

Living Donor Liver Transplantation Followed by Total Gastrectomy – A Two-stage Planned Operative Strategy for Early Gastric Cancer Concomitant with Decompensated Liver Cirrhosis

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Abstract. *Aim: With the recent popularization of living donor liver transplantation (LDLT), providing treatment for comorbidities in LDLT recipients has become important. We report the first case of a patient who was successfully treated with LDLT followed by total gastrectomy for early gastric cancer concomitant with decompensated liver cirrhosis. Case Report: A 64-year-old female was admitted for the treatment of severe liver cirrhosis. The patient's preoperative liver function was evaluated as Child-Pugh classification grade C. Upper gastrointestinal endoscopy revealed early gastric cancer. We first performed LDLT to improve her liver function and coagulopathy. Nineteen days after the LDLT, we performed total gastrectomy. Results: The patient's postoperative course was uneventful and she left our hospital on the 18th day after gastrectomy. The final pathological diagnosis of gastric cancer was Stage IA. Conclusion: Aggressive and adequate surgical strategy including LDLT is effective as curative treatment in patients with controllable malignancy concomitant with severe liver dysfunction.*

Surgical treatment for malignancy after liver transplantation is an important topic as an increase in the incidence of cancer in immunocompromised patients has been suggested (1). Concerning gastric cancer after liver transplantation, some case reports have demonstrated the successful use of gastrectomy to treat newly-developed gastric cancer after liver transplantation (2-4).

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On the other hand, the indications for living donor liver transplantation (LDLT) in patients carrying synchronous malignant disease have not been definitively documented. However, it is considered that conducting a strict preoperative evaluation and appropriately selecting patients and treatment strategies can make it possible to provide safe and curative treatment for such patients.

We herein report the case of a patient who was successfully treated with LDLT followed by total gastrectomy for early gastric cancer concomitant with decompensated liver cirrhosis. This is the first case report to show a successfully staged operative strategy including LDLT for decompensated liver cirrhosis with curative surgery for synchronous malignancy.

Case Report

A 64-year-old Japanese female was admitted to the Kyushu University Hospital for the purpose of LDLT to treat decompensated cirrhosis due to primary biliary cirrhosis. Hepatic encephalopathy was developing in her. The patient's hematological laboratory data on admission after medical treatment were as follows: white blood cell count, 2,240/ μ l (normal range: 3,500-9,000); hemoglobin, 10.9 g/dl (normal range: 12.0-16.0); platelet count, 5.4×10^4 / μ l (normal range: 14.0-44.0); total bilirubin, 2.6 mg/dl (normal range: 0.3-1.2); albumin, 3.2 g/dl (normal range: 4.0-5.0); prothrombin time (%), 56% (normal range: 70-130); carcinoembryonic antigen (CEA), 1.8 ng/ml (normal range: 0-5.0); carbohydrate antigen(CA)19-9, 46.7 U/ml (normal range: 0-37). Computed tomography (CT) showed marked liver cirrhosis, splenomegaly and a splenorenal shunt (Figure 1). The preoperative liver function was evaluated as Child-Pugh classification grade C, with a Child-Pugh score of 10 points and an MELD(Model for End Stage Liver Disease) score of 14 points.

