—Case Report—

Evaluation of the viability of hepatocellular carcinoma in the caudate lobe using contrast-enhanced endoscopic ultrasonography after transarterial chemoembolization

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ABSTRACT

A 71-year-old female was diagnosed with hepatocellular carcinoma (HCC). The tumor measured 65 mm in diameter and was located in the caudate lobe. Transarterial chemoembolization (TACE) was performed repeatedly; however, a follow-up dynamic computed tomography (CT) scan showed that the tumor remained viable. Thus, TACE was performed using drug-eluting beads that had been preloaded with epirubicin. Contrast-enhanced endoscopic ultrasonography (CE-EUS) was conducted for evaluating the treatment effects. First, we detected the internal part of the tumor. Then, a perflubutane suspension was injected intravenously. Next, CE-EUS was performed for the external ventral part of the tumor in the same manner. The perflubutane flowed into the tumor and spread into both its internal and external ventral regions. Thus, we considered that the tumor was still viable and planned to carry out TACE again. CE-EUS could be a useful tool for evaluating the treatment effects of TACE on HCC deep inside the liver.

Key words: Caudate lobe, contrast-enhanced endoscopic ultrasonography (CE-EUS), hepatocellular carcinoma (HCC)

INTRODUCTION

Recently, endoscopic ultrasonography (EUS) has been widely used as a new diagnostic and therapeutic modality in various fields. A number of studies have reported that EUS can facilitate the diagnosis and treatment of gastroenterological conditions, particularly pancreaticobiliary conditions. However, there have only been a few reports about the use of EUS in patients with liver diseases. This is the first report about the use of contrast-enhanced EUS (CE-EUS) for evaluating the viability of hepatocellular carcinoma (HCC) after transarterial chemoembolization (TACE).

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Quick Response Code:

Website: www.eusjournal.com

DOI: 10.4103/2303-9027.190924

CASE REPORT

A 71-year-old female was diagnosed with HCC associated with hepatitis C. The tumor measured 65 mm in diameter and was located in the caudate

How to cite this article: Nakaji S, Hirata N. Evaluation of the viability of hepatocellular carcinoma in the caudate lobe using contrast-enhanced endoscopic ultrasonography after transarterial chemoembolization. Endosc Ultrasound 0;0:0.

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Received: 2015-04-28; **Accepted:** 2016-01-12

lobe. Her medical history did not include any previous episodes of HCC, and her Child–Pugh score at the time of her diagnosis was "A." However, she was not a candidate for surgical treatment due to her religious beliefs. Therefore, repeated TACE using a cisplatin–lipiodol suspension was performed three times; however, a follow-up contrast-enhanced computed tomography (CE-CT) scan showed that the internal and external ventral parts of the tumor remained viable [Figure 1a and b]. Thus, TACE was performed using drug-eluting beads (DEB-TACE) that had been preloaded with epirubicin. A week later, contrast-enhanced ultrasonography (CE-US) was performed to evaluate the effects of the DEB-TACE; however, it was not able to clearly depict the whole of the tumor, especially the internal parts of the tumor [Figure 2]. Therefore, CE-EUS was performed. The procedure was performed with a curvilinear echoendoscope (GF-UCT260; Olympus Medical Systems, Tokyo, Japan) and the ProSound F75 Ultrasound Processor (Hitachi Aloka Medical, Tokyo, Japan). First, we detected the internal part of the tumor from a position close to the esophagogastric junction [Figure 3a]. Then, Sonazoid (Daiichi Sankyo, Tokyo, Japan), a second-generation contrast agent composed of a lipid-stabilized suspension of perflubutane gas microbubbles, was injected intravenously. About 30 s later, the perflubutane started to flow into the tumor, which was partially enhanced [Figure 3b]. Next, the external ventral part of the tumor was visualized from the duodenal bulb, and CE-EUS was performed in the same manner. About 10 s after the injection, the perflubutane started to flow into the tumor and spread into half of the external ventral section [Figure 3c]. Thus, we considered that both parts of the tumor remained viable after the DEB-TACE and planned to carry out TACE again.

