

Cardiac troponin T levels in patients with renal failure

Aviles RJ, Askari AT, Lindahl B, Wallentin L, Jia G, Ohman M, et al. Troponin T levels in patients with acute coronary syndromes, with or without renal dysfunction. *N Engl J Med* 2002;346:2047-52.

Background: Cardiac troponin T levels are useful in establishing a diagnosis and prognosis in patients with suspected acute coronary syndromes. However, their role in patients with renal dysfunction has been questioned, because cardiac troponin T may be cleared by the kidney.

Question: In patients with renal dysfunction who present with suspected acute coronary syndrome, what is the prognostic value of elevated cardiac troponin T levels?

Design: This study was part of a broader randomized, double-blind, placebo-controlled trial evaluating infusions of abciximab. Patients were recruited if a high-risk acute coronary syndrome was suspected: angina at rest lasting 5 or more minutes with significant ST-segment depression, or an elevated cardiac troponin level. Patients with renal dysfunction were included, but patients undergoing early revascularization were not. All patients were treated in a standard fashion, plus a random assignment of abciximab or placebo. Cardiac troponin T levels and creatinine clearance rates were measured at baseline. A positive cardiac troponin T level was defined as 0.1 µg/L or higher, as determined by means of a third-generation assay that uses recombinant human cardiac troponin T as standard material. An abnormal creati-

nine clearance rate was defined as a value in the lowest quartile (< 0.97 mL/s). The primary end point was a composite of death or myocardial infarction within 30 days.

Results: Of 7800 patients enrolled in the broader trial, 7033 (90.2%) had complete clinical, cardiac troponin T and creatinine clearance data. The primary end point occurred in 581 patients. Among the 25% of patients with a creatinine clearance rate in the lowest quartile, a positive cardiac troponin T level was associated with an increased risk of the primary end point (20% v. 9%; unadjusted odds ratio 2.5 [95% confidence interval 1.9-3.3]; $p < 0.001$). This finding remained unchanged in multivariate analyses, after adjustment for potential confounders (e.g., sex, age, comorbidities, angina, ST-segment depression, subsequent treatments). Similar results were obtained when the threshold for a positive cardiac troponin T level was lowered to 0.03 µg/L. When creatinine clearance was considered as a continuous variable, an elevated cardiac troponin T level was independently associated with the risk of death or myocardial infarction across a wide range of creatinine clearance rates, down to as low as 0.17 mL/s. Of interest, the odds ratios actually rose with declining creatinine clearance rates.

Commentary: This study used the newer, third-generation assay for measuring cardiac troponin T levels. This may explain why the results differ from those of previous studies, which used second-generation assays and found troponin levels to be less useful in patients with renal dysfunction. This study in-

cluded only 11 patients with a creatinine clearance rate of less than 0.17 mL/s; thus, the value of a positive cardiac troponin T level in establishing the diagnosis and prognosis in dialysis patients is not clarified by this study.

Implications for practice: Cardiac troponin T levels, as measured by current third-generation assays, are valuable markers in patients suspected of an acute coronary syndrome, even in those with renal dysfunction. Nevertheless, cardiac troponin T levels should be interpreted cautiously in dialysis patients, since previous investigators (using a second-generation assay) reported a high baseline prevalence of positive troponin levels among hemodialysis patients.¹ Although such baseline positive levels are associated with an increased risk of death or myocardial infarction in the longer term in stable hemodialysis patients,² the significance of positive levels becomes uncertain when assessing short-term risk in dialysis patients with a suspected acute coronary syndrome.

Benjamin H. Chen

Division of General Internal Medicine
Queen's University
Kingston, Ont.

In the Literature is edited by Dr. Donald Farquhar, head of the Division of Internal Medicine, Queen's University, Kingston, Ont. The articles are written by members of the division.

References

1. Deegan PB, Lafferty ME, Blumsohn A, Henderson IS, McGregor E. Prognostic value of troponin T in hemodialysis patients is independent of comorbidity. *Kidney Int* 2001;60:2399-405.
2. Mallamaci F, Zoccali C, Parlongo S, Tripepi G, Benedetto FA, Cutrupi S, et al. Troponin is related to left ventricular mass and predicts all-cause and cardiovascular mortality in hemodialysis patients. *Am J Kidney Dis* 2002;40:68-75.