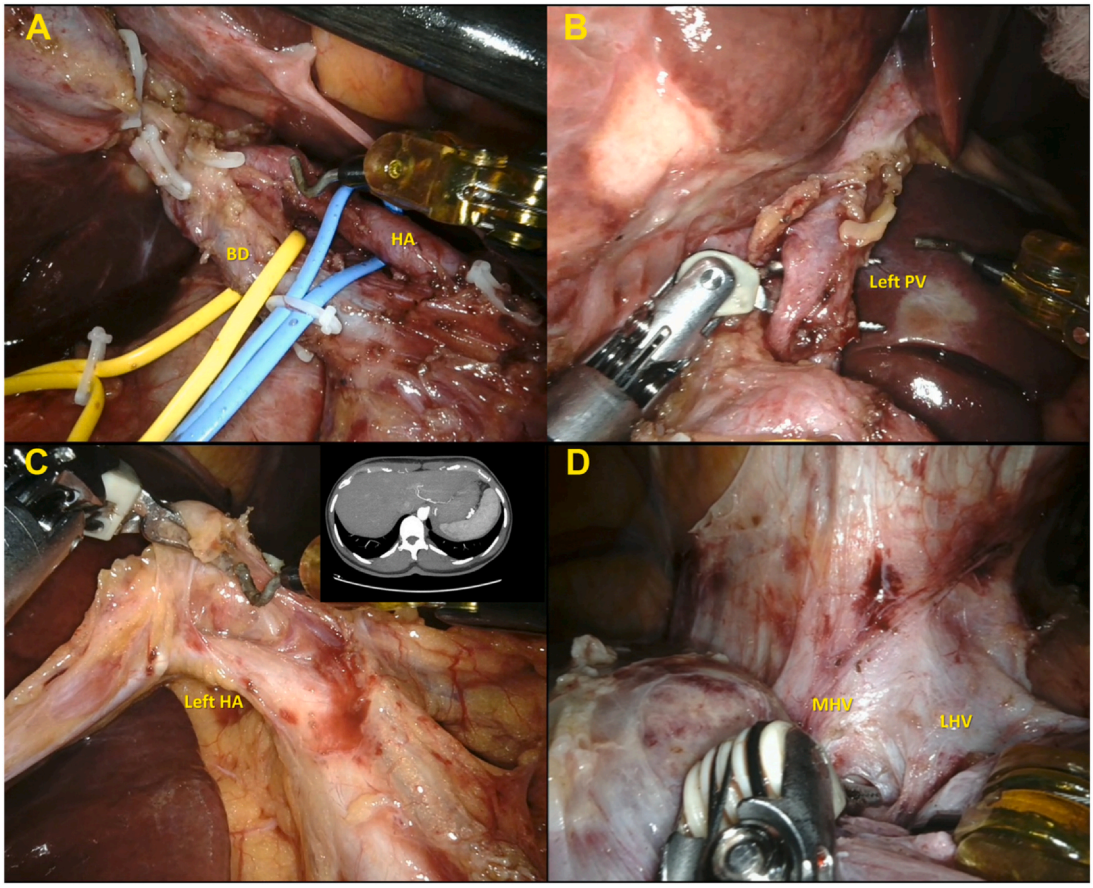

Figure 2. Robotic left trisectionectomy with lymphadenectomy and Roux-en-Y hepaticojejunostomy. A, Intraoperative view after lymphadenectomy. B, The intraoperative view shows the dissection of the left PV. C, The intraoperative view shows the dissection of the left HA originating from the left gastric artery. In the picture: CT scan of the arterial phase showing the left HA originating from the left gastric artery. D, Intraoperative view showing the dissection of the MHV and LHVs. BD, common bile duct; CT, computed tomography; HA, hepatic artery; LHV, left hepatic vein; MHV, middle hepatic vein; PV, portal vein.

patients with jejunal loop tension and sutured the jejunal loop to the retroperitoneal ligament under the remnant liver, to the right diaphragmatic pillar, and to the ligamentum Arantius to eliminate any sign of tension.

The total operating time was 407 min, and the estimated blood loss was 340 mL. An intermittent Pringle maneuver was performed and the total Pringle time was 64 min. No transfusion was required during or after surgery. Pathology revealed a single 6.5 cm cholangiocarcinoma (T3N1) with free margins. Recovery was uneventful and the patient was discharged on postoperative day 9. No bile leakage was observed.

