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Lack of correlation between I131 labeled albumin measurements of blood volume and serum B-natriuretic peptide levels in heart failure patients

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Many physicians treating patients with heart failure utilize the serum B-Natriuretic Peptide (BNP) as a guide to determine the presence of fluid retention and the quantification of diuretic therapy. The manufacturers of BNP testing equipment make no claim that it is a surrogate for blood or plasma volume measurements. Since BNP is predominantly released by the ventricular myocytes in response to stretch or increases in wall tension caused by intrinsic myocardial abnormalities, its common use as a surrogate marker for fluid retention and/or decisions regarding the need for diuretic adjustments therapy, requires careful re-examination.

The correlation between time-related venous BNP and Iodine-131 labeled Albumin measurement of blood volume (BVA-100, Daxor, NY) was made in 151 patients admitted to the heart failure service of a community hospital over the past 2.5 years. The patients entered in the study had ejection fractions by echocardiography, MUGA, or cardiac MRI that varied from 10% to 80%. There were 65 females and 86 males enrolled and the ages of the patients ranged from 38 to 94. There was no exclusion of patients or correction of the data for intrinsic renal function or body mass index. The results indicated that there was no significant correlation between serum BNP and Total Blood Volume measurement expressed either as a % deviation from Ideal Blood Volume or as the Absolute Blood Volume measurement. In addition, there was no correlation between serum BNP measurements and Total Blood Volume or the % deviation from Ideal Blood Volume when the data was stratified by gender or age. Over 60% of the patients enrolled had measured reductions in Red Cell Volumes of greater than 10% from the Ideal Red Cell Volume indicating the high prevalence of anemia in these patients.

These data represent the largest study to date correlating serum BNP to Iodine-131 labeled Albumin blood volume measurements. Previous studies have shown a lack of correlation between BNP and Blood Volume in acutely ill post-surgical patients and in a small cohort of patients undergoing pulmonary artery catheterization. In both studies, hemodynamics correlated significantly with Blood Volume measurements. These findings lend new credence to the use of Blood Volume measurements in conjunction with clinical assessment to guide diuretic therapy or other forms of renal replacement therapy in heart failure patients.

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