

Robotic right anterior sectionectomy with Glissonian approach

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Robotic liver resection is one of the most complex procedures in hepatobiliary surgery [1,2]. We have described a standardized technique for the Glissonian approach based on small incisions and following specific anatomical landmarks. It allows uncomplicated control of Glissonian pedicles without hilar dissection for both the right and left liver. This technique has been used in open and laparoscopic resections since 2001 [3,4]. This video demonstrates the technical aspects of a robotic right anterior sectionectomy using the Glissonian technique. In a 54-year-old man, a 1.6 cm tumor was discovered in the right liver during a routine examination. The MRI examination revealed that it was an inflammatory adenoma. However, during the follow-up examination, the tumor enlarged and became heterogeneous. MRI showed a heterogeneous hyperintense tumor on T2, with restricted water diffusion, diffuse and heterogeneous contrast enhancement in the arterial phase, which becomes hypointense in the hepatobiliary phase (Fig. 1). The original diagnosis was an adenoma with malignant transformation. A right hepatectomy was proposed, but the future liver remnant was small and the patient had a fatty liver. The patient is morbidly obese and has already undergone bariatric surgery. Due to the characteristics of the liver and the size of the future liver remnant, the multidisciplinary team opted for a right anterior sectionectomy. A robotic approach was proposed and consent was obtained.

In the Glissonian approach, a small opening is made in the liver substance at the level of the hilar plate. Using a blunt maneuver, the liver tissue is detached and the right anterior pedicle can be identified (Fig. 2). Intraoperative ultrasound is used to check the position of the tumor and its relationship to the right anterior pedicle. The right anterior pedicle is temporarily clamped and the ischemic demarcation is used together with the IOUS to delineate the resection margins. This demarcation is further confirmed by negative fluorescent staining after intravenous injection of indocyanine green (Fig. 3). The dosage of indocyanine green was 5 mg (2 mL of a 2.5 mg/mL solution) followed by a flush with a 10 mL bolus of 0.9 % sodium chloride injection.

The liver is then transected using bipolar forceps and scissors under saline irrigation. The pedicle is clamped during transection and ligated and divided at the end of the procedure. The operation time was 272 minutes, blood loss was estimated at 120 ml, with no transfusion re-

quired. Postoperative recovery was uneventful and the patient was discharged on postoperative day 3. Pathology revealed a hepatocellular carcinoma with a size of 4.5 cm and free surgical margins.

The robotic Glissonian approach is feasible and a useful technique for safe control of the right anterior pedicle, facilitating robotic right anterior sectionectomy. The main difference with the robotic approach is that we can easily encircle the pedicle in the same way as we have described for the open Glissonian approach [3]. This maneuver is much more difficult with the laparoscopic approach and blind insertion of the clamp followed by the stapling device was the rule [4]. The robotic approach allows a safer maneuver to reach the right anterior Glissonian pedicle while maintaining the minimally invasive technique. In summary, the robotic approach can help to perform liver resection with a minimally invasive technique, especially in more complex cases. The division of the liver following the ischemic area leads to less bleeding. This video shows the different steps required to perform this complex operation.

CRedit authorship contribution statement

Marcel A. Machado: Writing – original draft, Supervision, Software, Resources, Methodology, Investigation, Formal analysis, Conceptualization. **Micheli F. Domingos:** Writing – review & editing, Supervision, Resources, Methodology, Investigation. **Eduardo Brommelstroet Ramos:** Writing – review & editing, Supervision, Resources, Investigation, Conceptualization.

Disclosure

Dr Machado, Dr Domingos, and Dr Ramos have no conflicts of interest or financial relationships to disclose. This manuscript received no financial support. The patient has given full consent for the publication of her case.

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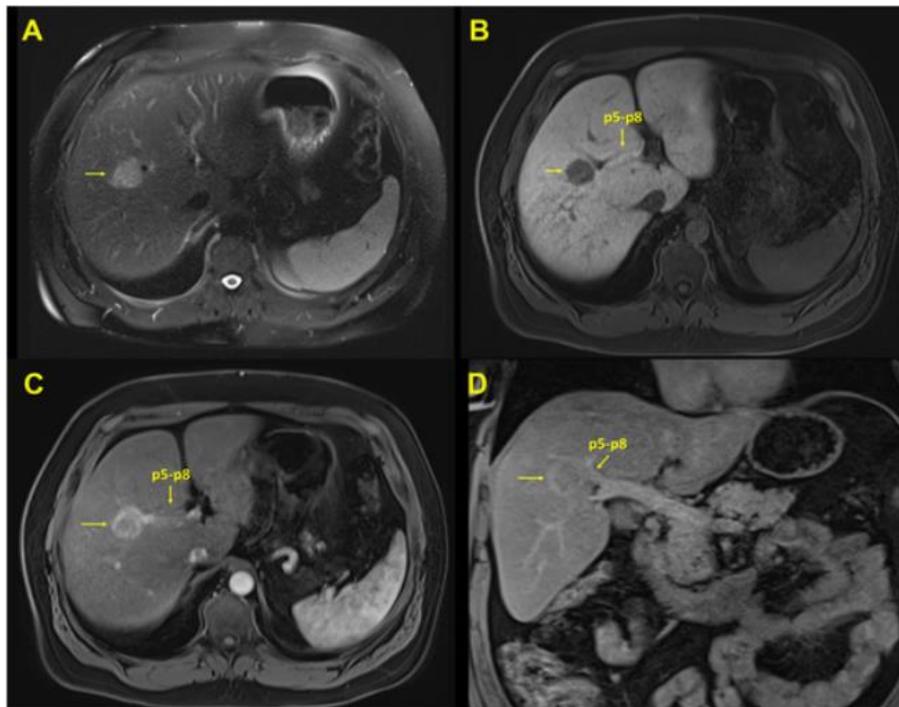


Fig. 1. Robotic right anterior sectionectomy. Preoperative imaging. A. MRI shows a heterogeneous hyperintense tumor on T2. B. MRI shows heterogeneous con-
 trast enhancement in the arterial phase. C. MRI shows a hypointense tumor in the hepatobiliary phase. D. Coronal MRI shows a tumor in close contact with the right
 anterior pedicle.

