Two-dimensional versus One-dimensional Transient Elastography: Benefits of Ultrasound Imaging Based Processing for Liver Stiffness Measurements

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1 Introduction

- Fibroscan® VCTE™: **1D** tracking of shear wave displacement generated with 50 Hz vibration + **A/M-Modes**
- Hepatoscope™ 2DTE: **2D** tracking of shear wave displacement generated with 50 Hz vibration + **B-Mode imaging**

2 Aim

To highlight benefits of 2DTE vs. 1D TE

- Shear wave propagation measured in **the direction of shear wave propagation** vs. in **the direction of ultrasound beam**
- **Quality control** of shear wave front
- **Visualization of the liver** to confirm the location of the shear wave measurement

3 Method

- Prospective single center study (NCT04782050)
- 96 patients referred to routine outpatient hepatology consultation for chronic liver disease
- 4 Hepatoscope™ liver exams
- 1 expert and 1 novice operators blinded to any median value
- 1D TE (LSM_{1D}) and 2DTE (LSM_{2D}) reprocessing

- Linear regression analysis LSM_{1D} vs. LSM_{2D}
- Repeatability / reproducibility (ICC)

4 Results

		LSM_{1D}	LSM_{2D}
Inter-operator Reproducibility	ICC [CI 95%]	0.59 [0.33-0.68]	**0.74** [0.60-0.84]
Intra-operator Repeatability (experts)	ICC [CI 95%]	0.53 [0.33-0.68]	**0.84** [0.73-0.91]

Linear Regression 1D TE vs 2DTE	Slope	1
	Intercept	2

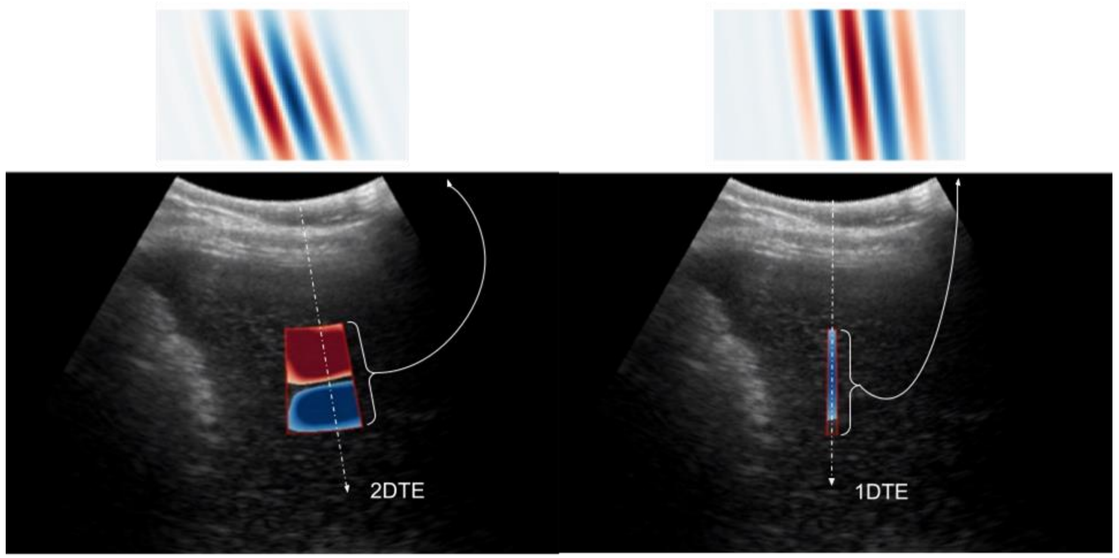

Figure 1: From left to right. Shear-Wave Propagation overlaid on B-Mode image as seen with 2DTE (leftmost image) and 1D TE (rightmost image). As the direction of propagation is not aligned with the analysis direction, 1D TE overestimates the shear-wave velocity.

5 Conclusions

2DTE has demonstrated its ability to **eliminate average over-estimation bias** of LSM by 1D TE

2DTE has led to **increased intra- and inter-operator reproducibility**

Further study against histology needed to demonstrate that 2DTE **reduces false positives of 1D TE**

6 Contact information

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2DTE: Seeing Is Believing

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