CASE REPORT

# Curative treatment for recurrent tumour implantation after ruptured hepatocellular carcinoma

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**Spontaneous rupture of hepatocellular carcinoma with intraperitoneal haemorrhage is a life-threatening condition. Intraperitoneal spread of the tumour after rupture occurs uncommonly. We report two cases of curative management for recurrent tumour implantation after ruptured hepatocellular carcinoma. The two patients presented with ruptured hepatocellular carcinoma and were treated with transarterial embolisation in the acute episode. Interval partial hepatectomy of the carcinoma was performed after the acute episodes. The first patient presented with a large epigastric mass 2 years after rupture. The mass was found to be adherent to the stomach and omentum. Distal gastrectomy was performed. The second patient presented with a right upper quadrant mass 4 months after rupture, and had a huge tumour attached to the ascending colon. Right hemicolectomy and omentectomy were performed. On histological examination, both tumours were confirmed to be recurrent hepatocellular carcinomas with clear surgical margins. After resection, both patients had no tumour recurrence at 1 year and 3 years, respectively.**

## Introduction

Spontaneous rupture of hepatocellular carcinoma (HCC) is a life-threatening condition.[1] Transarterial embolisation is an effective therapeutic intervention to achieve haemostasis for ruptured HCC in the acute phase.[2] Among patients who underwent transarterial embolisation, the 30-day mortality rate is 27 to 38%.[1,3,4] After initial stabilisation, at the

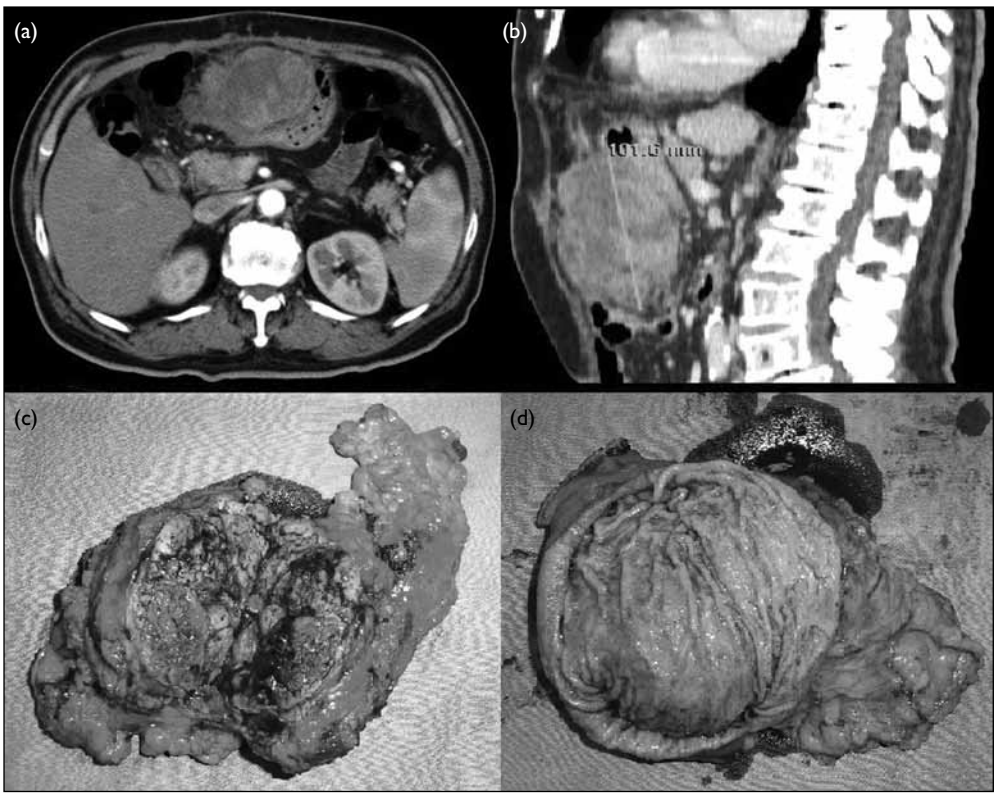


FIG 1. (a) A computed tomographic (CT) scan shows tumour implantation over the stomach anteriorly. (b) A sagittal CT image shows the tumour implantation in the upper abdomen. Specimens showing (c) the tumour arising from the anterior aspect of the stomach, and (d) intact stomach mucosa overlying the implanted tumour