Robotic left trisectionectomy with Roux-en-Y hepaticojejunostomy is safe and feasible. This complex procedure should be performed by experienced surgeons, both in open and robotic surgeries. The intrahepatic hepaticojejunostomy can sometimes be under tension, which can lead to postoperative bile leakage. Sutures to fix the jejunal loop can help to relieve this tension and reduce the risk of postoperative bile leakage.

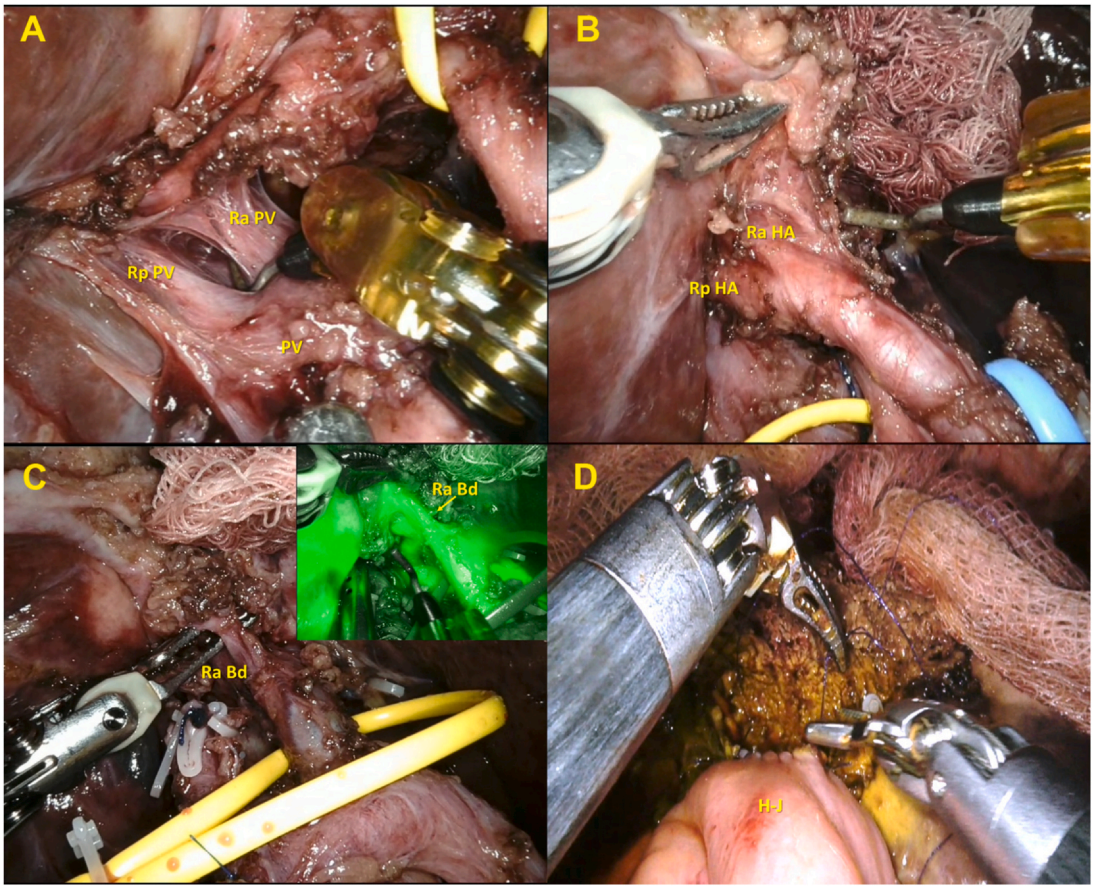

Figure 3. Robotic left trisectionectomy with lymphadenectomy and Roux-en-Y hepaticojejunostomy. A, Intraoperative view showing the Ra PV and the Rp PV. B, Intraoperative view showing the Ra HA and the Rp HA. C, Intraoperative view showing the Ra Bd. In the picture: fluorescence imaging highlights the bifurcation of the right bile duct. D, Final intraoperative view after robotic left trisectionectomy and Roux-en-Y hepaticojejunostomy (H-J). Ra Bd, right anterior bile duct; Ra HA, right anterior hepatic artery; Ra PV, right anterior portal vein; Rp HA, right posterior hepatic artery; Rp PV, right posterior portal vein.

Ethics approval

All procedures performed in this case complied with the ethical standards of the institutional and/or national research committee(s) and the Declaration of Helsinki (as revised in 2013). Written informed consent was obtained from the patient for publication of this article and accompanying images.

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Declaration of competing interest

The authors declare no competing interests.

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