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Ultrasound shear wave elastography, shear wave dispersion and attenuation imaging in pediatric liver disease with histological correlation

A prospective feasibility study

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No disclosures

Background

Chronic liver disease in children is an increasing health issue

There is a need for improved non invasive liver characterization to detect and monitor liver disease

Background

Ultrasound

Shear Wave Elastography (SWE) - differentiate between no/mild and moderate/severe fibrosis

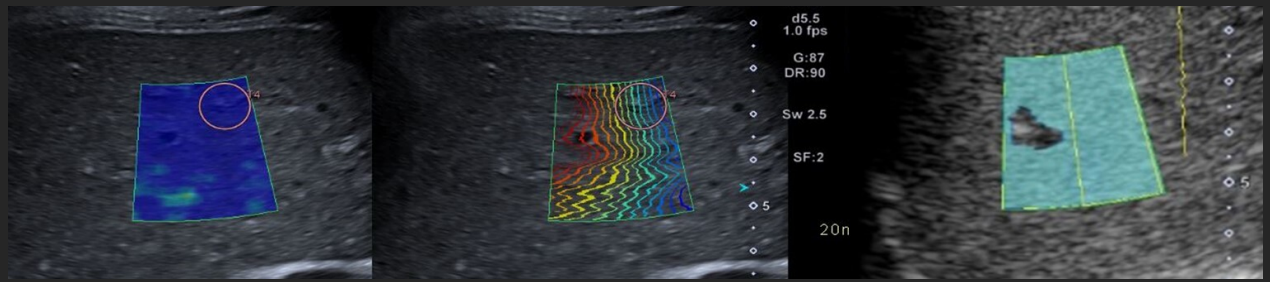
Attenuation Imaging (ATI) - enables a surrogate estimation of liver steatosis in adults

Shear Wave Dispersion (SWD) – estimated to represent inflammation

Studies comparing all these new markers with histological correlation in pediatric population are lacking

Purpose

To evaluate the feasibility of multiple ultrasound markers for the non-invasive liver characterization of fibrosis, inflammation and steatosis in the pediatric patient

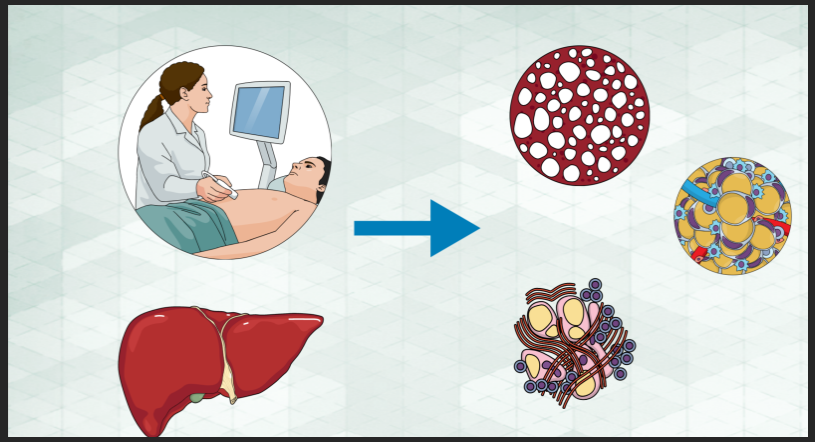


Material & Methods

During 6 months period

35 patients

15 controls



SWE, SWD and ATI (with Toshiba Aplio i800)

