Development of a Home N-Terminal Pro-Brain Natriuretic Peptide Assay for Early Detection of Congestive Heart Failure

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Congestive heart failure (CHF) affects millions of patients and is associated with a high mortality rate. Early detection and treatment can improve outcomes and avoid hospitalization, but it is often difficult to tell if symptoms are specifically due to CHF or another cause. N-Terminal Pro-Brain Natriuretic Peptide (NT-proBNP) is an excellent biomarker for CHF. The lateral flow assay (LFA) is a technology that can be adapted for use as a home test. A NT-proBNP assay was created using a universal LFA kit with the appropriate capture and detection antibodies. Recombinant NT-proBNP was used to test the assay at varying concentrations. NT-proBNP was readily detectable using this system and the visual bands on the LFA strips were quantified using an optical densitometry protocol. After optimization of the reagents, NT-proBNP levels down to 5,000 pg/mL were detectable. This puts the test in the range of NT-proBNP levels that have been described for patients hospitalized with CHF. This test was repeated with purchased human serum spiked with recombinant NT-proBNP and demonstrated detection at similar concentrations. The results of this experiment were shown to 20 blinded volunteers who were able to detect the positive test lines of NT-proBNP concentrations of 5,000 pg/mL and higher. These results show that a home NT-proBNP test is feasible and could be used for early detection and treatment of CHF.

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