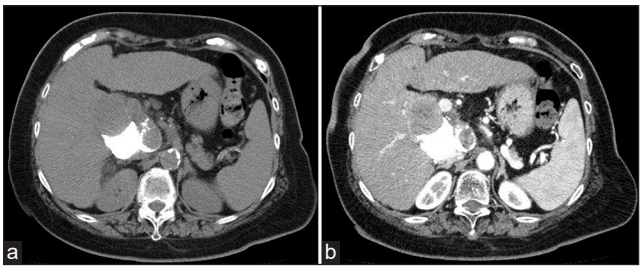

Figure 1. A plain computed tomography scan did not detect any lipiodol accumulation in the internal or external ventral parts of the tumor (a), but these regions of the tumor were enhanced in the arterial phase (b)

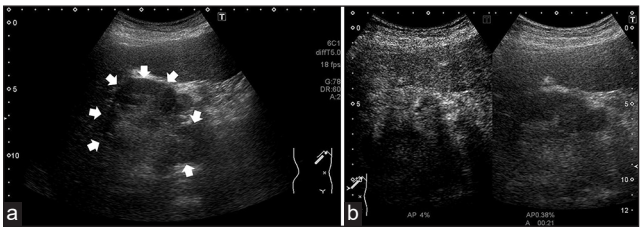

Figure 2. Transabdominal ultrasonography could not clearly depict the whole of the tumor (arrows) (a), therefore, it was not possible to evaluate the viability of the internal part of the tumor using contrast-enhanced ultrasonography (b)

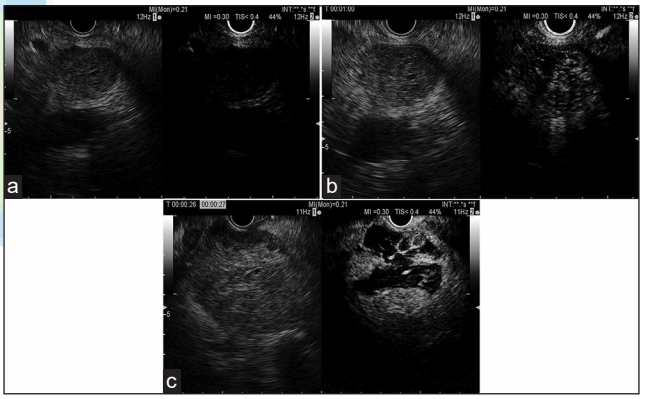

Figure 3. The internal part of the tumor was clearly visible from a position close to the esophagogastric junction (a) after injecting perflubutane that flowed into the internal (b) and external ventral parts (c) of the tumor and was detected on contrast-enhanced endoscopic ultrasonography

DISCUSSION

CE-US is considered to be the optimal method for evaluating the effects of treatments for HCC because it makes it possible to dynamically observe tumor vessel perfusion. In a recently published study by Liu *et al.*, the authors concluded that the diagnostic performance of CE-US was superior to that of CE-CT for detecting residual tumors after TACE.[1]

DEB-TACE is a novel procedure in which microspheres are used as the embolic material instead of lipiodol. The treatment effects of DEB-TACE are usually evaluated with contrast-enhanced examinations,[2,3] and CE-US has also been reported to be useful for assessing the outcomes of DEB-TACE.[4] Another advantage of CE-US is that it can be performed repeatedly in patients with renal dysfunction.

Although EUS is now often used to image the pancreaticobiliary region, the use of EUS to evaluate liver disease is less common because the diagnostic and therapeutic procedures involving transabdominal US have already been established. However, it is difficult to visualize areas deep inside the liver using transabdominal US because of echo signal attenuation.

Specifically, it is generally considered that the limit of observation of CE-US is about 10 cm below the skin. In addition, as was found in the present case, we sometimes encounter cases in which transabdominal US cannot detect HCC clearly. In the current case, we used EUS to solve this problem. As a result, we were able to visualize the HCC in the caudate lobe more clearly and in greater detail than had been possible with transabdominal US. In most of the previous reports about EUS, the anatomy of the liver was simply described in terms of the left and right lobes; however, Bhatini *et al*.[5] reported a detailed liver segmentation method for describing the anatomy of the liver based on findings obtained using a curvilinear echoendoscope. Regarding the diagnostic utility of EUS, including CE-EUS, there have been several reports about the use of EUS to diagnose various abdominal lesions;[6] however, no cases in which CE-EUS was employed to image HCC have been reported. As for the diagnosis of HCC using EUS, most previous studies in which such an approach was adopted involved EUS-guided fine-needle aspiration (EUS-FNA).[7] EUS-FNA of focal liver lesions is deemed to be safe; however, it is recommended for lesions that are difficult to access by percutaneous FNA, *de novo* lesions that are detected by EUS, and lesions that have been sampled using percutaneous FNA without a definitive diagnosis being obtained.[7] We consider that CE-EUS should be used to examine lesions that cannot be clearly visualized with CE-US. In addition, several cases in which EUS was used to guide ablative liver tumor therapy or abscess drainage have been reported.[8-10]

CONCLUSION

In conclusion, CE-EUS could be a useful tool for evaluating the efficacy of treatments for HCC located deep inside the liver, especially in patients treated with DEB-TACE. Furthermore, combining CE-EUS with EUS-guided tumor ablative therapy might result in more accurate local treatment for tumors such as HCC in the caudate lobe.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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