The Significance of Transarterial Embolization for Advanced Hepatocellular Carcinoma in Liver Transplantation


ABSTRACT

Introduction. Transarterial embolization (TAE) is the treatment of choice for advanced HCC to control or even induce tumor shrinkage. The aim of this study was to evaluate the effect of pretransplantation TAE for treatment of advanced HCC.

Material and methods. From 1996 to 2002, we studied 12 cirrhotic patients with HCC, including six who met and six who exceeded the Milan criteria. All patients had sufficient hepatic function to undergo TAE. Liver transplantations were performed subsequently and they were followed prospectively for a median of 22 months (range 12 to 53 months).

Results. The explanted livers from the 12 patients who had undergone TAE were noted to have extensive tumor necrosis. The pathological specimens at LT showed downstaging of the HCC, which allowed those six patients to meet the Milan criteria. The overall 1- and 2-year survival rates were 92% and 73%, respectively. The overall 1- and 2-year disease-free survival rates were 92% and 73%, respectively. One death unrelated to liver disease at 2 years after LT was noted in the downgraded group. One patient of the initially eligible group developed lung metastasis at 6 months and died at 12 months after LT.

Conclusion. TAE is effective to downstage advanced HCC and reduce the dropout rate on the LT waiting list. Pre-LT TAE may be considered as a better therapeutic strategy for patients with advanced HCC.

HEPATOCELLULAR CARCINOMA (HCC) is the most common form of primary liver cancer worldwide. Theoretically, liver transplantation is the optimal therapy, because it treats the cancer as well as the underlying disease with eradication of the cirrhotic tissue that may progress to dysplastic nodules or HCC in the future. The current United Network of Organ Sharing (UNOS) policy for organ allocation among patients with HCCs favors those with tumors confined within the limits of diameter and number of nodules defined by the Milan criteria: (A) solitary tumor < 5 cm or (B) three or few lesions none of them > 3 cm. Another major obstacle to orthotopic liver transplantation (OLT) as treatment for HCC is tumor growth. Hence, adjuvant treatments play an important role in the pretransplantation preparation to reduce the dropout rate on the OLT waiting list. Transcatheter arterial embolization (TAE) is the treatment of choice to induce necrosis of unresectable HCC and to control tumor progression. The aim of this study was to evaluate the effect of pretransplantation TAE for patients with advanced HCC.

MATERIALS AND METHODS

From 1996 to 2002, 12 cirrhotic patients with HCC (12 men) were divided into two groups according to eligibility to meet Milan criteria. Six patients who met the Milan criteria were included in group A. Another six who exceeded the Milan criteria were included in group B. All 12 patients had sufficient hepatic function to undergo TAE.

Complete celiac and superior mesenteric artery injections using...
a 4F catheter were performed on all patients to locate hypervascular tumors. A coaxial microcatheter system (Tracker 18 Vascular Access System; Target, San Jose, Calif, USA) was necessary in 12 patients. After pretreatment by infusion of 3 to 5 mL of 1% lidocaine to prevent pain and arterial spasms, a mixture of ethanol (99.5%) and iodized oil (ratio = 1:3) was infused continuously at the rate of 0.5 to 1 mL/min until the adjacent segmental or lobar portal branches were opacified. All 12 patients underwent LT and were followed in the outpatient clinic with ultrasound, computed tomography, and liver function tests for a median of 22 months (range = 12 to 53 months).

RESULTS
All 12 patients underwent LT. The explanted livers of these patients who underwent pre-LT TAE showed extensive tumor necrosis. Downstaging of HCC was achieved in all six patients in group B to meet the Milan criteria.

The overall 1- and 2-year survival rates were 92% (group A = 83%, group B = 100%) and 73% (A = 83% and B = 75%) respectively. The overall 1-year disease-free survival rates were 92% (A = 83%, B = 100%) and 2-year disease-free survival rates were 73% (A = 83% and B = 75%). One patient of group A developed lung metastases at 6 months and died at 12 months after LT. One death unrelated to liver disease at 2 years after LT was noted in group B.

DISCUSSION
HCC has been the leading cause of cancer death in Taiwan for years. The primary treatment of HCC is surgical resection whenever possible. However, one-half of the patients have advanced disease at the time of diagnosis with a dismal prognosis. Nonsurgical methods such as TAE, percutaneous ethanol injection, hormone therapy, or thermal ablation provide disappointing results. Liver transplantation has been encouraged to treat advanced HCC, but the organ shortage dissuades the policy for organ allocation for malignant disease in Taiwan.

Most patients have a size and number of liver tumors that exceed the Milan criteria for OLT. We had demonstrated that TAE before LT for HCC was beneficial to control, tumor growth, downstage tumor size and improve transplant survival. Majno et al6 reported better disease-free survival in patients with large tumors (>3 cm) who were downstaged by TACE compared to those that were not downstaged. In our study, the overall 1- and 2-year survival rates were 83% and 83%, respectively, and 100% for the group who met the Milan criteria and 75% for the group who did not meet the Milan criteria. All six patients were downgraded to suffice the Milan’s criteria after TAE. Our result of TAE followed by LT was comparable to those of Harnois et al7 and Graziadei et al.8 These results provide evidence to redefine organ allocation for malignant liver diseases.

The improved survival rate noted in recent studies, the development of living donor liver transplantation, and the continuous evolution of organ allocation schemes may reshape the scoring system that would prioritize patients with advanced HCC to receive organ allocation. Furthermore, it may reduce the waiting time for LT in patients with advanced HCC to achieve better survival and quality of life. Pre-LT TAE has been considered as a better therapeutic strategy for patients with advanced HCC. Our results support a redefinition of the selection policy.

REFERENCES