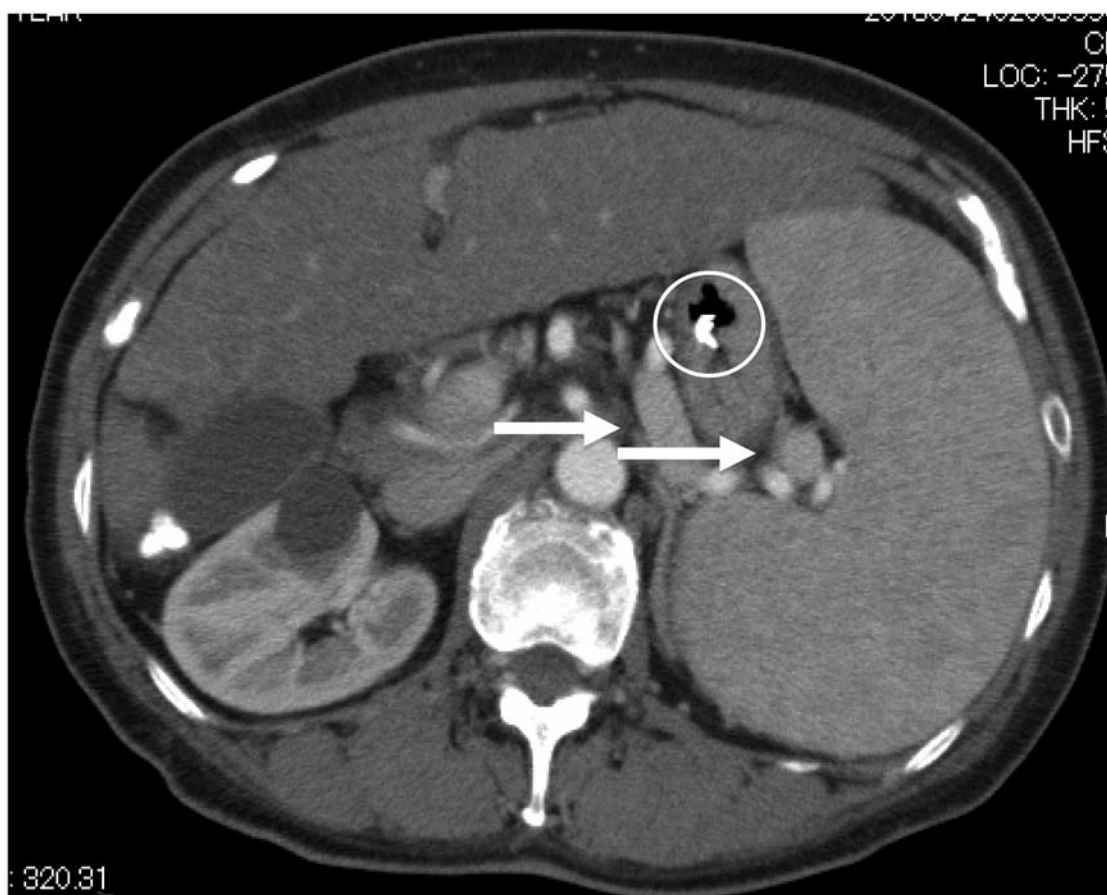


Figure 1. Preoperative abdominal CT. Findings of severe liver cirrhosis, splenomegaly, a splenorenal shunt (white arrows) and intragastric clips (encircled).

Upper gastrointestinal endoscopy for preoperative inspection revealed 0-IIc type (5) early gastric cancer in the lower gastric corpus (Figure 2a). Histopathology demonstrated signet ring cell carcinoma with poorly-differentiated carcinoma. During a biopsy, bleeding from the gastric lesion due to a bleeding tendency and portal hypertension was noted and it was necessary to attach clips in order to achieve complete hemostasis (Figure 2b). CT revealed no lymph node or distant metastasis. The preoperative diagnosis was gastric cancer: Clinical T1b N0 M0 Stage IA.

We decided to first perform LDLT, splenectomy and splenorenal shunt ligation in order to improve the patient's liver function and coagulopathy. For the second operation, we planned to perform total gastrectomy because devascularization of short gastric vessels accompanied by splenectomy was required in the first operation.

During the first operation, we performed LDLT using a right lobe graft obtained from the patient's daughter, splenectomy and splenorenal shunt ligation. The amount of bleeding was 3,924 g and the length of operation was 17 h and 46 min. The patient's postoperative course was

uneventful and her capacity for blood coagulation subsequently returned to normal levels. After the LDLT procedure, immunosuppression with steroids, tacrolimus and mycophenolate mofetil was administered. The hematological laboratory data 18 days post LDLT were as follows: white blood cell count, 7,840/ μ l; hemoglobin, 10.5 g/dl; platelet count, 33.1×10^4 / μ l; total bilirubin, 1.6 mg/dl; PT(%), 96%.

Total gastrectomy was performed 19 days after LDLT. Since there was adhesion, especially between the liver graft and lesser curvature side of the stomach, we dissected the lesser omentum along the lesser curvature so as not to damage the reconstructed vessels. Reconstruction was performed according to the antecolic Roux-en-Y (6). The amount of bleeding was 286 g and the length of operation was 3 h and 38 min. No blood transfusions were performed. Treatment with tacrolimus was restarted on the first postoperative day through a nasal feeding tube for perioperative immunosuppression.

There were no postoperative complications after total gastrectomy. The patient resumed oral intake on the seventh postoperative day and was discharged from the hospital on the 18th day after total gastrectomy (the 32nd day post

