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Contrast-enhanced ultrasonography as a method of monitoring focal liver lesion – initial report.

Aim of the study: Hepatocellular adenoma (HCA) and Focal nodular hyperplasia (FNH) are benign liver tumors. HCA has potential for growth, metaplasia and rupture; therefore, it should be long-term monitored. In current guidelines biopsy is not recommended in standard diagnostic protocol. (1) Magnetic resonance imaging (MRI) is accepted as standard in diagnostics and monitoring of these lesions. The aim of the study is comparison of contrast-enhanced ultrasound (CEUS) and MRI in imaging of these tumors and determine whether CEUS can be useful in monitoring of benign liver tumors.

Materials and methods:

1. Characteristics of the study group:

- Number of patients: 47 (40 females, 7 males)
- Age of patients: 19 to 62 years
- Clinical diagnosis: 32 cases of HCA, 27 cases of FNH

2. Study methodology:

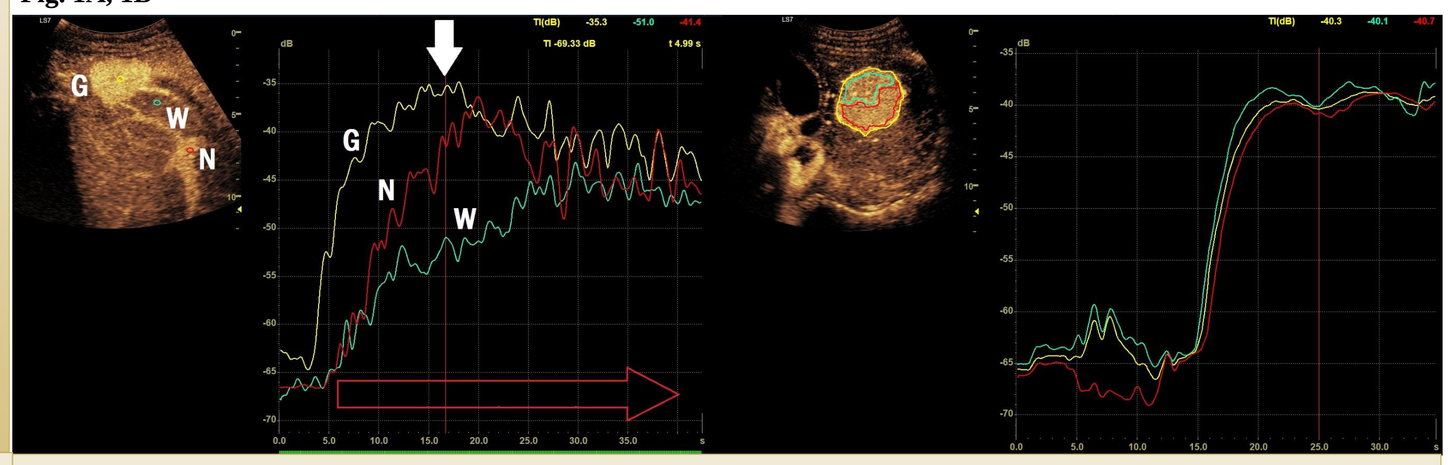
-Approval by the Bioethics Committee (number: RNN/266/22/KE)

- **Inclusion criteria**: confirmation of focal liver lesions using MRI
- **Exclusion criteria**: contraindications to contrast use in ultrasonography (e.g., respiratory insufficiency, acute coronary syndrome, adverse post-contrast reactions, pregnancy)
- **MRI imaging protocol**: LI-RADS Version 2018, with assessment of late enhancement (2)
- **Contrast-enhanced ultrasound protocol:** according to CEUS in Liver – 2020 update guidelines (3)

3. Statistical analysis:

- Shapiro-Wilk normality test
- Mann–Whitney U test
- Analysis of HCA and FNH enhancement in CEUS at 10-second intervals over a 180-second observation period (Fig. 1A)
- Calculation of mean enhancement values for each tumor over time (Fig. 1B)

Fig. 1A, 1B



Results:

1. Mean sizes of liver lesions:

- HCA (MRI): 3.29 x 2.75 cm (Fig. 2A, 2B, 2C)
- HCA (CEUS): 3.33 x 2.72 cm (Fig. 2D, 2E, 2F)
- FNH (MRI): 4.25 x 3.20 cm (Fig. 3A, 3B, 3C)
- FNH (CEUS): 4.17 x 3.12 cm (Fig. 3D, 3E, 3F)

2. Comparison of tumor enhancement in CEUS with liver tissue enhancement (Fig. 4A, 4B)

3. Comparison of enhancement difference between the best and worst parts of the tumor (Fig. 5)

Conclusions:

