Spectral Doppler Ultrasonography of Hepatic Vein in a Patient with Atrial Fibrillation and Rapid Ventricular Rate.

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Background:
Point of Care ultrasound (POCUS) is a tool that enables the clinicians to objectively assess hemodynamics at the bedside. Recently, a novel concept of venous excess Doppler ultrasound (VExUS) grading system has been proposed to assess venous congestion at the organ level in real time. This concept evaluates the presence of severe flow abnormalities in 2 or more veins (of the hepatic, portal, and kidney parenchymal veins) with a dilated IVC (≥2 cm). There are reports in literature that tachyarrhythmias alter the flow pattern in the hepatic veins.
Case presentation:
We present a case of a 88-year-old gentleman with a past medical history of hypertension, paroxysmal atrial fibrillation, CKD and diabetes, who was admitted due to sepsis in the setting of multifocal pneumonia. On admission day 3, the patient developed atrial fibrillation with rapid ventricular response and worsening hemodynamic status. A bedside POCUS was performed as part of the evaluation. Hepatic vein doppler flow showed complete S wave reversal suggesting high right atrial pressures (RAP) and severe intravascular congestion. Diltiazem infusion was started immediately, and diuretics were ordered. Rate control was achieved after 2 hours of diltiazem infusion. Reassessment of hepatic vein Doppler flow showed normalization of S wave with an S < D pattern which is common in atrial fibrillation even in the absence of elevated RAP. A decision was made to discontinue diuretics as S wave reversal was attributed to rapid ventricular rate.
Conclusions:
VExUS grading is a novel concept, that evaluates intravascular congestion based on IVC diameter, hepatic, portal and kidney veins Doppler waveforms. Awareness of hepatic vein doppler alterations in tachyarrhythmias allows one to avoid misinterpretation of the hepatic vein signal and permits assessment of the impact on right heart hemodynamics.