

CLINICAL IMAGE

Nephrologist-performed portal vein Doppler to monitor response to diuretic therapy

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Abstract

Conventional parameters for assessment of fluid status suffer from several limitations. IVC maybe chronically dilated in patients with pulmonary hypertension. Portal vein Doppler offers an additional data point to assess the severity of venous congestion as well as monitor the efficacy of decongestive therapy.

KEYWORDS

Doppler, nephrology, point-of-care ultrasonography, point-of-care ultrasound, venous Doppler

1 | DOES THE PORTAL VEIN DOPPLER WAVEFORM CHANGE IN RESPONSE TO DECONGESTIVE THERAPY IN HEART FAILURE PATIENTS?

There has been a growing interest in the utility of point-of-care ultrasonography (POCUS) for the assessment of fluid status in patients with heart failure (HF).^{1,2} A 78-year-old woman with a history of HF with reduced ejection fraction (~20%) and pulmonary hypertension presented with altered mental status. Laboratories were significant for acute kidney injury (AKI) with a serum creatinine of 2.2 mg/dl (baseline ~1.1) and leukocyturia. AKI was presumed to be secondary to volume depletion as her oral diuretic regimen was recently intensified. Moreover, there was no significant increase in weight compared with last documented value nor obvious jugular venous distension. NT-pro-BNP was 8118 pg/ml (last available was 10,537). 1 liter of isotonic fluid was

administered, and diuretics were held. Her mental status improved with the treatment of urinary infection, but AKI was persistent, for which nephrology was consulted. POCUS-assisted physical examination with a handheld ultrasound device (Kosmos™, EchoNous, Inc.) demonstrated severely impaired left ventricular systolic function and a plethoric inferior vena cava (IVC) (Video S1). Portal vein Doppler waveform was pulsatile with intermittent flow reversal consistent with severe venous congestion. Based on these findings, intravenous diuretic therapy was instituted. Serum creatinine improved to 1 mg/dl at discharge. While IVC continued to be dilated (Figure 1), portal vein Doppler waveform showed consistent improvement during decongestive therapy (Figure 2). This Doppler parameter is a valuable addition to the tool kit of clinicians managing patients with HF and cardiorenal syndrome. In addition, combined assessment of hepatic, portal, and renal parenchymal venous Doppler (VExUS scan) has shown to predict AKI in selected patients.³

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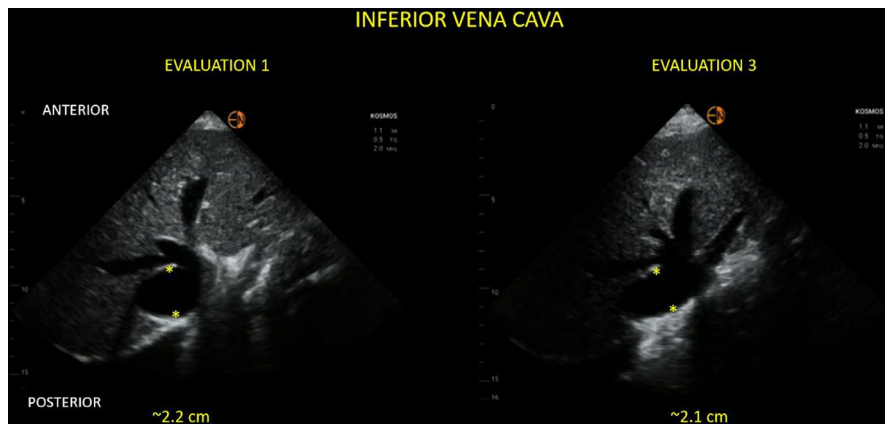


FIGURE 1 Dilated inferior vena cava in transverse axis at the time of nephrology consult (evaluation 1) and final follow-up (evaluation 3). Note that the anteroposterior diameter has minimally changed

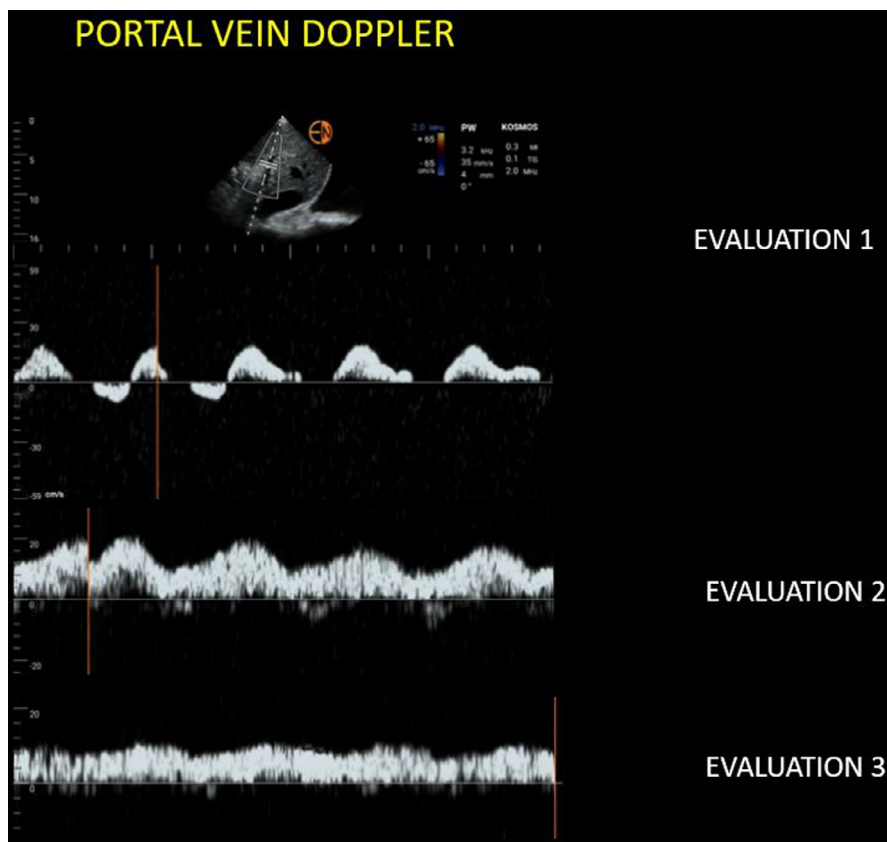


FIGURE 2 Portal vein Doppler at the time of nephrology consult (evaluation 1), 2 days after starting diuretic therapy (evaluation 2), and final follow-up 2 days later (evaluation 3). Note the improvement in pulsatility (normal is less than 30%)

ACKNOWLEDGEMENTS

None.

CONFLICT OF INTEREST

The author has declared that no conflict of interest exists.

AUTHOR CONTRIBUTIONS

AK performed sole author and attending nephrologist on the case, performed, and interpreted ultrasound scans.

CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

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