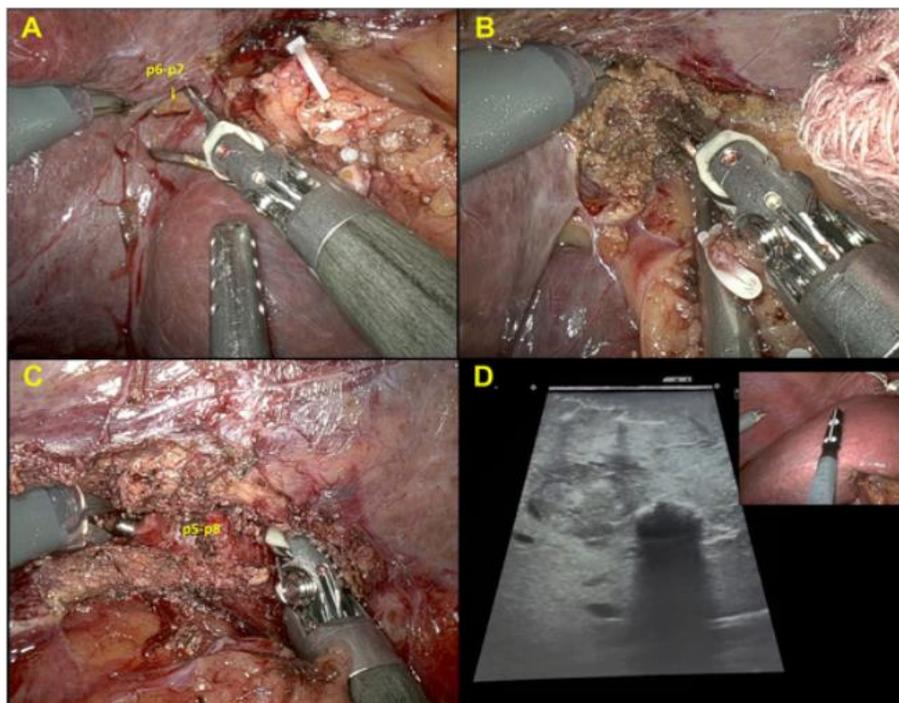


Fig. 2. Robotic right anterior sectionectomy. A. Intraoperative view. The right posterior pedicle is highlighted. B. Intraoperative view. Incision over the hilar plate
 C. Intraoperative view. The right anterior pedicle is circled. D. Intraoperative ultrasound shows the proximity of the tumor to the right anterior pedicle.

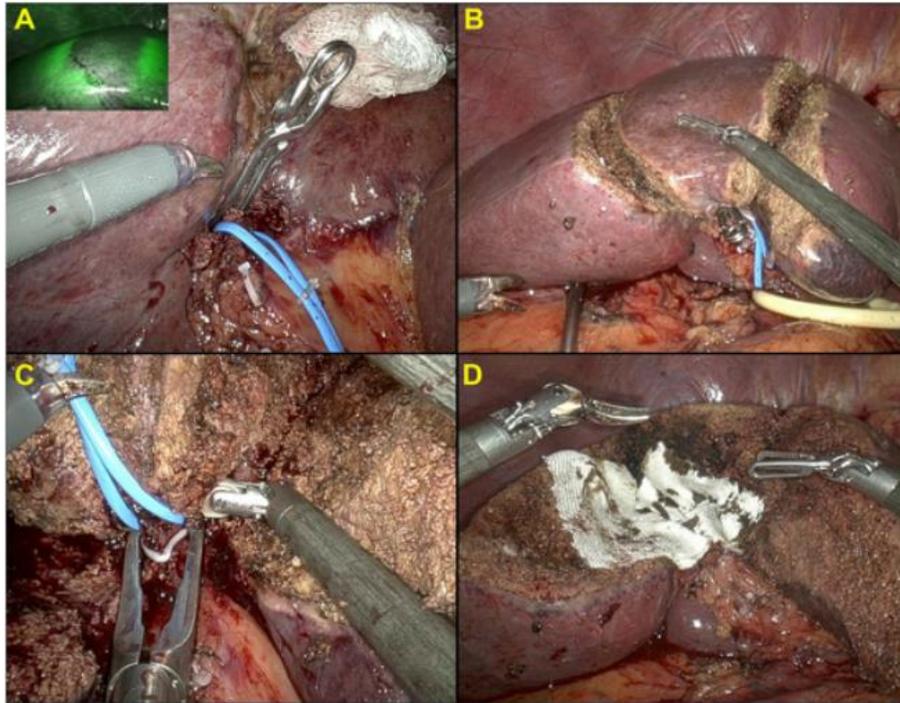


Fig. 3. Robotic right anterior sectionectomy. A. Intraoperative view. The right posterior pedicle is temporarily clamped. The small image shows negative fluorescence staining of the right anterior section after intravenous injection of indocyanine green. B. Intraoperative view of the right anterior sectionectomy. C. Intraoperative view. The right anterior pedicle is divided between hem-o-locks. D. Intraoperative view after completion of the right anterior sectionectomy.

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.

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