Author's response to reviews

Title: Successful en bloc resection of recurrence hepatocellular carcinoma directly invading the abdominal wall: case report

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Successful en bloc resection of recurrent hepatocellular carcinoma directly invading the abdominal wall

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**Introduction:** Repeat hepatic resection as the most effective treatment for intrahepatic recurrence has been previously reported, although en bloc resection of recurrence hepatocellular carcinoma directly invading the abdominal wall has not been previously reported.

**Case presentation:** In Sept 2012, a 64-year-old Chinese male patient was referred to our hospital because of primary hepatocellular carcinoma (HCC) located in the Couinaud's segments III and V. He first underwent hepatectomy of the liver. Ten months later, extrahepatic metastases were found in the abdominal wall. He is suffering from recurrence hepatocellular carcinoma (HCC) associated with direct invasion into the abdominal wall. The patient presented with an abdominal wall mass, and upper abdominal pain. Computer tomography (CT) and magnetic resonance imaging (MRI) scans demonstrated a 10cm tumour in the left liver with invasion to the abdominal wall. The patient underwent an en bloc left hepatectomy with the resection of the tumour in the abdominal wall. Pathology revealed HCC involving the abdominal wall. Disease-free margins of resection were achieved. The patient's postoperative course was uneventful. Eight months after the last surgery, the patient died due to recurrence and distal metastasis.

**Conclusion:** Direct invasion of HCC into the abdominal wall is rarely encountered. Complete surgical resection should be considered in selected patients with an appropriate hepatic functional reserve and technical difficulty.

**Key word:** Hepatocellular carcinoma, hepatectomy, recurrence,

**Introduction**

Hepatocellular carcinoma (HCC) is one of the most common cancers worldwide, especially in China. The hepatocellular carcinoma directly invading the abdominal wall has been rarely reported (1, 2), although the en bloc resection of recurrence hepatocellular carcinoma directly invading the abdominal wall has never been reported.

**Case Presentation**

A 64-year-old Han Chinese male patient had primary multi-hepatocellular carcinoma (HCC). The tumours were located in the Couinaud's segments III and V, which was a local resection. Post-operation, he received TACE. After 10 months, the patient was referred to hospital with right upper abdominal pain and an abdominal wall mass (Fig.1). He tested negatively for the hepatitis B virus, only HbcAb (+). Physical examination revealed the abdominal wall mass (7x8cm). The routine blood chemistry was normal. The tumour markers alpha-fetoprotein (AFP), carcinoembryonic antigen (CEA), and carbohydrate antigen 19-9 (CA199) were all within the normal range. The functional status of the liver was assessed as Child A. Abdominal computed tomography (CT) and magnetic resonance imaging (MRI) scans demonstrated a mass
with ill-defined borders in the left lobe of the liver and additionally revealed abdominal wall invasion (Fig.2). The maximum diameter of the lesion was 10cm. Because of the extrahepatic tumour invasion or recurrences of hepatocellular carcinoma directly invading the abdominal wall, a hepatectomy and resectioning of the abdominal wall were considered and an operation was selected as the procedure of choice.

The second surgery was performed in July 2013. The incision began between the original incisions (including a colour-mass in the abdominal wall. Fig.3). The intraoperative findings revealed a 10 cm tumour involving the left lobe (Couinaud’s segment IV) of the liver invading the abdominal wall. The trunk of the left portal vein, left hepatic artery and left bile duct was divided and ligated. The common venous trunk of the left and middle hepatic veins was then divided and ligated. The liver parenchymal transection was performed not using Pringle’s maneuver. Liver resection was carried out by a clamp-crushing method. Great care was taken to protect the stomach and intestinal wall. Consequently, a left lobectomy with the en-bloc removal of the abdominal wall was performed. The cut surfaces of the liver were directly covered by a greater omentum and absorbable hemostatic gauze; due to the large wound (cut surface), using local gauze packing was applied to avoid postoperative bleeding. The operation lasted 2 hrs. The intra-operative blood loss was 1200ml with 6U RBC and 4U of fresh plasma transfused during the operation. Continuous abdominal double cannula lavage and low negative pressure drainage were utilized to drain the abdominal cavity. The abdominal drain and gauze packing were loosened and removed on the third and fifth day after the operation respectively. The postoperative course was uneventful. There were no postoperative complications. The histologic findings were consistent with moderately differentiated hepatocellular carcinoma invading the abdominal wall. The patient suffered a recurrence six months after the second surgery, refused treatment, and died at eight months (Fig.4).