In awake and sedated state

Biopsy from corresponding area

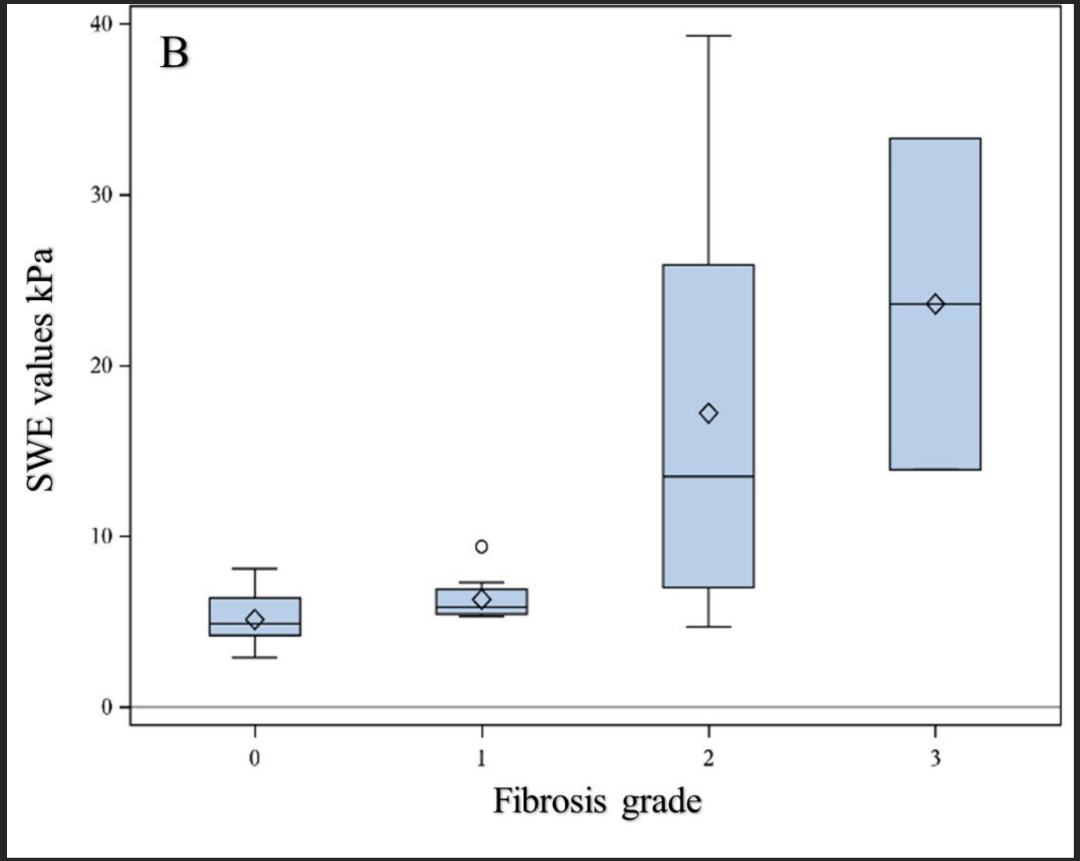
Results

32 patients, median age of 12.1 years (range 0.1–17.9)

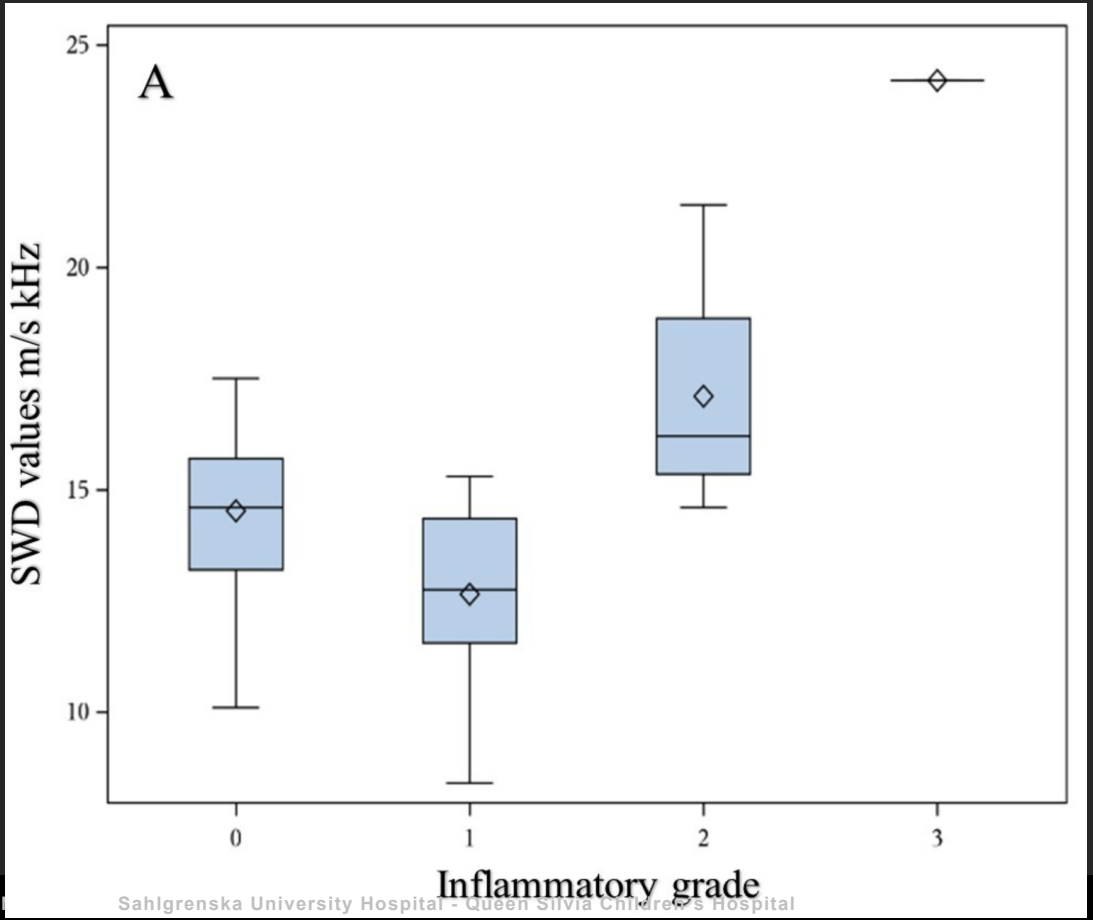
15 controls, median age of 11.8 years (range: 2.6–16.6)

