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Serum albumin and platelet count obtained on routine laboratory tests correlate with hepatic elasticity/stiffness

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Background: Fibrosis is defined by the accumulation of excess collagen and other proteins present in extracellular matrix. It is a progressive process and contributes to the development of cirrhosis and its complications. The historical gold standard for the grading of hepatic fibrosis has been a liver biopsy. Imaging studies utilized for this purpose include US, CT and MRI. Each has downsides consisting of interpretation variations which reduce sensitivity and specificity. The assessment of tissue elasticity and stiffness relies on the measurement of shear wave propagation following the generation of an ultrasound induced force to create a conical shear wave front that can be captured by very rapid sequential ultrasound images. Importantly, in a single study, multiple sites within the organ investigated can be evaluated enabling a global assessment of hepatic elasticity/stiffness eliminating the problem of tissue heterogeneity.

Aim: To correlate measures of tissue elasticity/stiffness acquired utilizing the Aixplorer multi-wave ultrasound instrument with the levels of routinely measured analytes available in a clinic setting.

Goal: Identification of routinely acquired analytes that can be obtained in every clinic that correlate with tissue elasticity/stiffness.

Methods: 28 individuals with a variety of liver diseases seen in a hepatology clinic were studied. 10 had hepatitis C associated cirrhosis, 2 had hepatitis C without cirrhosis, 5 had Nash associated cirrhosis, 3 had Nash with cirrhosis, 2 had sickle cell disease and 1 each had fatty liver disease, alcohol associated cirrhosis, hepatitis B associated cirrhosis, Gilbert's syndrome, and right heart failure. Each had a complete blood cell count and complete metabolic profile obtained on the day of their clinic visit. In addition, the mean value for each parameter obtained in the 2 profiles obtained within the preceding 3-4 months were utilized to calculate a mean value for each parameter across time. Shear wave propagation was measured utilizing the Aixplorer multi-wave instrument.

Results: Two analytes, serum albumin and platelet count correlated inversely with tissue elasticity as assessed by shear wave propagation (r values of -0.67 and -0.47, respectively, both highly significant with a p value less than 0.005). Both the single measurements obtained on the day of the study as well as the mean value for each analyte for the preceding 2 clinic visits correlated with the measured tissue elasticity.

Conclusion: It identifies readily inexpensive analytes available in every clinical laboratory that correlate with tissue elasticity in patients with liver disease. Second, it suggests that the utilization of these analytes can replace the use of more complex batteries of tests utilized to assess hepatic fibrosis. Third, the results obtained provide real time data within hours rather than days or weeks that correlate with hepatic elasticity/stiffness. Fourth, thay can be repeated frequently in combination with elasticity/stiffness measurements to assess progression or regression of disease inexpensively compared to more complex panels and imaging studies used to assess hepatic fibrosis.

Biography

D Van Thiel obtained his MD from the University of California at Los Angeles and completed his Internal Medicine residencies at Cornell University Hospitals and Boston University. He completed a Gastrointestinal/Hepatology fellowship at Boston University and the University of Pittsburgh. At the latter institution, he progressed from an Instructor of Medicine to Professor of Medicine and Director of the Gastroenterology/Hepatology program and served as the medical Director of Liver transplantation. He has published more than 100 peer reviewed papers in a variety of journals and is on the Editorial Board of several journals as well as serves as a Reviewer.

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