

## Endoscopic ultrasound (EUS)-guided ethanol injection for hepatocellular carcinoma difficult to treat with percutaneous local treatment

An 82-year-old man with liver cirrhosis associated with hepatitis C attended hospital for a follow-up. His past medical history included recurrence of hepatocellular carcinoma (HCC) and he was readmitted on the present visit due to another recurrent episode of HCC. A computed tomography (CT) scan showed two new HCC lesions: one in S6 (13 mm in diameter) and the other in S8 (17 mm in diameter) (Fig. 1). The lesion in S6 was treated with radiofrequency ablation. For the other lesion, we carried out transcatheter arterial chemoembolization (TACE) because the HCC was located deep within the liver and close to the inferior vena cava and hepatic veins and was thus difficult to treat through a percutaneous

route. However, the HCC remained viable on follow-up CT after TACE. We then opted to manage the lesion with endoscopic ultrasound-guided ethanol injection after obtaining the patient's consent. The procedure was carried out under conscious sedation while monitoring the respiratory and circulatory dynamics with a curvilinear echoendoscope (GF-UCT240; Olympus Medical Systems, Tokyo, Japan). The HCC was detected more clearly and was more easily visualized by EUS than ultrasound (Fig. 2a). Prior to attempting the puncture with a 25-gauge needle (Expect; Boston Scientific Corp., Natick, Massachusetts, USA), a color Doppler ultrasound was used to ensure the vessels were avoided. A total of 8.5 mL of ethanol

was injected (Fig. 2b, c). A follow-up CT scan 2 weeks later showed the HCC had completely necrosed.

Recently, many methods using EUS have been developed for the treatment of malignancies. In the case of HCC, EUS-guided neodymium: yttrium-aluminum-garnet (Nd:YAG) laser ablation has been reported [1]. EUS-guided ethanol injection, because of its lower invasiveness, may be a new innovative option for HCC that is difficult to treat by percutaneous local treatment.

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**Competing interests:** None

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**Fig. 1** Computed tomography (CT) showing recurrent hepatocellular carcinoma in S8 in an 82-year-old man with liver cirrhosis associated with hepatitis C.



**Fig. 2** a Hepatocellular carcinoma detected by endoscopic ultrasound (EUS). b Needle inserted into the lesion. c Ethanol being injected.