Supplementary data

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Reference

[1] Kim N, Cheng J, Jung I, Liang J, Shih YL, Huang WY, et al. Stereotactic body radiation therapy vs. radiofrequency ablation in Asian patients with hepatocellular carcinoma. J Hepatol 2020;73(1):121–129.

Teh-Ia Huo[1,3,4,*]
Shu-Yein Ho[2,4]
Chih-Chieh Ko[2,4]

[1]*Department of Medical Research, Taipei Veterans General Hospital, Taipei, Taiwan*
[2]*Department of Medicine, Taipei Veterans General Hospital, Taipei, Taiwan*
[3]*Institute of Pharmacology, National Yang-Ming University School of Medicine, Taipei, Taiwan*
[4]*Faculty of Medicine, National Yang-Ming University School of Medicine, Taipei, Taiwan*
[*]Corresponding author. Address: Department of Medical Research, Taipei Veterans General Hospital, No. 201, Sec. 2, Shipai Rd., Taipei 11217, Taiwan. Tel.: + 886 2 2871 2121, fax: + 886 2 2873 9318.
E-mail address: tihuo@vghtpe.gov.tw (T.-I. Huo)

Reply to: "Stereotactic body radiation therapy *vs.* radiofrequency ablation for HCC: More questions than answers"

To the Editor:

We thank Huo *et al.* for their interest in our recent article[1] and for their thoughtful comments.

Huo *et al.* raised a question regarding the inclusion criteria in our study, which they considered confusing. Both radiofrequency ablation (RFA) and stereotactic body radiation therapy (SBRT) are local treatment modalities for (a) targeted lesion(s). In this study, we included patients with both treatment naïve and recurrent hepatocellular carcinoma (HCC), resulting in 57% of the entire cohort having recurrent disease following initial liver-directed treatment. Since the primary endpoint of this study was time-to-local recurrence of the target area from the date of RFA or SBRT, we excluded patients with a history of RFA or SBRT to the target area.

They also had 3 more questions; for the first, both time-to-recurrence and time-to-death were calculated from the first date of RFA or SBRT to a targeted lesion(s). This time point was also applied in patients with a history of liver-directed treatments because we analyzed the treatment outcomes for each viable lesion regardless of previous liver-directed treatments.

The second question is about the difficulty of translating the efficacy of RFA or SBRT to survival impact. Superior local control in the single target area cannot simply be translated into overall survival improvement, as we mentioned in the current study. Furthermore, a deterioration in liver function is one of the key determinants affecting the outcomes in HCC.[2] In the current study, a well-compensated liver function was associated with better survival outcomes in the matched cohort. It is clear that an analysis of overall survival in patients with HCC needs to consider multifactorial risk factors, including not only initial or subsequent treatment but also liver function.

Lastly, they suggested a separate analysis for recurrent and new lesions after transarterial chemoembolization (TACE). Regarding recurrent disease after TACE in 924 patients, 87.8% of patients presented with a recurrent tumor from a previously treated area. Regarding recurrent tumors from previous TACE sites, SBRT was associated with a lower cumulative local recurrence rate (CLRR); the 2-year CLRRs were 21.1% and 30.1% in the SBRT and RFA groups, respectively (p = 0.004). However, treatment modality had little effect on local recurrence for new lesions developed elsewhere; the 2-year CLRRs were 23.5% and 33.4% in the SBRT and RFA groups, respectively (p = 0.105). Although there are several reports supporting either RFA[3,4] or SBRT[5,6] as a salvage treatment option in recurrent HCC, the data is limited. In conclusion, Huo *et al.*'s comments highlight the importance of further prospective trials comparing the efficacy of individual treatments.

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Conflicts of interest

The authors declare no conflicts of interest that pertain to this work.

Please refer to the accompanying ICMJE disclosure forms for further details.

Authors' contributions

Nalee Kim and Jinsil Seong contributed to the conception of the article, initiated the draft of the article, and revised the article.

