Pilot Study to investigate Home Potassium testing in Heart Failure

Francis Nwaneri[1], Nicholas Jakupco[1], Michael Mirro[2,3]

[1]Indiana University School of Medicine, [2]Parkview Health, [3]Mirro Center for Research and Innovation

Background and hypothesis: Heart failure (HF) is one of the leading causes of death in the United States. Normal K+ range is 3.5 to 5 mEq/L. Low potassium level is associated with fatal dysrhythmia, and elevated potassium levels result in slow cardiac rhythms and asystole. Current venipuncture methods used for potassium testing are complicated with hemolysis, which create false K+ results. Our study objective is assessing the effectiveness of an at home device that would enable HF patients to test potassium levels frequently to avoid any complications as it relates to dyskalemia. We hypothesize that by utilizing a home testing solution, patients can develop a home HF management strategy to improve health outcomes.

Experimental Design or Project Methods: Patients diagnosed with HF will be recruited from Parkview Physicians Group – Cardiology. A venipuncture and a finger stick sample will be collected simultaneously, and their serum potassium levels will be analyzed. Venipuncture blood will be analyzed by ion-selective electrode (ISE) and flame photometry analyses. Finger stick blood will be analyzed by a novel Blaire Biomedical device. Surveys about the device will be given to both patients and clinicians. Linear regressions comparing the Blaire Biomedical results to both the ISE and flame photometry results will be created.

Results: The r-values for the regressions will be analyzed. An r-value close to 1 would indicate that the results are directly correlated and clinically equivalent. Results of the surveys will be used to gauge interest in the device.

Conclusion and Potential Impact: This study will establish a more efficient way for HF patients to measure K+ levels, to ensure it stays in the narrow range of 3.5 to 5 mEq/L. This device will assist in reducing potassium imbalance complications, which will translate to a decrease in mortality in HF patients as it relates to dyskalemia.