Successful treatment of large-size advanced hepatocellular carcinoma by transarterial chemoembolization followed by the combination therapy of percutaneous ethanol-lipiodol injection and radiofrequency ablation

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Abstract. We report a case of large-size hepatocellular carcinoma (HCC) successfully treated with transarterial chemoembolization (TACE) followed by the combination therapy of percutaneous ethanol-lipiodol injection and radiofrequency ablation (PELI-RFA) and percutaneous ethanol-lipiodol injection (PELI) therapy. In the present case, the patient had a large-size advanced HCC, 7 cm in diameter, located in the S8 region of the liver. In addition, the hepatic reserve of the patient was severely poor. In order not to impair the poor hepatic reserve, we chose PELI-RFA and PELI, originally developed in our department and reported as milder treatment modalities than others. After TACE, PELI-RFA and PELI were performed several times, the HCC was totally destroyed and early enhancement shown by helical dynamic computed tomography disappeared completely after treatment. The hepatic reserve of the patient was not impaired by the series of treatments. Serum levels of tumor markers, α-fetoprotein and Des-γ-carboxy prothrombin, were rapidly decreased to almost normal levels. PELI-RFA and PELI may be effective for the treatment of large-size HCC of patients with poor hepatic reserve.

Introduction

Hepatocellular carcinoma (HCC) is still one of the most progressive malignancies resistant to treatment (1). Repeated recurrences often occur due to multicentric carcinogenesis and intrahepatic metastasis. Although several treatment modalities are currently available for HCC, large-size advanced HCC is still difficult to treat. Among therapies, radiofrequency ablation (RFA) now plays a central role for the local control of hepatic malignancies (2-4). However, several limitations of RFA have been pointed out, such as limited coagulated necrosis and relatively frequent local tumor recurrences (5). To overcome these limitations, we have developed several percutaneous treatments. We showed that the combination therapy of percutaneous ethanol injection and RFA (PEI-RFA) could induce wider coagulated necrosis with a smaller energy requirement compared to routine RFA (6,7). Furthermore, we also developed a percutaneous treatment of injecting a mixture of ethanol and lipiodol (percutaneous ethanol-lipiodol injection therapy, PELI) instead of ethanol alone (8,9). Recently, we experienced a case of large-size advanced HCC formed on the cirrhotic liver with poor hepatic reserve which was successfully treated with PELI-RFA and PELI without impairing hepatic reserve.

Case report

A 68-year-old female attended a health examination, and a large-size tumor was found in the right hepatic lobe by ultrasonography (US). She was referred to our hospital for diagnosis and treatment of the tumor. By US, the large-size tumor was visualized as a round-shaped low-echoic lesion with a halo (Fig. 1A), and a daughter nodule of 2.5 cm in diameter was also detected (Fig. 1B). Helical dynamic computed tomography (CT) showed enhancement of the lesion in the early vascular phase and defect in the late phase (Fig. 2). The patient was positive for hepatitis C virus antibody and had high serum levels of α-fetoprotein (AFP) and Des-γ-carboxy prothrombin (PIVKA II) (AFP, 127 ng/ml; PIVKA II, 8150 MAU/ml). Based on these findings, the tumors were easily diagnosed as HCC. A chest X-ray examination revealed that the large-size tumor was protruding from the surface of
the S8 region of the liver and had pushed the diaphragm up towards the pleural cavity (Fig. 3). In addition, laboratory data indicating hepatic reserve, such as serum levels of prothrombin time (PT), a hepaplastin test (HPT), chorine esterase (ChE), albumin (Alb), platelet (Plt), total cholesterol (T-cho) and total bilirubin (T-bil), were very poor: PT, 52%; HPT, 40%; ChE, 133 U/l; Alb, 2.8 g/dl; Plt, 6.6x10^4/μl; T-cho, 99 mg/dl; and T-bil, 3.64 mg/dl. Therefore, an extremely cautious treatment was highly desirable as not to impair the poor hepatic reserve.

Because the large-size tumor was hypervascular and was protruding from the surface of the liver, transcatheter arterial chemoembolization (TACE) was initially chosen to shut down the arterial blood supply. Abdominal angiography showed the massive tumor stain in the area of the right hepatic artery immediately under the diaphragm (Fig. 4). After injecting 30 mg of epirubicin dissolved in 2 ml of lipiodol into the tumor through the right hepatic artery,
embolization of the main branch of the feeder artery was performed using pieces of gelfoam. Although the accumulation of lipiodol in the tumor was shown by CT 7 days after the angiography, the deposit of lipiodol in the tumor was loose, indicating that the tumor was not completely destroyed (Fig. 5). Severe hepatocellular damage and impairment of hepatic reserve fortunately did not occur after a single TACE treatment. Therefore, PELI-RFA and PELI, originally developed in our department, were additionally performed. PELI-RFA was performed twice for the large-size tumor and once for the daughter nodule at a relatively low power output for a short-time duration by using the Cool-tip RF system (Radionics, Burlington, VT, USA). For the large-size tumor, RFA was performed at 30 W for 2 min, 50 W for 2 min, 70 W for 2 min and 80 W for 3 min (9 min in total), after injecting 11 ml of 15% lipiodol in ethanol for the first RFA; and at 30 W for 2 min, 50 W for 2 min, 70 W for 2 min and 80 W for 3 min (9 min in total), after injecting 10 ml of 15% lipiodol in ethanol for the second RFA. In both PELI-RFA treatments, the final temperature achieved by the electrode was 70°C. Since liver function was kept stable after PELI-RFA, PELI was further performed once 10 days after the second PELI-RFA. Eight milliliters of 15% lipiodol in ethanol was injected into the main tumor. In total, 29 ml of 15% lipiodol in ethanol was injected into the main tumor throughout a series of PELI-RFA and PELI. For the daughter nodule, RFA was performed at 30 W for 2 min and 60 W for 3 min after injecting 4.8 ml of 15% lipiodol in ethanol. In the previous report, we stated that the therapeutic effects of PELI-RFA and PELI were easily and roughly evaluated by plain CT without using helical dynamic CT. Plain CT taken after PELI showed the homogeneously tight deposit of lipiodol in the whole tumor. Moreover, helical dynamic CT showed no enhancement of the lesions in the early vascular phase and no defect in the late phase. Therefore, PELI-RFA and PELI were additionally performed.
phase, indicating that the entire tumor was destroyed (Fig. 6). Laboratory data indicating hepatic reserve were unchanged after treatment; PT, 47%; HPT, 39%; ChE, 153 U/l; Alb, 2.9 g/dl; and T-bil, 3.1 mg/dl. The elevated serum level of AFP was immediately decreased to an almost normal level (27 ng/ml), and that of PIVKA II was decreased to a normal level (8 MAU/ml). The patient felt good without major complaints throughout the admission period.

Discussion

HCC is one of the most common malignancies worldwide (1), especially in Asia. Despite the advances in diagnostic and therapeutic modalities for the treatment, HCC often progresses to an advanced stage. RFA was recently innovated therapeutic modalities for the treatment, HCC often especially in Asia. Despite the advances in diagnostic and therapeutic modalities for the treatment of HCC and is widely available for patients advanced HCC of patients with poor hepatic reserve.

References


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