are asymptomatic with respect to anginal symptoms, we wonder whether other symptoms such as hypotension, hypertension or cramps have occurred during blood sampling. We believe that consideration of these issues would have reinforced the results.

Conflict of interest statement. None declared.

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1. Kumar N, Michelis MF, Devita MV et al. Troponin I levels in asymptomatic patients on haemodialysis using a high-sensitivity assay. *Nephrol Dial Transplant* 2010

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Reply

Sir,

We appreciate your inquiries regarding our study [1]. The primary purpose of our study was to measure the incidence of troponin I (TnI) elevation in end-stage renal failure using a sensitive assay and assess the variability of TnI over time. We did not find that serum albumin and hemoglobin, which are inversely correlated with inflammation in end-stage renal failure [2, 3], had any association with TnI. We did not measure c-reactive protein levels or other inflammatory markers nor did we assess intradialytic blood pressure fluctuations or cramping symptoms for our study. No angiography was performed in response to an elevated TnI, even in the AMI range, as patients remained asymptomatic. We are in the process of gathering follow-up data regarding our patients to determine if there was an association of positive TnI with cardiovascular outcomes over a 1-year period.

Conflict of interest statement. None declared.


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Troponin levels in hemodialysis patients: interpretation based on guidelines, changing concentrations and high-sensitivity assays

Sir,

Recent studies have demonstrated that elevations in cardiac troponin I (cTnI) are present in those with end-stage renal disease (ESRD) when using sensitive cardiac troponin I assays, similar to what has been observed for cardiac troponin T (cTnT) [1,2]. The article by Kumar et al. [3] adds to this evidence by demonstrating that measurement with another sensitive cTnI assay (VITROS Troponin I ES, Ortho Clinical Diagnostics) [4] in patients on hemodialysis also yield elevations in cTnI. It is important to stress that Kumar et al. [3] did not interpret cTnI elevations based on the Universal Definition of Myocardial Infarction that supports only one cutoff (the 99th percentile) [4] and not two different levels as used in the study [i.e. intermediate elevation (IE): 0.035–0.120 ng/mL and >0.120 ng/mL for acute myocardial infarction (AMI)]. Rather than classifying individuals with respect to different ranges [i.e. no elevation ≤0.034 ng/mL (≤99th percentile); IE and AMI], an alternative approach would be to identify those individuals with changing cTnI concentrations. In those with symptoms suggestive of acute coronary syndrome in the emergency setting, a 30% change in concentration using the same cTnI assay (VITROS Troponin I ES) improved both the specificity for AMI detection and risk stratification [4]. Thus, it would be of interest to evaluate if employing this percent change criterion by itself or in conjunction with the 99th percentile to this population identified more individuals with change as opposed to just using the predefined ranges.

Another point of clarification is that the cTnI assay used by Kumar et al. was not a high-sensitivity assay. High-sensitivity assays are different from current in-use assays in two fundamental ways: (i) the majority of healthy individuals will have measurable concentrations of cardiac troponin using these assays and (ii) the units are different, with concentrations reported in nanogram per liter or picogram per milliliter (pg/mL) as opposed to nanogram per milliliter (ng/mL) for current assays [5]. To date, only one high-sensitivity assay (hs-cTnT) has been measured in ESRD patients, with 100% of patients (n = 32) having at least one elevation above the 99th percentile cutoff over a 6-month period [2]. Thus, interpretation may prove to be even more challenging when using high-sensitivity assays in those with ESRD. Future studies measuring high-sensitivity cardiac troponin assays in this population will need to consider what constitutes a significant change in concentration or possibly alternative cutoffs based on adverse outcomes [5].
Conflict of interest statement. Dr Kavsak has received speaker fees and/or grant support from the following Diagnostic Companies: Beckman Coulter, Roche, Randox Ltd and is a consultant for Ortho Clinical Diagnostics which manufactures the VITROS® Troponin I ES assay.

Declaration: The text presented in this letter has not been published previously in whole or part.

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