- **Similar effectiveness of HCA and FNH imaging in MRI and CEUS**
- **Significant differences in tumor enhancement compared to liver tissue (+/- 30dB)**
- **CEUS is a valuable tool for monitoring, particulary noting changes that prompt follow-up MRI.**

Bibliography:

1. EASL Clinical Practice Guidelines on the management of benign liver tumours Journal of Hepatology 2016 vol. 65 386-398

2. Chernyak et al. Liver Imaging Reporting and Data System (LI-RADS) Version 2018: Imaging Reporting and Data System (LI-RADS) Version 2018: Imaging of Hepatocellular Carcinoma in At-Risk Patients Radiology. 2018 Dec;289(3):816-830

3. Dietrich F C, Nolsøe C P, Barr G R, Berzigotti A, Burns N P, Cantisani V, et al. Guidelines and good clinical practice recommendations for contrast-enhanced ultrasound (CEUS) in the liver – update 2020 WFUMB in cooperation with EFSUMB, AFSUMB, AIUM, and FLAUS Ultrasound in Med. & Biol,. Vol. 46 No. 10, pp. 2579-2604, 2020

Fig. 2A-2F

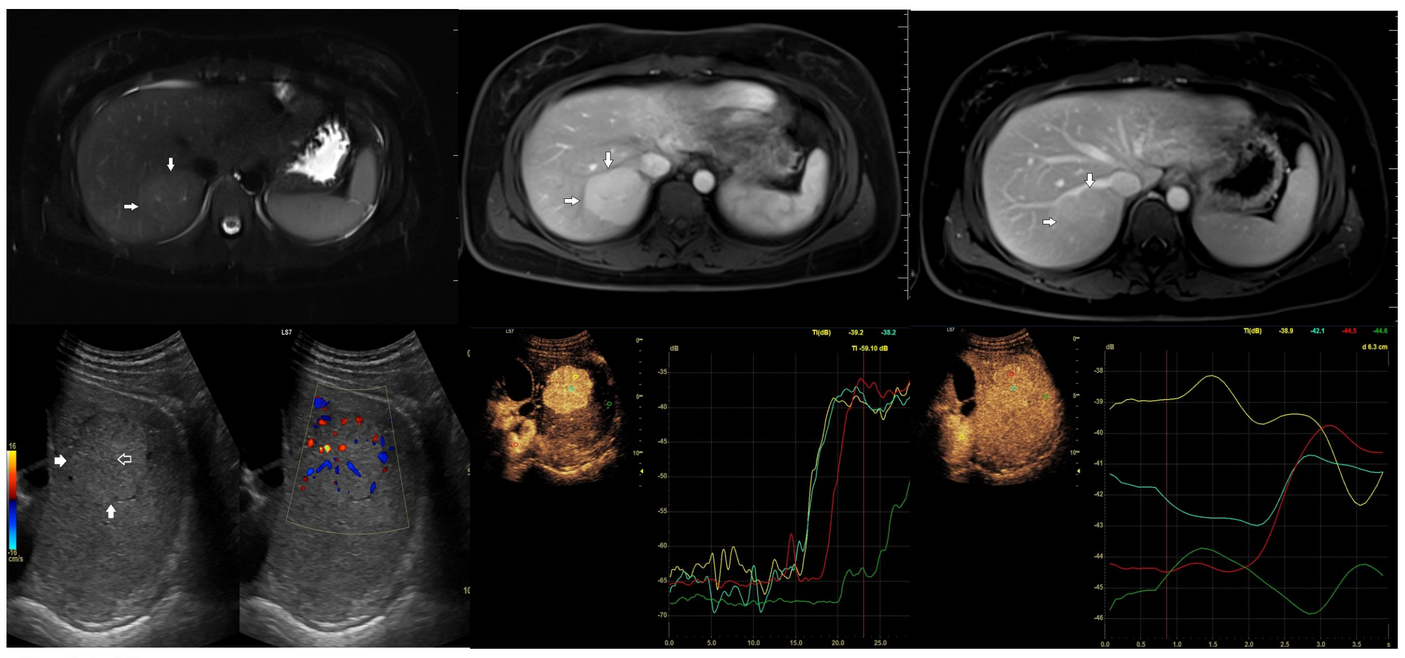


Fig. 3A-3F

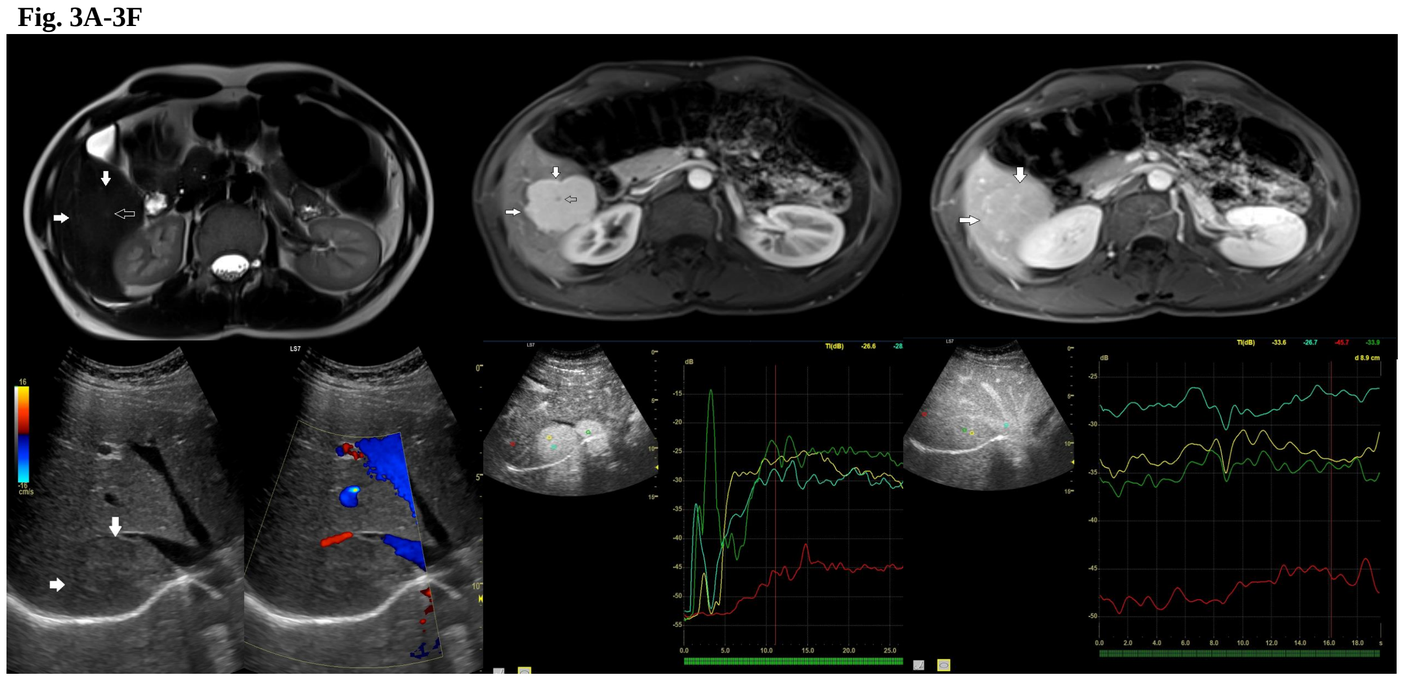


Fig. 4A-4B

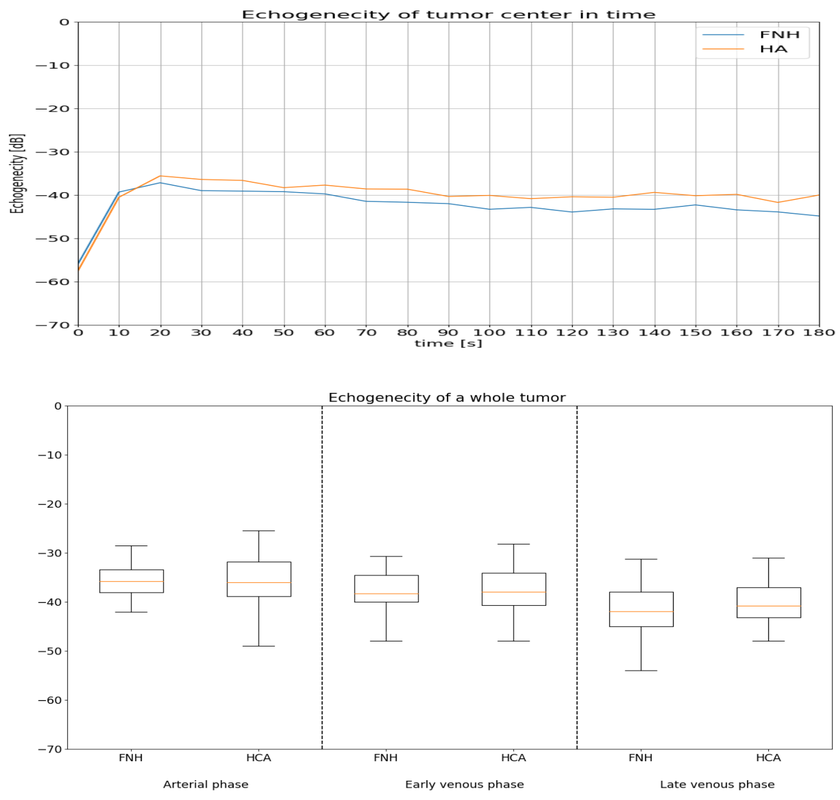


Fig. 5