

**Short Report***Open Access, Volume 3***Correlation between BNP and D-dimer levels  
in Heart Failure: A short report****Hamnah Tayyab<sup>1</sup>; Aminah Tayyab<sup>1</sup>; Syed Murtaza Haider Zaidi<sup>1\*</sup>; Aima Javaid<sup>3</sup>; Shaharyar Naeem<sup>1</sup>; Arbab Furquan uddin Kasi<sup>1</sup>; Shoaib Saleem<sup>1</sup>; Arbab Burhanuddin Kasi<sup>2</sup>**<sup>1</sup>Mayo Hospital, Lahore, Pakistan.<sup>2</sup>Ruth K.M.PFAU Civil hospital Karachi, Pakistan.<sup>3</sup>Sir Ganga Ram Hospital, Lahore, Pakistan.**\*Corresponding Author: Haider Zaidi SM**

Mayo Hospital, Lahore, Pakistan.

Email: murtazahaider207@gmail.com

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**Keywords:** Heart failure; D-dimer; BNP; Hypercoagulability.**Abbreviations:** BNP: B-type Natriuretic Peptide; HF: Heart Failure; APE: Acute Pulmonary Embolism; AF: Atrial Fibrillation.**Introduction**

Heart failure is associated with clinically measurable markers such as B-type Natriuretic Peptide (BNP) and D-dimer levels. We did a brief literature review to assess the diagnostic accuracy of these biomarkers and their correlation. The significance of BNP and D-dimer as individual biomarkers is more reliable compared to their correlation as suggested by multiple research studies found in relevant databases.

**BNP as the diagnostic marker in HF**

BNP (Brain Natriuretic Peptide) is identified as the single most reliable predictor of heart failure [1]. The B-type natriuretic peptide and NT-proBNP tests have excellent sensitivity and a low negative likelihood ratio, implying that concentrations of either natriuretic peptide within the proper cut points may rule out the possibility of heart failure with full accuracy [2].

The efficacy of measuring plasma BNP or NTproBNP as a “rule-out” test for heart failure in patients has been established for fast-access diagnostic clinics confirming their clinical utility [3]. Such markers are of particular significance in healthcare settings where one cannot have easy access to more advanced cardiological testing.

Patients suffering from clinical signs and symptoms of heart failure, especially in primary care, can be identified for further evaluation using echocardiography or other cardiac function testings based on a high plasma level of natriuretic peptides [4].

**D-dimer as an additional diagnostic marker in HF**

Many studies suggest elevated levels of coagulation markers, particularly D-dimer, in later stages of HF as various factors linked with the pathophysiology of Heart Failure (HF), such as vascular disease, hypercoagulability, as well as venous stasis,

result in the development of thrombi-embolic events and increased D-dimer levels, however; its usefulness as a long-term prognostic marker in HF patients is yet unclear [5] and D-dimer remains the most useful clinically in excluding the diagnosis of acute thromboembolic states. D-dimer levels are frequently elevated in hypercoagulable states such as disseminated intravascular coagulation, malignancy, pregnancy, and many other clinical situations and should be used to rule out deep venous thrombosis and pulmonary embolism in patients with low pre-test probability for such events excluding its diagnostic accuracy for heart failure [6].

#### Does a correlation between BNP and D-dimer exist in HF

According to the findings in the research by Chaudhry et al, there is a moderately strong correlation between D-dimer and BNP levels (Spearman correlation coefficient of 0.46) in all clinical diagnoses. Patients with decompensated heart failure indicate a strong correlation between these biomarkers, followed by those with pulmonary/deep venous thromboembolism and sepsis syndrome [7]. However, a special focus should be on superimposed hypercoagulable diseases for better short-term prognosis in heart failure patients.

In one study by Zeng et al, plasma BNP and serum D-dimer levels were both significantly positively connected with the severity of the patient's condition of Acute Pulmonary Embolism (APE) ( $r=0.69$ ,  $0.41$ ,  $P<0.01$ ), and plasma BNP level was significantly positively correlated with serum D-dimer level ( $r=0.79$ ,  $P=0.002$ ), according to Pearson correlation analysis. Therefore, plasma BNP and serum D-dimer measurements in APE patients can be used as a foundation for therapeutic tailored therapy [8].

In another study by Sadanaga et al, BNP levels above 200 pg/ml can be used to assess thromboembolic events in patients with Atrial Fibrillation (AF) who are taking oral anticoagulants further necessitating the significance of correlation in such clinical scenarios [9].

However, physicians should not use such correlation to make an incorrect diagnosis for suspected cases of superimposed hypercoagulable states in heart failure since the states of inflammation in heart failure itself predispose to deranged D-dimer levels and we need more clinical data to rely on it without further evidence as there are a few conducted experimental and clinical trials we found regarding the correlation.

#### Take home message

In a nutshell, we need to focus more on the curves of D-dimer and BNP levels as independent markers but the importance of sound clinical judgment must always be considered to avoid overreliance solely on such biomarkers and their correlation by clinicians and must be confirmed by further investigations.

Increased D dimer levels along with BNP in heart failure should put a special emphasis on not only considering advanced

stages of heart failure as an independent stimulus of the hypercoagulable state itself but can also be used as a focus to rule out superimposed hypercoagulable conditions like atrial fibrillation, acute pulmonary embolism, and deep venous thrombosis. This can be further used as a potential predictor by clinicians to rule out subsequent thromboembolic events in heart failure patients and deal with the severity of such conditions in their earlier stages. Moreover, conditions like AF might have D dimers level raised along with BNP and the latter could be a useful predictor of subsequent thromboembolic events but there is further room for research to enhance the strength of its evidence. Also, BNP in patients of APE could potentially hint toward the severity of the patients' condition and short-term prognosis.

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