Cardiac troponin is a strong prognostic biomarker for patients admitted with heart failure

R. Hasselbalch¹, C. Sindet-Pedersen¹, M. Pries-Heje², N. Strandkjaer¹, J.H. Kristensen¹, M. Porsborg Andersen³, C. Torp-Pedersen³, H. Bundgaard², K. Iversen²
¹Herlev Hospital - Copenhagen University Hospital, Department of Cardiology, Copenhagen, Denmark
²Rigshospitalet - Copenhagen University Hospital, Department of Cardiology, Copenhagen, Denmark
³Nordsjaellands Hospital, Department of Cardiology, Hillerød, Denmark

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Background: Cardiac troponin T (cTnT) and I (cTnI) are strong prognostic biomarkers in several diseases and play a key role in risk stratification of patients admitted with cardiac disease. Though viewed as equals, there are substantial differences in the biology and frequency of elevations among non-cardiac illnesses between cTnT and cTnI. A recent study of all comers with a measurement of cTnI showed that the risk of mortality was highest for patients with low grade elevations of cTn, while high concentrations were associated with a paradoxical decrease in the risk. We aimed to investigate whether this pattern exists among patients with heart failure.

Purpose: To compare the prognostic ability of cTnT and cTnI among patients admitted with heart failure.

Methods: This nationwide cohort study includes patients admitted with heart failure who had cTn measurements from 2009-2022 using one of five different cTn assays: Roche high-sensitivity cTnT (hs-cTnT), Abbott Alinity high sensitivity cTnI (hs-cTnI), Siemens Vista Hs-cTnI, Siemens Atellica hs-cTnI and Beckman-Coulter hs-cTnI. We selected the peak concentration of cTn on admission and grouped patients into those with measurements of cTnI and those with cTnT. The primary outcome was all-cause mortality. We divided the peak cTn concentrations into groups based on the bands of concentrations of cTn from <1 times the 99th percentile, 1-2, 2-5, 5-100 and >100 times the 99th percentile and compared cumulative mortality using Kaplan-Meier analysis and the risk of mortality for each group using logistic regression for the 30-day mortality.

Results: A total of 9,344 patients were included in this study with a median age of 75 years (65-83) and 5,613 (60%) were males. Of these, 2,874 (31%) had a history of heart failure and 2,349 (25%) had a history of ischemic heart disease. When grouping for type of cTn used, there were more patients treated using hs-cTnT (n = 7,131 76%) than hs-cTnI (n = 2,213, 24%). The median age of patients treated who had a measurement of cTnI was slightly higher; 77 years (IQR 67-84) vs cTnT 74 years (64-83) p<0.001.

Of the 9,344 patients, 1,096 (12%) died within 30 days of admission. Figure 1 shows the absolute risk of 1-year all-cause mortality for each band of cTn concentration for (panel A) hs-cTnI and (panel B) hs-cTnT. This showed an increase in the risk of mortality for patients up to 2-5 times the 99th percentile for cTnI and 5-100 times the 99th percentile for cTnT. Figure 2 shows the risk of 30-day mortality for patients for each concentration of cTn. There was a much higher risk of mortality associated with elevation of cTnT than cTnI for all bands of concentration.

Conclusion: Though both cTnI and cTnT are strong prognostic markers of mortality among patients admitted with heart failure, cTnT seemed to be the strongest prognostic marker. The risk of mortality increased with concentration of cTnT up to very high concentrations of >5 times the 99th percentile.
Figure 1

Figure 2