Supplementary data

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Nalee Kim*
Jinsil Seong*
Department of Radiation Oncology, Yonsei Cancer Center, Yonsei University College of Medicine, Seoul, Republic of Korea
*Corresponding author. Addresses: Department of Radiation Oncology Yonsei Cancer Center, Yonsei University Health System, Yonsei University College of Medicine, 50-1 Yonsei-ro, Seodaemun-gu, Seoul 120-752, Korea. Tel.: 82-2-2228-8095, fax: 82-2-2227-7823.
E-mail addresses: rodr.naleekim@gmail.com (N. Kim), jsseong@yuhs.ac (J. Seong)

Extracorporeal portosystemic shunt in secondary Budd-Chiari syndrome

To the Editor:

Introduction

Budd-Chiari Syndrome is a rare disorder resulting from hepatic venous outflow obstruction at any level between the small hepatic veins and the right atrium, leading to portal hypertension, increased hepatic sinusoidal pressure and liver failure.[1] Rapid restoration of intrahepatic blood flow by creation of a transjugular intrahepatic portosystemic shunt (TIPS) has become a mainstay in the treatment of acute Budd-Chiari syndrome.[2,3] Although more challenging than in cirrhotic livers, TIPS is technically feasible in most patients with Budd-Chiari syndrome.[4] However, the endovascular approach makes TIPS creation essentially impossible in patients with complete inferior vena cava obstruction. Herein, we report on a case of successful percutaneous extracorporeal portosystemic shunting in a patient with secondary Budd-Chiari syndrome due to complete obstruction of the inferior vena cava by large tumor masses.

A previously healthy 37-year-old patient presented to our emergency department with lethargy, testicular swelling, leg edema and a large intraabdominal mass. The initial laboratory results showed acute liver and kidney failure (Table 1). Abdominal ultrasound examination revealed significant hepatomegaly with retrograde portal vein flow. A subsequent whole-body CT scan revealed a large tumor, extending from the pelvis via the inferior vena cava into the right atrium, with infiltration of the renal and hepatic veins (Fig. S1). Complete occlusion of the venous outflow tract of the liver was evident, confirming a secondary Budd-Chiari syndrome as the cause of the acute liver failure. Testicular biopsy showed only necrosis but given the tumor localization and an alpha-fetoprotein level >30,000 U/L, a gonadal germ cell tumor was diagnosed.

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In the setting of acute and life-threatening liver failure, systemic chemotherapy was not possible. At the same time, a TIPS procedure was not feasible given the complete occlusion of the inferior vena cava, which is why we decided to establish a temporary percutaneous extracorporeal portosystemic shunt (PEPS).

Methods

Following ultrasound-guided puncturing of a left-sided branch of the portal vein using a micropuncture set (Merit Micropuncture Set), a 6Fr introducer sheath was placed in the central portal vein. Subsequently, a stiff guidewire (Terumo) was inserted to facilitate gradual dilatation and implantation of an 11.5 Fr × 24 cm Shaldon catheter (Mahurkar) to be used as an outflow port. The tip of the catheter was placed in the central portal vein (Fig. 1). A second 11.5 Fr × 16 cm Shaldon catheter was inserted in the right internal jugular vein as an inflow port and continuous porto-jugulary blood flow at a flowrate of 250 ml/min was

Table 1. Laboratory findings at presentation and after 7 days.

Variable	Reference range	On presentation	After 7 days
Alanine aminotransferase (U/L)	<45	3,448	524
Aspartate aminotransferase (U/L)	<35	3,988	97
Alkaline phosphatase (U/L)	40–129	356	213
Gamma-glutamyltransferase (U/L)	<55	389	263
Lactate dehydrogenase (U/L)	<248	1,729	1,172
Bilirubin (μmol/l)	2–21	35	36
Ammonia (μmol/l)	15–60	275	61
Lactic acid (mmol/L)	0.6–2.4	6.8	1.2
International normalized ratio	0.9–1.25	2.42	1.14
Sodium (mmol/L)	135–145	125	128
Potassium (mmol/L)	3.5–4.6	6.5	4.4
Urea nitrogen (mmol/L)	2.8–7.2	17.4	24.2
Creatinine (μg/dl)	59–104	175	193
Alpha fetoprotein (μg/dl)	<7	32,037	2,220