

Study: B-type natriuretic peptides lose prognostic value for clinical outcomes in LVAD recipients with cardiogenic shock

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B-type natriuretic peptide levels have played a vital role in diagnosing and prognosticating heart failure. However, physician-scientists at the University of Alabama at Birmingham Marnix E. Heersink School of Medicine have found that BNP levels may not be an effective prognostic tool in heart failure among patients with a ventricular assist device.

Their study published in the [American Journal of Cardiology](#) showed that BNP levels were high in end-stage heart failure patients with [cardiogenic shock](#), but lose their prognostic value in VAD recipients.

BNP levels in the blood reflects the severity of cardiac dysfunction. Higher BNP levels have been associated with adverse clinical outcomes. This study looked at end-stage heart failure patients with cardiogenic shock, a condition in which the heart is unable to pump enough blood to the vital organs in the body. However, due to a lack of data on end-stage heart failure patients, the BNP levels and their prognostic value have not been defined previously.

"Heart failure is a progressive disease wherein the pumping function of the heart gradually decreases," said Naman S. Shetty, M.D., first author of the study and a clinical research fellow in the UAB Division of Cardiovascular Disease.

"End-stage heart failure represents the end of the clinical spectrum of heart failure where patients require a [heart transplant](#) or a device like a VAD that assists with the pumping function of the heart. Considering that there is a shortage of hearts for transplantation, there is a significant increase in the number of patients being implanted with a VAD."

Shetty says predicting outcomes after VAD implantation is crucial for allocating resources effectively and providing the best care for patients. A combination of clinical, imaging and biomarker data is typically used to assess patient candidacy and predict outcomes after VAD

implantation. Therefore, there is a need for a gold standard biomarker that can help guide health care decisions for patients with end-stage heart failure.

Shetty and his team analyzed data from approximately 7,000 VAD recipients enrolled in the [INTERMACS](#)—a rich database housed at UAB that contains clinical information on VAD recipients across the United States. Shetty noted that the BNP levels in end-stage heart failure patients with cardiogenic shock were similar to those in patients in the preceding stage of heart failure.

"It was previously hypothesized that, in end-stage heart failure, the heart's ability to produce and release these hormones may become impaired due to the weakening of the heart muscle and the overall dysfunction of the cardiovascular system," Shetty said.

"Considering that the heart releases BNP, it was thought that BNP levels would be relatively lower in end-stage heart failure patients compared to the patients in the beginning stages of heart failure. Our study provides evidence refuting this belief," said Pankaj Arora, M.D., the senior author of the manuscript and an associate professor in the UAB Division of Cardiovascular Disease.

"Furthermore, the study showed that factors influencing BNP levels in healthy individuals continued to act even in patients with end-stage heart failure with cardiogenic shock. Previously, we have shown that BNP was lower in males and Black individuals compared with their counterparts. We noted a similar pattern even in end-stage heart failure with cardiogenic shock."

Arora highlights that BNP is a routinely used marker that predicts risk of death across the spectrum of heart failure. However, BNP loses its value for accurately predicting death in end-stage heart failure patients with

cardiogenic shock. Furthermore, the study also showed that BNP levels did not predict other clinical outcomes such as arrhythmias, right heart failure and cardiovascular mortality.

Arora notes that future research should focus on examining the prognostic value of biomarkers representing other pathophysiological pathways such as fibrosis to help guide clinical decisions in end-stage heart failure.

"Currently, BNP levels are being routinely measured in patients with end-stage [heart failure](#)," Arora said. "Given the lack of [prognostic value](#) of this marker, the study questions the need for this practice. Machine learning models that incorporate several factors to estimate the risk of mortality may be developed and implemented in this patient population to guide clinical decision-making."

More information: Naman S. Shetty et al, Clinical Correlates and Prognostic Value of B-Type Natriuretic Peptide in Left Ventricular Assist Device Recipients With Cardiogenic Shock: Insights from INTERMACS, *The American Journal of Cardiology* (2023). [DOI: 10.1016/j.amjcard.2023.07.177](#)

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