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Shear wave elastography of peripheral muscle weakness in patients with chronic heart failure: A new diagnostic ultrasound method**Mariya Maslarska, Christoph Weis, Christoph Bode and Christoph Hehrlein**
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Background: It is well known that patients with heart failure often suffer from severe peripheral muscular weaknesses resulting in difficulties performing daily life tasks. Reduced oxygen delivery, lowered lactate turnover and mitochondrial capacity are thought to be responsible for a diminished contractility of peripheral muscles in heart failure patients.

Purpose: We sought to investigate whether shear wave elastography (SWE) is a useful tool in identifying weaknesses in extension (stretch) and flexion of peripheral muscles.

Material & Methods: 28 patients (pts) with chronic congestive heart failure (CHF, age 64.9 ± 13) with mid-range (HFmrEF, LVEF 40-49%) and reduced ejection fraction (HFrfEF, LVEF < 40%) and 17 healthy controls (CP, age 55.8 ± 20.4 , $p = 0.115$) participated in the study. SWE of the gastrocnemius and flexor carpi muscles was performed using a Loqiq E9 XDClear ultrasound machine, applying a 9L-linear array scanner. Resting kPa and exercise kPa between the muscles were assessed within a range of 0-300 kPa. Data was expressed as mean \pm SD and compared using the unpaired Student's t-test with Bonferroni correction wherever applicable.

Results: Resting kPa was not different in CHF and CP, neither for muscle flexion (19.8 ± 5.1 vs. 20.5 ± 6 $p = 0.683$) nor in the muscle extension group (12.7 ± 3.9 vs. 13.3 ± 3 ; $p = 0.602$). Exercise -kPa of gastrocnemius muscle (57.2 ± 19.5 vs. 87.1 ± 13.7 ; $p < 0.001$) and flexor carpi muscle (44.3 ± 13.3 vs. 61.6 ± 21.7 ; $p = 0.005$) were markedly reduced in CHF-compared with CP pts.

Conclusion: Shear wave elastography appears to be an extremely valuable tool to diagnose muscle weaknesses in patients with chronic heart failure.

Biography

Mariya Maslarska is a Medical student in her final year at the Albert-Ludwig University of Freiburg, Germany. She is a Member of the Shear Wave Elastography Research Group under the supervision of Professor Christoph Hehrlein and his team at the Vascular Center of the University Medical Center of Freiburg. Her team has been intensively researching the diagnostic impact of shear wave elastography for patients with chronic heart failure.

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