Image based markers	Patients	Controls	
SWE (kPa)	6.2 (2.9; 39.3)	4.6 (3.3; 7.5)	<0.002
SWD (m/s/kHz)	14.4 (8.4; 24.2)	11.7 (9.4; 13.7	<0.005
ATI (dB/cm/MHz)	0.56 (0.4; 0.94)	0.54 (0.45; 0.85)	0.87

Results SWE



Results SWD

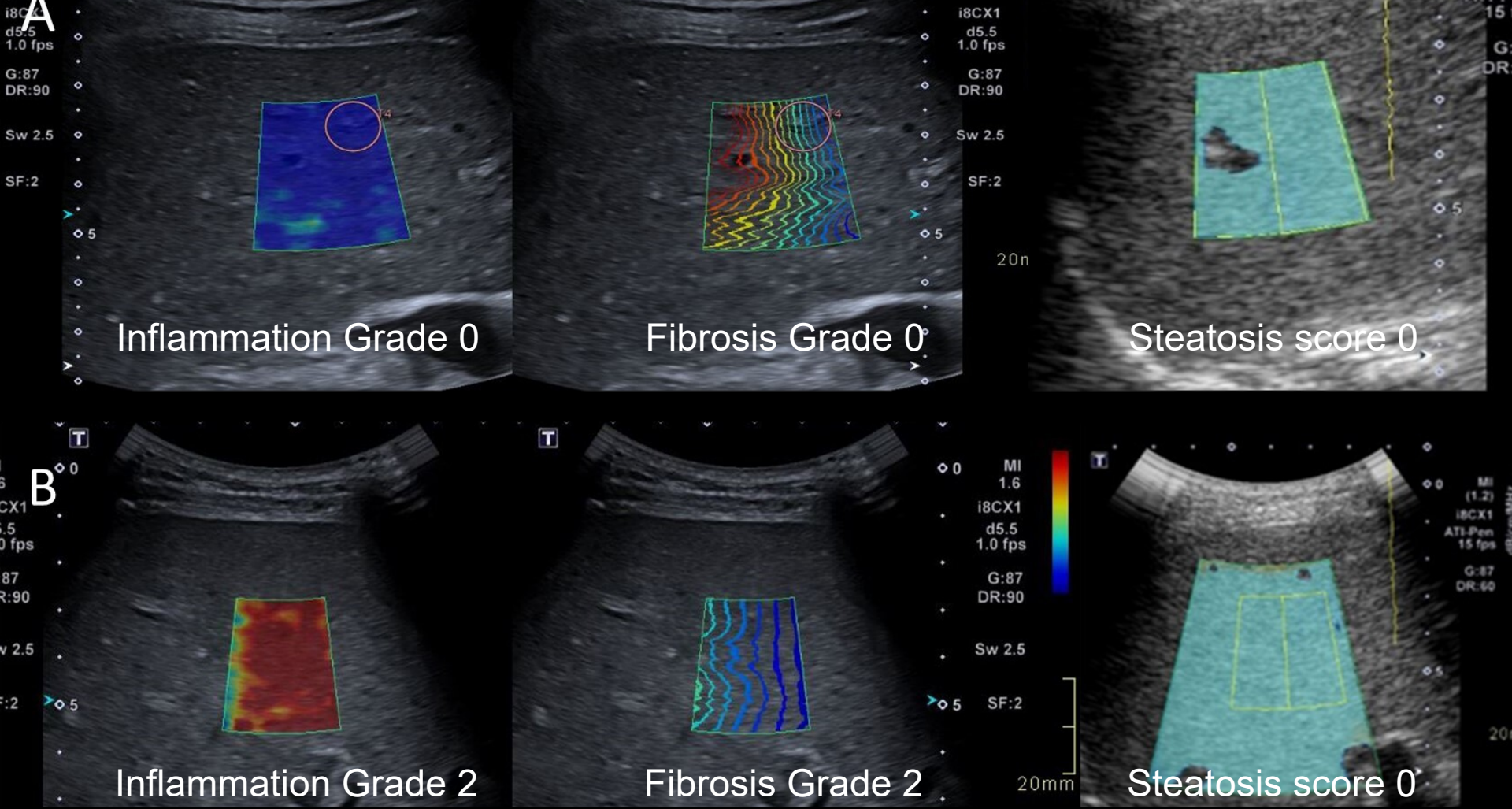


Results ATI

In 30 patients with no steatosis, ATI showed median value of 0.56 dB/cm/MHz

Median value of ATI for our control group was 0.54 dB/cm/Mhz

No significant difference in any ultrasound based markers in awake compared to sedated state


A
Inflammation Grade 0
Fibrosis Grade 0
Steatosis score 0
B
Inflammation Grade 2
Fibrosis Grade 2
Steatosis score 0

Conclusion

Ultrasound using SWE, SWD and ATI was feasible in children

Potential to reflect the various components of liver affection non-invasively

These US markers could likely be used clinically to rule out significant fibrosis, inflammation and steatosis in children

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Thank you for your attention!

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