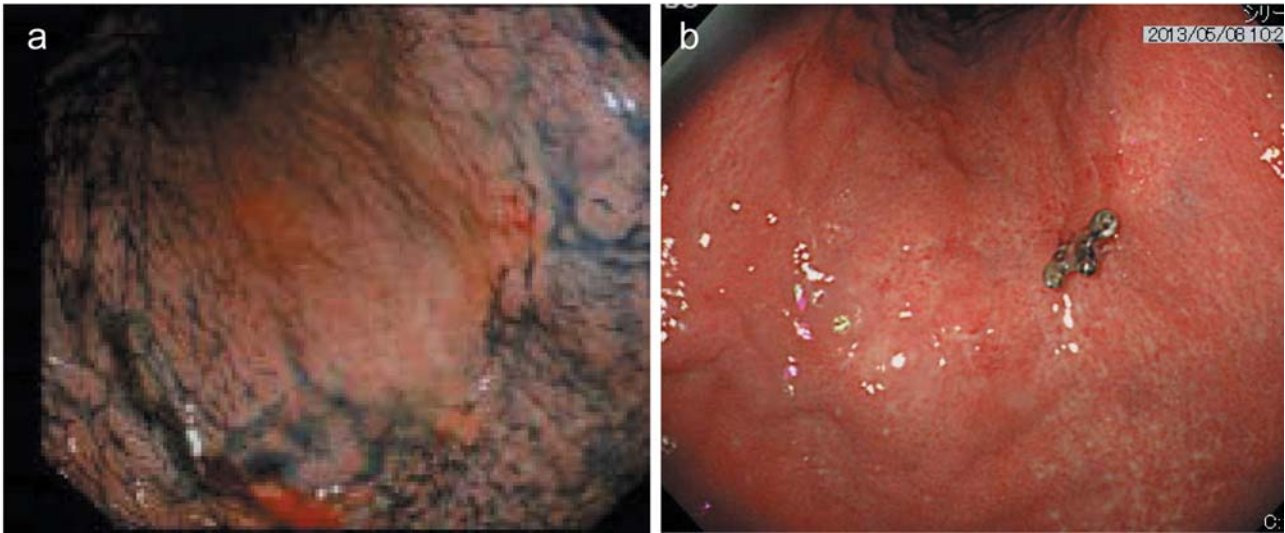


Figure 2. Preoperative gastroscopy. (a): 0-IIc type early gastric cancer in the lower gastric corpus, (b): Clips attached for hemostasis after the biopsy examination.

LDLT). The final pathological diagnosis of gastric cancer was poorly-differentiated adenocarcinoma with signet ring cell and pT1b (SM1) N0 M0 Stage IA. To date, we are continuing follow-up her in the outpatient department without recurrence for one year after the operation.

Discussion

Since the surgical results of LDLT have improved, the number of long-term survivors after LDLT has increased (7). Accompanying this background, the development of malignancy after LDLT has become a serious problem. The overall incidence of malignancy in transplant recipients has been estimated to be as high as 20% in the 10-year period after transplantation (8).

Synchronous malignancy is also a disputable point in patients indicated for liver transplantation. Liver transplantation is generally a contraindication in recipients with uncontrollable extrahepatic malignancy (9). However, liver transplantation should be carefully considered in cases involving controllable malignancy, such as early gastric cancer. To the best of our knowledge, this is the first report to demonstrate the use of LDLT followed by total gastrectomy as a two-stage operative strategy for early gastric cancer concomitant with decompensated liver cirrhosis.

In the current case, the patient had a potentially resectable early gastric cancer and a favorable long-term outcome was thus expected for curative surgery. On the other hand, the liver damage was too severe to be controlled with conservative therapy alone. LDLT was thought to be the only treatment capable of managing the patient's liver

dysfunction. One-staged LDLT with total gastrectomy was considered as a possible treatment. However, this strategy appeared to be more risky with respect to development of intraoperative and postoperative complications, such as severe bleeding due to coagulopathy and delays in wound healing. Additionally, the patient's liver dysfunction, not early gastric cancer, was life-threatening at the time of her initial presentation. Therefore, we planned to first perform LDLT in order to improve her liver function and coagulopathy, followed by total gastrectomy as the second-stage operation. Total gastrectomy was required in this case because simultaneous splenectomy was performed as a formulaic procedure in LDLT in order to decrease the portal vein pressure and improve the patient's pancytopenia (10). The appropriate interval between LDLT and total gastrectomy in this two-staged operation is debatable. We thought that the second operation should be performed as soon as the patient's liver function recovered and before severe fibrous adhesion occurred. The second operation was performed 19 days after the LDLT and, as a result, the two-staged operation was safely and successfully completed.

The indications for LDLT in patients with malignancy should be carefully determined because healthy donors must undergo surgery. At this time, there are no guidelines clearly describing the indications for LDLT in this patient population. We consider that it is reasonable to perform LDLT and surgery for malignancy when the long-term results of surgical treatment for concomitant malignancy are estimated to be better than those of LDLT. The 1-, 5- and 10-year patient survival rates of LDLT in our institute are 85.6%, 77.9% and 69.5%, respectively (7). These survival

rates constitute now our standard for determining the indication for surgery. However, this issue should be carefully investigated by accumulating large numbers of cases, as the results of surgery for malignancy among patients in an immunosuppressive state are debatable.

In conclusion, we herein reported the case of a patient who received LDLT followed by total gastrectomy for early gastric cancer concomitant with decompensated liver cirrhosis. Conducting careful preoperative screening for sub-clinical malignancy is important among candidates for LDLT. Furthermore, aggressive and adequate surgical treatment including LDLT is a feasible curative strategy in patients with controllable malignancy concomitant with severe liver damage.

Conflicts of Interest

Sho Nishimura and the other co-authors have no conflict of interest.

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