



# Repeat Laparoscopic Hepatectomy for Recurrent Hepatocellular Carcinoma after Open Central Bisectionectomy

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## Abstract

Although laparoscopic liver resection is widely accepted as a minimally invasive surgical approach for Hepatocellular Carcinoma (HCC), repeat laparoscopic hepatectomy has not been widely adopted due to its technical difficulties. Therefore, it has been limited to highly selected patients. A 75-year-old man was admitted to our hospital with a diagnosis of HCC and underwent open central bisectionectomy. One year after surgery, abdominal Computed Tomography (CT) revealed a mass measuring 10 mm in diameter on the cut liver surface of Segment 7 (S7). Our preoperative diagnosis was recurrent HCC and the patient underwent repeat laparoscopic S7 partial hepatectomy. There was no sign of recurrence 10 months after hepatectomy. Repeat laparoscopic hepatectomy for recurrent HCC in S7 after open hepatectomy is an especially challenging, but suitable and safe procedure for selected patients. We report a case of repeat laparoscopic S7 partial hepatectomy for recurrent HCC after open central bisectionectomy.

**Keywords:** Recurrent hepatocellular carcinoma; Repeat laparoscopic hepatectomy; Segment 7

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Received Date: 17 Aug 2021

Accepted Date: 13 Sep 2021

Published Date: 17 Sep 2021

### Citation:

Yamane H, Nakamura H, Fukuoka E, Mohri K, Yoshida T, Yamagishi T, et al. Repeat Laparoscopic Hepatectomy for Recurrent Hepatocellular Carcinoma after Open Central Bisectionectomy. *Clin Oncol.* 2021; 6: 1860.

ISSN: 2474-1663

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## Introduction

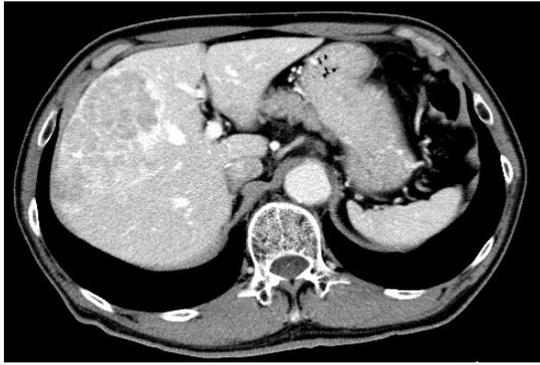
Liver resection is well established as the most effective therapy for Hepatocellular Carcinoma (HCC). However, tumor recurrence has a very high incidence of approximately 70% 5 years after liver resection [1]. Repeat hepatectomy has been demonstrated to be an effective treatment, with good long-term surgical outcomes for recurrent HCC [2,3]. Although laparoscopic hepatectomy is widely accepted as a minimally invasive surgical approach for HCC or metastatic liver tumors, repeat laparoscopic hepatectomy has not been widely adopted due to its technical difficulties associated with postoperative adhesions, changes in anatomy, formation of collateral circulation and fewer liver remnants caused by the previous resection. Therefore, repeat laparoscopic liver resection has been limited to highly selected patients.

We herein report a case of repeat laparoscopic Segment 7 (S7) partial hepatectomy for recurrent HCC after open central bisectionectomy.

## Case Presentation

A 75-year-old man was admitted to our hospital with a diagnosis of HCC. Dynamic contrast-enhanced Computed Tomography (CT) revealed a mass measuring 110 mm in diameter with high attenuation, early-phase enhancement, and washout during the late-phase in segments 4, 5 and, 8 (Figure 1). Our preoperative diagnosis was HCC, and the clinical stage was T1bN0M0, or Stage IB, in terms of the Union for International Cancer Control Classification (Eighth Edition).

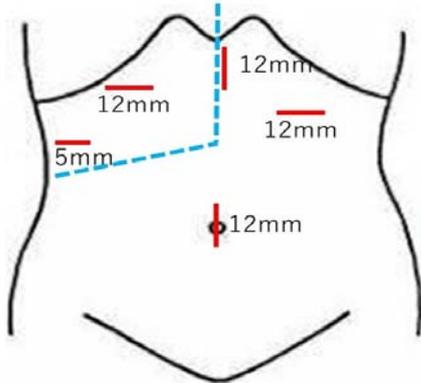
Tests for hepatitis B virus surface antigen and antibodies to hepatitis C virus were negative. Liver function tests were graded as Child-Pugh class A, but the 15-min retention rate for Indocyanine Green (ICG15) was 13.8%. His serum alpha-fetoprotein and serum proteins induced by the absence of vitamin K or antagonist II measured 9100 ng/ml and 670 mAU/ml, respectively. The patient underwent open central bisectionectomy. The operative time was 571 min, and the estimated intraoperative blood loss was 1200 ml. Postoperative pathological examination showed a moderately differentiated HCC measuring 110 mm in diameter with a 5-mm tumor-free resection margin. Analysis of the noncancerous portion of the resected liver confirmed a diagnosis of chronic hepatitis. The patient had a favorable clinical course without any complications, and he was



