

Letter to Editor

4d Ultrasonography for Therapeutic Radiofrequency Ablation for Hepatocellular Carcinoma

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Introduction

Studies to evaluate the tumor vascularity in HCC have been done extensively with various imaging modalities because the finding of the vascularity is helpful to evaluate the biological features of the tumor. In the present study, we investigated whether 4D real-time flow imaging is useful to display the accurate position of percutaneous radiofrequency ablation (RFA) needle in the tumor and evaluated the efficacy of RFA therapy in patients with HCC.

Materials and Methods

58 patients with 58HCC lesions (44men and14women, aged 40 to 83 years with a mean age of 61.9years), admitted to our Masuko Memorial Hospital, were enrolled to the present study. Their diagnosis was confirmed by dynamic CT and celiac angiography. Based on Child-Pugh score, 50 patients was diagnosed as grade A, and 8 patients as grade B. All patients enrolled showed hypervascular enhancement of HCC on contrast-enhanced US and/or dynamic CT. The diameters of tumors were 1.1-2.0 cm in 30 nodules, 2.1-3.0 cm in 19, 3.1-5.0 cm in 9, respectively. All patients gave written informed consent and this protocol had been approved by the Human Studies Committee at Masuko Memorial Hospital.

US Imaging

We used VOLUSON730 (GE Medical systems, Milwaukee) [1], APLIO XG (Toshiba Medical Systems) [2] and IU22 (Phillips) [3,4] for RFA therapy with a convex probe as US system. APLIO and VOLUSON machine probe is mechanical probe and IU22 probe is matrix array probe.4D Real-time refers here to the display of 3-dimensional moving im-

ages composed of 3 orthogonally intersecting scans in the transverse, longitudinal and horizontal planes. RF ablation was carried out under a real-time US guidance. We used a radiofrequency generator with 200 W power connected to a 17-gauge perfusion needle (Radionics Inc., Burlington, MA); the circuit was closed through a dispersive electrode.

Results

It was possible to obtain accurate position of cool-tip needle and to perform RFA procedure in all 58 HCC patients with 58 nodules using 4D real-time US machines. We confirmed by various angles that the needle was inserted into the center of tumor nodule. The simultaneous study before RFA therapy showed the inflow of arterial blood and tumor stain. And importantly it appeared that 4D real-time US provided much perceptible information on the spatial relationship between RFA needle and the target lesion, and resulted in accurate We experienced the treatment of 58 patient with HCC by RFA using 4D real-time ultrasound system. Application of this method allowed a more accurate cauterization of the tumor.

We used a real-time 4D device for RFA therapy in the present study and confirmed that the needle was inserted accurately into the center of the target tumor. The tumor was ablated with an adequate safety margin. We easily and quickly obtained useful information regarding position needle. The device is advantageous in terms of excellent distinction between the target and surrounding tissues with rapid construction of 4D images and no vibration on the probe. Since the device can depict the tumor in all sections, it is possible to confirm the 3D positional relationships among the target, needle and adjacent organs such as large blood vessels, gallbladder and diaphragm. This will

allow the RFA procedure to be performed more safely.

References

- 1) N Hotta, T Maeno, M Ayada, Sato K, Ishikawa T et al. Four Dimensional Ultrasonography for Therapeutic Radiofrequency Ablation for Hepatocellular Carcinoma. *Hepatogastroenterology* 2006, 53(70): 521-525.
- 2) N Hotta, S Yamada, K Murase, Kazuo Masukoa et al. Usefulness of Real-time 4D Ultrasonography during Radiofrequency Ablation in a case of Hepatocellular Carcinoma. *Case rep Gastroenterol* 2011, 5(1): 82-87.
- 3) N Hotta, K Masuko. Usefulness of new live 3D ultrasound probe during radiofrequency ablation in a case of hepatocellular carcinoma. *Open Journal of Gastroenterology* 2012, 2(1): 15-17.
- 4) Hotta N, Ayada M, Okumura A, Ishikawa T, Kakumu S. Usefulness of live 3D echocardiography during radiofrequency ablation in a case of hepatocellular carcinoma. *Clin Imaging* 2007, 31(4): 283-286.