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LAY ABSTRACT

Heart failure (HF) affects more than 5.5 million patients in the United States. It is a frustrating disease not always easy to diagnose and difficult to treat. A variety of drugs, such as angiotensin converting enzyme (ACE) inhibitors, angiotensin receptor blockers (ARBs), aldosterone antagonists and beta-blockers are available for HF treatments. While the administration of these drugs has been found to be effective in responsive patient populations, however, a number of patients either do not respond, or more frequently, are intolerant of these medications due to some limitations such as bradycardia, hypotension or impaired renal function.

HF is a disease of oxidative stress resulting from free oxygen radical generation in the heart muscle. Thus, there also has been considerable interest in using various antioxidants supplements in heart disease treatment and prevention. One particular class of dietary supplements is coenzyme Q10 (CoQ10) which is an important antioxidant and plays a major role in ATP generation. CoQ10 biosynthesis decreases with age and its deficit in tissues is associated with aging process. Heart muscle tissues of cardiovascular disease (CVD) patients are deficient in CoQ10 and the observed level of CoQ10 deficiency is correlated with the severity of heart failure. It is well known that heart metabolism is under direct control of the mitochondrial energy. Thus, it is hypothesized that CoQ10 might be helpful in heart metabolism. CoQ10 fulfills various criteria of an obvious adjunct in patients with HF: it is devoid of significant side effects and improves symptoms and quality of life. Thus, CoQ10 supplementation concurrent with standard therapy holds promise in patients who are intolerant/non responsive to drug therapy. Till this date, several double-blind placebo-controlled trials using Co10 supplementation as an adjunct to the standard drug therapy, have been conducted which have been largely positive, although some negative or neutral, with respect to various clinical parameters: improvement in exercise capacity and hemodynamic end points as well as reduced hospital admissions. However, CoQ10 supplementation is needed to be further explored for cardiac functional outcomes using state of the art techniques, especially in CHF patients refractory or intolerant to standard drug regimen that has not been examined to date. **The major goal of this proposal is to test our hypothesis that CoQ10 supplementation will improve the heart functions in patients with HF who are not well respondent to the standard therapy available.** In a double-blind, placebo-controlled randomized trial (n=60 patients in total; 30 patients in each group), we will test CoQ0 supplementation on hemodynamic end points (ejection fraction and cardiac output), 6 minute walk test, recurrent hospital admissions and BNP (B-type Natriuretic Peptide) levels as a surrogate marker of heart failure.

We have gathered a combination of investigators and approaches outlined in the project will provide us a platform to conduct this study with a goal of achieving treatment options available to HF patients intolerant/refractory to the standard drug therapy. The data obtained from these studies will form the basis of a large multi-center proposal that will be submitted to National Institute of Health for funding.