**Key words**
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second stage a hepatic resection rate of 21 to 56% may be achieved and may result in prolonged survival in selected patients.[1,2,4] Following rupture of an HCC, growth of tumour resulting from peritoneal implantation may occur. Among the cases reported in the literature, documentation of recurrence has ensued 3 months to more than 8 years after the initial rupture, mostly within 14 months.[5-11] Most of the cases presented as single implanted tumour.

We report on two patients with such tumour implantation after rupture of an HCC, which presented 4 and 25 months after the initial episode. Complete resection was achieved in both patients.


## 肝癌破裂後細胞植入散播導致的復發性腫瘤的治療

肝癌的自發性破裂加上腹腔內出血可以致命。肝癌破裂後癌細胞在腹腔內散播很少發生。本文報告兩個肝癌破裂後細胞植入散播導致的復發性腫瘤的病例。兩名肝癌破裂的病人均第一時間接受經動脈肝臟腫瘤栓塞術，其後進行部分肝切除。其中一名病人在肝癌破裂兩年後上腹部出現大腫瘤，這腫瘤連接着胃及大網膜，遂為病人進行遠端胃切除。另一名病人在肝癌破裂四個月後右上腹部出現一個連接着升結腸的大腫瘤，後為病人進行右側大腸切除及下網膜切除。兩宗病例的組織學檢查結果均證實為復發性肝腫瘤。兩名病人分別在接受切除後的一年及三年後未有復發。


## Case reports

### Case 1

A 73-year-old man presented with sudden-onset right upper quadrant abdominal pain in March 2008. He had been a chronic drinker and smoker, but had enjoyed good past health and was hepatitis B– and C–negative. Computed tomography (CT) confirmed the diagnosis of liver cirrhosis with ruptured HCC in the left lobe. The tumour was 6.8 cm x 5.3 cm x 7.3 cm in size and located in the inferior subcapsular region of segment III/IVa. Bleeding was controlled by emergency transarterial embolisation. One month later, a second-stage tumour resection with left hemi-hepatectomy was performed. Pathology showed an HCC with macronodular cirrhosis and clear resection margins. He had an uneventful recovery thereafter; his alpha-fetoprotein (AFP) level returned to normal and CT 4 months after resection showed no recurrence of tumour.

About 25 months after the initial presentation, he presented again with a palpable epigastric mass. An irregular heterogeneous mass in the upper abdomen was found on CT; its size was 6.0 cm x 9.1 cm x 10.2 cm (Fig 1a, 1b). Feeding vessels were branching from the right gastroepiploic artery. The tumour was arising from the stomach anteriorly and separate from the liver. Positron emission tomography showed fluorodeoxyglucose uptake in the periphery and C11 acetate uptake in the superior part of the lesion. The AFP level was elevated to 9.2 ng/mL. At laparotomy, the tumour was noted to adhere to the anterior distal part of the stomach but the mucosa was not involved (Fig 1c, 1d) Resection of the tumour with distal gastrectomy and a Roux-en-Y reconstruction were performed. Pathology confirmed recurrence of HCC involving the greater curve mesentery of the stomach with clear peripheral resection margins and no mesenteric lymph node spread. There was no recurrence 1 year after the second operation.

