

## **POINT-OF-CARE ULTRASOUND IN CARDIO-RENAL SYNDROME TYPE 1: A CASE REPORT**

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Point-of-care ultrasound (POCUS) is an emerging discipline aiming to enrich physical examination with real-time information from ultrasound. Cardio-renal syndrome (CRS) type 1 is a complex clinical entity, in which acute heart dysfunction causes acute kidney injury (AKI).

Mrs. PS was an 87-year old woman with congestive heart failure, aortic and mitral stenosis, pulmonary hypertension, and chronic kidney disease stage 4, admitted with a patellar fracture.

An Internal Medicine (IM) consultation was requested due to respiratory distress. EKG showed signs of non-recent inferior and anterior infarction. The laboratory results revealed a BNP of 3380 pg/ml and a high-sensitivity troponin I of 1577 ng/L. Plasma urea was 231 mg/dl and creatinine 3.14 mg/dl. She was diagnosed with an acute decompensated heart failure causing type 1 CRS. During the next days, AKI kept worsening. IM decided to treat her with IV saline.

On day 4, Nephrology was called due to oligoanuria and severe azotemia. The patient was slightly obtunded, polypneic, tachycardic and her BP was 68/48 mmHg. She had bilateral JVT, bilateral diffuse lung crackles, and pitting edema on her thighs. We decided to induce hemodialysis, but we were concerned with her BP.

POCUS cardiac views showed moderate right ventricle dilatation with apical hypokinesia and a leftward shift in the interventricular septum in diastole, and severe systolic dysfunction of the left ventricle. Inferior vena cava had no respiratory variability, with a diameter of 22 mm. Color Doppler revealed severe tricuspid regurgitation with reversal of flow on hepatic veins. There were no signs of pericardial effusion. Lung ultrasound revealed multiple, bilateral B-lines.

Not only POCUS confirmed that the cause of AKI was type I CRS, but it also showed compelling evidence of severe fluid overload and right heart strain. The appropriate treatment was ultrafiltration (UF), so she was started on sustained low-efficiency dialysis. Her BP increased to 85/62 mmHg after 2.2 liters of UF. After three more days of daily dialysis, her urine output increased to 950 ml / 24 h.

This case highlights the potential usefulness of POCUS in the diagnosis and treatment of type 1 CRS by augmenting the clinician's confidence, increasing patient safety, and speeding up appropriate care.