

The ‘Disappearing’ Liver on CEUS: Nothing to Worry About

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Case Presentation

A 72-year-old female patient was referred to our US department for contrast-enhanced ultrasound (CEUS) due to rectal cancer and focal liver lesions. In addition, she was suffering from chronic left heart failure (NYHA III) due to combined aortic valve disease and coronary heart disease. The patient’s liver was examined using a Hitachi Ascendus US machine in low MI mode. She received 2.4 ml of immediately prepared SonoVue® (Bracco Imaging) intravenously, followed by 10 ml of saline solution. The known liver lesions were diagnosed as hemangiomas.

Starting about 150 seconds after the administration of SonoVue®, hyperechoic spots emerged all over the liver, starting in the periportal regions (► Fig. 1), subsequently growing together to form cloud-like “lesions” (► Fig. 2). The visibility of the liver in grayscale decreased significantly and the liver parenchyma was not visible at all 3 min after the injection. The image was the same 1 h later. Changing from low to high MI mode did not improve the visibility of the liver parenchyma (► Fig 3).

The patient was completely free of discomfort the entire time and her liver enzymes remained in the normal range. An ultrasound examination four weeks later depicted a regular liver parenchyma.

Discussion

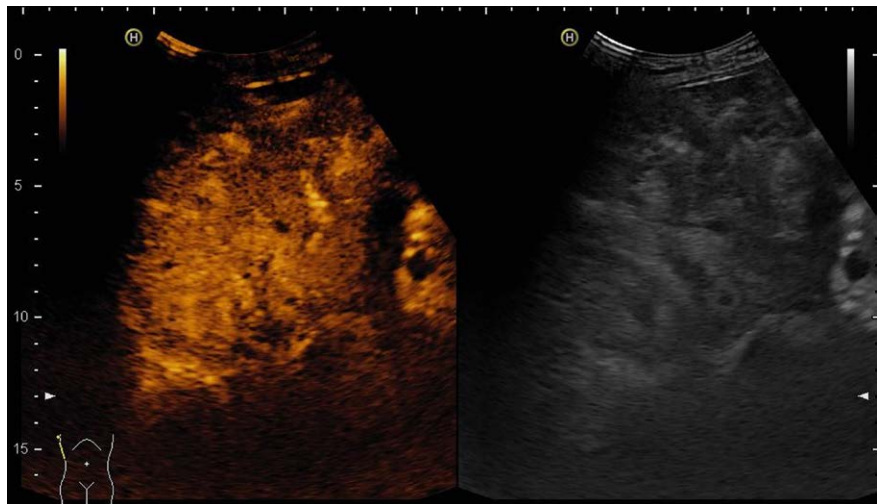
So-called prolonged heterogeneous liver enhancement (PHLE) after intravenous injection of various amounts of first- and second-generation US contrast media has been reported as case reports or small case series since 2002 (Okada M et al. *Ultrasound Med Biol* 2002; 28: 1089–1092), with reporting on a total of 33 patients to date. So far, no reliable conditions for the appearance of PHLE could be identified. The appearance of hyperechoic areas alongside the portal branches in the liver started mostly in the late phase and could be observed for hours. On the US images of PHLE published so far, the liver parenchyma still remains visible at least in part. In this case, it became entirely invisible on grayscale US in our case due to a

scattered tight pattern of hyperechoic areas (► Fig. 3).

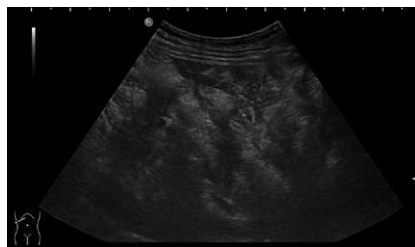
The etiology of the phenomenon is still unknown and various hypotheses have been discussed: intestinal formation of un-sheathed gas, bubble fusion or gas bubble pooling (Caruso G et al. *Radiol Med (Torino)* 2007; 112: 56–63; Shimada T et al. *Ultrasound Med Biol* 2012; 38: 1317–1323; Cui XW et al. *Ultraschall Med* 2014; 35: 246–252). In all reported cases except one, the patients remained free of symptoms and liver enzymes were not reported to be altered. One patient experienced “general discomfort and a transient skin rush” during the infusion of the contrast media, before the appearance of PHLE (Tana C et al.

Ultrasound Med Biol 2013; 39: 2214). After days, the US image of the liver is normal again in all patients. In the few patients that received a second portion of US contrast media days later, the phenomenon did not reappear.

From the case series estimations, the incidence rate seems to be somewhere around 0.01–0.8% of CEUS examinations. These rates are questionable and do not quite match the results from a recent oral survey among experienced German medical doctors, each having performed more than 1 000 CEUS investigations. Most of them were not aware of this side effect of contrast media.



► Fig. 1 Almost three minutes after the injection of SonoVue®, hyperechoic scattered areas appeared close to the portal vein branches and start spreading. Left: low MI mode.



► Fig. 2 Six minutes after the injection, the hyperechoic areas have become cloudy and the liver parenchyma is hardly visible on grayscale US.



► Fig. 3 One hour after the injection, the regular structure of the liver parenchyma is completely invisible. Using the ‘high MI mode’ does not reduce the hyperechoic areas.

Conclusion

Being a rare side effect that can seriously confuse doctors and worry patients, US examiners should know about PHLE and be able to distinguish this probably harmless artifact from pathological findings and reassure their patient.

Conflict of Interest

The authors declare that they have no conflict of interest.

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Bibliography

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