### Case 2

The second patient was a 63-year-old man, who was a social drinker with good past health except for a prior appendicectomy, who presented with right upper quadrant pain for 1 month in February 2008. Multiple hypervascular tumours in the right lobe of liver with rupture were evident on CT. Transarterial embolisation was performed for stabilisation, and later a right hepatectomy was performed. A ruptured HCC at segment V/VI with old blood and clot around the liver was noted intra-operatively. Pathology showed moderately differentiated HCC with clear

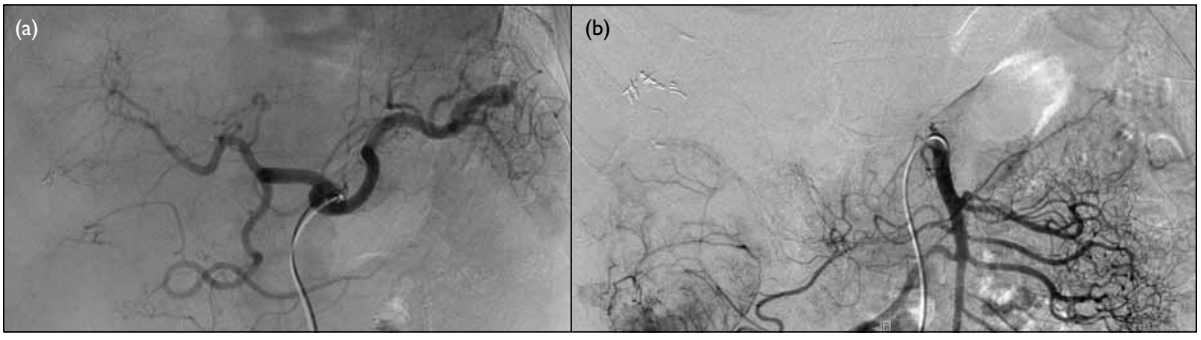


FIG 2. Angiogram showing the vascular supply of the implanted tumour at the ascending colon that involve branches of the coeliac trunk and the superior mesenteric artery (SMA)
(a) Coeliac trunk cannulation and (b) SMA cannulation during the angiogram

resection margins. The patient had an uneventful recovery.

Four months later, he presented again with a right upper quadrant painful mass. Angiogram showed that the mass was supplied by branches of the coeliac trunk (Fig 2a) and the superior mesenteric artery (Fig 2b). A huge tumour mass at ascending colon was found on laparotomy and right hemicolectomy for tumour resection was performed. Pathology confirmed the mass to be recurrent HCC at the ascending colon, with predominantly clear cell components. The resection margins were clear. There was no recurrence 3 years after the second operation.

## Discussion

Hepatocellular carcinoma is the fifth commonest cancer in the world.[12-14] Rupture of carcinoma occurs in 3 to 15% of patients with HCC.[2,15] The mechanism of spontaneous rupture is still not known. Hypotheses include rapid tumour growth and necrosis, rupture by splitting of overlying non-tumourous liver parenchyma or erosion of a vessel, increased intra-tumour pressure with the occlusion of hepatic veins by tumour thrombi or invasion, coagulopathy, and vascular dysfunction.[2]

Intraperitoneal metastasis is rare in unruptured cases, and seems to occur late in the disease. Rupture of an HCC is life-threatening.[1] Management options in the acute phase include one-stage emergency liver resection, transarterial embolisation, perihepatic packing, suture placation, hepatic artery ligation, absolute alcohol injection, and a conservative approach. Transarterial embolisation is increasingly popular and has a high success rate for haemostasis (53-100%).[2] With increasing use of transarterial embolisation for initial control of bleeding followed by a second-stage hepatic resection (in selected patients), prolonged survival may be achieved.[1,2]

Intraperitoneal implantation has been reported to manifest from 3 months to more than 8 years after the initial rupture,[5-11] mostly as a single tumour mass. Such implantation differs from a metastasis, in that prolonged survival up to many years is possible after resection of the implant. Methods to prevent tumour implantation during the initial operation should also be looked into. Possible methods suggested for further investigation include vigorous irrigation of the peritoneal cavity with normal saline and administration of anticancer agents intraperitoneally.[5] However, there is no good evidence to support these kind of measures.

In conclusion, tumour recurrence due to tumour implantation after ruptured HCC may occur months to years after the initial presentation. Radical resection of recurrent HCC due to intraperitoneal implantation following previous rupture is worthwhile, as the procedure can confer a marked survival benefit.

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