Discussion

The tumour recurrence rate remains high, at 50-60% (3-15), and even over 80% (16), and is the main cause of poor survival after liver resection. Many authors have reported that repeat hepatic resection might be the most effective treatment for intrahepatic recurrence, and the 5-year survival following re-resection ranged from 31-69% (17, 18). Hanazaki reported (19) that a curative repeat hepatectomy may be considered the most effective therapeutic modality for recurrent HCC because the survival from recurrence in patients undergoing repeat hepatic resection was significantly longer than that in patients who underwent TACE or PEIT in their study. Roayaie S et al (20) think that second hepatic resection for recurrent hepatocellular cancer is applicable in about 15% of patients with recurrence. The procedure is safe and can achieve excellent results in carefully-selected patients (20). Therefore, repeat hepatic resection is accepted as the best treatment for intrahepatic recurrence.

The second surgery is difficult for intrahepatic recurrence and extrahepatic metastasis. Repeat hepatic resection is more difficult than primary resection because of the
impaired liver function due to the progression of hepatitis, the presence of adhesion, and modifications in the anatomy due to the previous operation (21). For the wound bleeding, local gauze packing was applied, which can achieve good outcomes. With removal 3-5 days postoperatively, there is no infection.

The incision of the design: the tumour on the incision always grows quickly and will rupture, so surgery is necessary. Sometime, the incision needs a skin flap or graft. The abdominal wall mass is large. If the defect of the incision is large post-surgery, a flap is needed, or reconstruction of the skin requires further skin replacement for the abdominal wall. After resection of the intrahepatic recurrence and abdominal wall mass combined, the abdominal tension of this patient was reduced, so the incision could be sutured, and so did not need a flap.

**Conclusion**

Because of the extrahepatic tumour invasion or recurrences of hepatocellular carcinoma, a left hepatectomy and resectioning of the abdominal wall were considered and an operation was selected as the procedure of choice, which may be useful in improving the cure and resection rates for liver cancer that is unresectable by the technique. This is an extremely rare case of a patient who successfully underwent repeated resections for hepatic recurrences directly invading the abdominal wall after hepatectomy for HCC. In order to prevent the postoperative recurrence of HCC, the patient requires comprehensive treatment.

**List of abbreviations:**

- Hepatocellular carcinoma (HCC)
- Computer tomography (CT)
- Magnetic resonance imaging (MRI)
- Transcatheter arterial chemoembolization (TACE)
- Percutaneous ethanol injection (PEIT)
- Red blood cell (RBC)
- Hepatitis B core antibody (HbcAb)
- Alpha-fetoprotein (AFP)
- Carcinoembryonic antigen (CEA)
- Carbohydrate antigen 19-9 (CA199)

Conflict of interest The authors declare that they have no conflict of interest.

**Author Contributions:** Dr. Aijun Li studied conception, designed the surgery, and drafted the manuscript. Dr. Bin Wu and Lonjiu Cui participated in the surgery and performed the acquisition of data and statistical analysis. Dr. Menchao Wu carried out critical revision. All authors read and approved the final manuscript.

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References:


**Figures.1:** The original incision with a colour-mass in the abdominal wall.

**Figures.2:** MRI: The recurrence of the liver was in segment IV after 10 months.

**Figures.3:** The incision between the original incision (including a colour-mass in the abdominal wall).

**Figures.4:** Left hepatectomy and resection of the extended skin was successfully performed during the liver operation. The patient has had no recurrence during 1 month since the second operation.