**Figure 1:** Dynamic contrast-enhanced CT showing a mass measuring 110 mm in diameter in segments 4, 5 and 8.



**Figure 2:** Dynamic contrast-enhanced CT showing a mass measuring 10 mm in diameter in S7 (solid arrow).

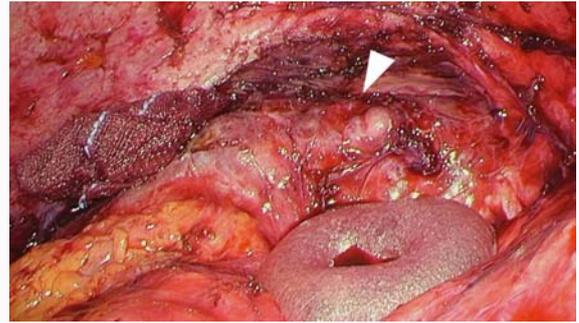


**Figure 3:** Schema demonstrating the placement of each port. The broken lines indicate the open central bisectionectomy scar.

discharged on postoperative day 11.

One year after surgery, dynamic contrast-enhanced CT revealed a mass measuring 10 mm in diameter in S7 of the liver (Figure 2). Our preoperative diagnosis was recurrent HCC, and we planned to perform laparoscopic S7 partial hepatectomy.

For the surgical procedure, the patient was placed in the lithotomy position. A 12-mm port was placed through an umbilical incision, and the procedures were performed using pressure-controlled carbon dioxide pneumoperitoneum, whose pressure was maintained below 10 mmHg. Because of the severe adhesions between the abdominal



**Figure 4:** Laparoscopic findings. The tumor (triangular arrow) was detected after the adhesions were sufficiently detached.

wall and the remnant liver revealed by laparoscopy, two 12-mm ports were placed first through the right and left upper abdominal quadrants separately. After the adhesions were detached to create the surgical field, a 5-mm port and a 12-mm port were placed through the right anterior axillary line and the cranial side of the umbilical region to the median line, respectively (Figure 3). The tumor was located on the right posterior section side of the cut liver surface after the adhesions were sufficiently detached (Figure 4). Although the transverse colon adhered to the cut liver surface severely, it was unnecessary to detach it to enable S7 partial hepatectomy. Intraoperative Ultrasound (IOUS) was performed to confirm the extension of the tumor. Using the crash-clamp method with a harmonic scalpel (Ethicon, USA), the liver parenchyma was transected. Pringle's maneuver was not performed. The resected specimen was removed in a retrieval bag through an umbilical port site. The operative time was 236 min and the estimated intraoperative blood loss was 50 ml. Postoperative pathological examination showed a moderately differentiated HCC measuring 10 mm in diameter with a 7-mm tumor-free resection margin. The patient had a favorable clinical course without any complications, and he was discharged on postoperative day 5. There was no sign of recurrence 10 months after the repeat hepatectomy.

## Discussion

Repeat hepatectomy has been accepted as an effective treatment for recurrent HCC and metastatic liver tumors [4]. However, repeat laparoscopic hepatectomy has not been widely adopted due to its technical difficulties despite the recent worldwide spread of laparoscopic hepatectomy. In particular, the total number of HCC patients who have undergone repeat laparoscopic hepatectomy remains small despite the increase in reports regarding repeat laparoscopic hepatectomy for metastatic liver tumors [5], because the procedure for recurrent HCC is inherently more difficult due to associated liver cirrhosis. The generally observed disadvantage of open surgery over laparoscopic surgery is that it causes more adhesion. Thus, repeat laparoscopic hepatectomy for recurrent HCC after open hepatectomy is especially challenging. Nevertheless, several authors have recently reported that repeat laparoscopic hepatectomy is feasible and useful with good short-term outcomes for selected patients [6,7].

Additionally, laparoscopic hepatectomy for tumors in liver S7 is also technically challenging because this area is located at the bottom of the small subphrenic cage and is overlaid by the large and heavy right liver [8]. Thus, laparoscopic S7 partial hepatectomy requires full mobilization of the right hepatic lobe to obtain a suitable surgical view and manipulation that is sufficient to ensure hemostasis and creation

of an adequate surgical margin. In our institute, we performed laparoscopic S7 partial hepatectomy after the right hepatic lobe is fully mobilized without combined intercostal port insertion [9], although the validity of intercostal ports for laparoscopic hepatectomy for posterosuperior tumors has often been reported [10].

In the present case, severe adhesions between the abdominal wall and the remnant liver were identified. After the adhesions were detached, we detected recurrent HCC on the cut liver surface of S7. As a result, mobilization of the right hepatic lobe was unnecessary. Additionally, recurrent HCC was located separately from adhesions between the transverse colon and the cut liver surface. Therefore, we could relatively easily perform a repeat laparoscopic S7 partial hepatectomy with no perioperative complications.

## Conclusion

In summary, we report a case of repeat laparoscopic hepatectomy for recurrent HCC after open central bisectionectomy. Repeat laparoscopic hepatectomy for tumors in S7 is a suitable and safe procedure even after open hepatectomy in selected patients.

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