Bioimpedance Measurement for Volume in Patients with Chronic Kidney Disease Participating in the CanPREDDICT Study: Design of a Prospective Study and Results of a Single Centre Pilot

Trevor J. Wilkieson[1], Mukesh Khandelwal[1], Cathy Z. Kotsamanes[1], Adeera Levin[2], Azim S. Gangji[1], Catherine M. Clase.[1]

[1]Medicine, McMaster University, Hamilton, ON, Canada, [2]Medicine, University of British Columbia, Vancouver, BC, Canada.

BACKGROUND: Volume status is difficult to assess clinically. Hypervolaemia may predispose patients to congestive heart failure (CHF) in the short term and in the longer term cause arterial changes and cardiac remodelling that lead to myocardial infarction (MI), stroke, and sudden death. Data on volume status in patients with chronic kidney disease (CKD) not on dialysis are sparse.

METHODS: Nested in the multi-centre CANPREDDICT study, we conducted a single-centre pilot to examine the feasibility of conducting a substudy measuring bioimpedance in prevalent patients with CKD who were already participating in CANPREDDICT. We measured bioimpedance in triplicate on a single occasion. We analyzed the data according to the method of Piccoli, classifying patients based on the resistance (R) – reactance (Xc) graph. Primary outcomes for the pilot were the proportion of CANPREDDICT participants who were eligible and consenting to the substudy, and the proportion of substudy participants who were volume overloaded. For the main study, we plan to recruit 500 of 1136 CANPREDDICT participants in 7 to 9 centres and examine whether volume overload, assessed by bioimpedance predicts a primary outcome composite of stroke, MI, amputation for peripheral vascular disease, CHF or vascular death, with power of 0.7 to detect hazard ratios of 1.6 or greater.

RESULTS: From 2009 December 09 through 2010 June 03, 57 consecutive CANPREDDICT participants were approached at their first return visit. Of these, 46 participants were eligible, 36 (78%) participated and 10 declined. Participants were 39% women, mean age 67 years, 44% were volume overloaded by RXc graph.

CONCLUSIONS: The study appears feasible; volume overload by RXc graph is prevalent.