

Project title: LUNG WATER by Ultra-Sound GUIDED TREATMENT TO PREVENT DEATH AND CARDIOVASCULAR COMPLICATIONS IN HIGH RISK END STAGE RENAL DISEASE (ESRD) PATIENTS WITH CARDIOMYOPATHY (LUST)

Length of the project:

From March 8, 2013 to March 31, 2020

Principal Investigator:

Carmine Zoccali

Proposed research: Volume overload is a leading risk factor for death and cardiovascular events in end stage renal disease patients maintained on chronic dialysis, particularly in those with myocardial ischemia and heart failure which represent a substantial fraction of this population. Early identification of volume overload may prevent cardiovascular sequela in these patients but clinical signs of volume expansion are unsatisfactory to reliably identify patients at risk and to monitor them over time. On the other hand, however reliable, standard techniques for measuring extracellular or circulating (blood) volume do not convey information on fundamental heart function parameters that determine the individual hemodynamic tolerance to volume excess and the response to ultrafiltration, i.e. left ventricular (LV) filling pressure and LV function.

Extra-vascular lung water is critically dependent on these parameters and represents a proxy of both, circulating volume and LV filling pressure and function, and may therefore be a better criterion to identify patients at a higher risk of volume-dependent adverse clinical outcomes and to monitor the effect of therapy aimed at preventing these outcomes. A fast (< 5 min.), easy to learn, simple and non-expensive technique which measures extra-vascular lung water by using standard ultrasound (US) machines has been validated in dialysis patients. Whether systematic measurement of lung water by this technique may translate into better clinical outcomes in ESRD patients has never been tested.

Aim of the research: The aim of this randomized clinical trial is that of testing a treatment policy guided by extra-vascular lung water measurements by ultrasound to prevent death, decompensated heart failure and myocardial infarction as well as progression of LVH and LV dysfunction and hospitalization in high risk dialysis patients with myocardial ischemia (a history of myocardial infarction with or without ST elevation or unstable angina, acute coronary syndrome documented by ECG recordings and cardiac troponins or stable angina pectoris with documented coronary artery disease by prior coronary angiography or ECG) or overt heart failure (NYHA class III-IV).

List of the papers published in peer review journals:

- 1) Efficacy of a remote web-based lung ultrasound training for nephrologists and cardiologists: a LUST trial sub-project. *Nephrol Dial Transplant.* 2016 Dec;31(12):1982-1988
- 2) The agreement between auscultation and lung ultrasound in hemodialysis patients: the LUST study. *Clin J Am Soc Nephrol.* 2016 Nov 7;11(11):2005-2011.

List of the presentations done at major congresses / meetings: none