

QUANTITATIVE ULTRASOUND FOR LIVER STEATOSIS ASSESSMENT WITH A NEW POINT-OF-CARE DEVICE, HEPATOSCOPE, IS REPRODUCIBLE AND SHOWED GOOD CORRELATION TO OTHER NON-INVASIVE TESTS.

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BACKGROUND

- **Ultrasound** (US) is the **first line** non-invasive modality to screen for **significant steatosis** [1], using qualitative assessment of liver **US brightness**.
- US propagation properties in tissues correlate with fat content [2].
- We used **quantitative brightness-derived parameters**, US attenuation (**UA**) and backscatter coefficient (**BSC**), as well as speed of sound (**SOS**).

OBJECTIVES

- To evaluate the **repeatability** (intra-operator) and **reproducibility** (inter-operator) of UA, BSC and SOS measurements performed by **expert and novice** operators with the Hepatoscope™
- To assess **correlation** between available routine non-invasive steatosis tests: Fatty Liver Index (FLI), Fibroscan Controlled Attenuation Parameter (CAP™), and Aixplorer® UA and SOS.

METHODS

- Single center study with 96 patients (NCT04782050).
- 4 Hepatoscope liver exams performed by 2 operators: **1 novice and 1 expert**, blinded to values.
- 10 consecutive sets of US data collected.
- UA, BSC and SOS values computed.
- Assessment of intra- and inter-operator reproducibility (ICC with 95% CI).
- R² correlations between non-invasive tests for steatosis.

RESULTS

Repeatability & Reproducibility

- BSC and UA measurements were **highly repeatable** (ICC ≥ 0.87).
- The number of values used to compute BSC and UA measurements **did not impact** repeatability.
- **Reproducibility** of BSC and UA measurements obtained from 3 valid values were **0.86 and 0.84**, respectively.
- **Repeatability** by experts and novices was **similar and excellent**: 0.91 (95%CI [0.86-0.94]) and 0.87 (95%CI [0.81-0.91]) for BSC, respectively; 0.89 (95%CI [0.85-0.93]) and 0.87 (95%CI [0.81-0.91]) for UA, respectively.
- Using 3 values to compute **SOS measurements**, their overall **repeatability and reproducibility were moderate**: 0.71 and 0.65, respectively.

Correlations between non-invasive tests

- UA, SOS and BSC correlated moderately with CAP.
- BSC showed the highest correlations with CAP (0.67; 95%CI [0.51-0.79]) and UA (0.88; 95%CI [0.80-0.93]).
- US parameters correlated weakly with FLI.

	CAP	SSI ATT	UA	SSI SOS	SOS	BSC	FLI
CAP		0.27	0.49	0.27	0.33	0.67	0.20
SSI ATT			0.27	0.07	0.06	0.44	0.09
UA				0.10	0.17	0.88	0.15
SSI SOS					0.44	0.28	0.16
SOS						0.32	0.24
BSC							0.25

CONCLUSION

- **Three values** of liver steatosis-related US parameters with the Hepatoscope were sufficient to ensure moderate to excellent repeatability and reproducibility.
- **Correlation** with Fibroscan CAP was **good**.
- Hepatoscope may be used at the bedside to assess liver steatosis.
- Future studies against MRI PDFF are needed to confirm performance.

REFERENCES

- 1 EASL; EASD; EASO. EASL-EASD-EASO Clinical Practice Guidelines for the management of non-alcoholic fatty liver disease. J Hepatol. 2016 Jun;64(6):1388-402.
- 2 Han A et al. Assessment of Hepatic Steatosis in Nonalcoholic Fatty Liver Disease by Using Quantitative US, Radiology 2020 295:1, 106-113

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