

Phenotyping of Congestion in Decompensated Heart Failure: Life-Saving Accuracy

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Short editorial related to the article: *Correlation Between Venous Excess Ultrasound and N-Terminal Pro-B-Type Natriuretic Peptide Levels in Patients With Acute Decompensated Heart Failure*

Diagnosing heart failure (HF) in patients with multiple comorbidities continues to pose a challenge, especially when overlaps with pulmonary disease, obesity, or atypical clinical presentation. In this context, complementary diagnostic tools, such as NT-proBNP and venous excess ultrasound (VExUS) score, enable earlier and more accurate assessment of congestion, reducing adverse effects and fostering timely implementation of guideline-directed medical therapy.¹

Management of decompensated HF becomes even more complex when there is subclinical fluid retention, a frequently underestimated condition that is associated with higher rates of hospital readmission and a comparable mortality risk to that observed in patients with clinically evident edema.^{2,3} In these scenarios, VExUS has become a central tool in the diagnostic and therapeutic arsenal, both in differentiating the etiology of dyspnea and in managing patients with overt congestion and cardiorenal syndrome, by allowing for safer and more individualized management of diuresis, minimizing the risk of kidney injury.⁴

A growing body of evidence has supported this role. Anastasiou et al.⁵ demonstrated that the VExUS score outperformed other isolated markers of congestion, such as the inferior vena cava diameter, in predicting in-hospital mortality, reinforcing its prognostic value. Furthermore, a randomized clinical trial showed that VExUS-guided diuresis doubled the likelihood of achieving euvolemia in only 2 days when compared to standard care,⁶ consolidating bedside ultrasound not only as a diagnostic tool, but as a natural extension of contemporary physical examination.

The role of natriuretic peptides, especially BNP and NT-proBNP, has been well established since the early 2000s. Values within the normal range have sensitivity greater than 90% for excluding HF diagnosis, whereas elevated levels have consistently been associated with worse cardiovascular outcomes and higher mortality.⁷ The integration of biomarkers

and ultrasound assessment of congestion, therefore, achieves strategic relevance by adding objectivity to risk stratification and allowing for earlier and more informed clinical decisions.

That notwithstanding, regional disparities and the need for specific training in VExUS still represent challenges to the widespread dissemination of this technology. In contrast, NT-proBNP is a widely available biomarker that is financially viable in the Brazilian Unified Health System (SUS) and relatively simple to interpret. Nevertheless, studies directly correlating NT-proBNP levels with VExUS scores remain scarce, and this gap limits a truly integrated approach to congestion.

The pioneering study by Flores et al.⁸ stands out by correlating NT-proBNP levels with VExUS score during the first 24 hours of hospitalization for decompensated HF. The majority of the sample was composed of elderly patients (median age of 79 years), and the proportion of female patients was greater than 45%, thus reflecting a population that is frequently underrepresented in clinical studies. They observed that patients with moderate to severe venous congestion (VExUS 2 to 3) had median NT-proBNP levels between 5,430 and 13,200 pg/mL, suggesting that values above 5,430 pg/mL in elderly patients are associated with significant systemic congestion and require immediate clinical attention.

Future studies that stratify these findings by age group, sex, and specific comorbidities, such as chronic kidney disease, congenital heart disease, pulmonary hypertension, and valvular disease, are needed to further refine this approach. In a setting where early decisions directly impact the morbidity, mortality, and quality of life of patients with HF, the integration of biomarkers and functional imaging is not merely a diagnostic innovation, but a clinical imperative.

In patients with HF, identifying congestion before its clinical expression does not mean merely anticipating diagnosis; it involves intervening while it is still possible to alter the outcome.

Keywords

Heart Failure; Natriuretic Peptides; Ultrasound.

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