High Cardiac Troponin T Doubles Event Risk

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CHICAGO – Higher serum concentrations of cardiac troponin T indepen-
dently predicted an increased rate of new-onset heart failure and cardiovas-
cular death in a longitudinal study of more than 4,000 elderly, community-
dwelling Americans with a median follow-up of 12 years.

“Measurement of cTnT [cardiac tro-
ponin T] may be useful in cardiovas-
cular risk stratification in older adults,” Dr. Christopher R. deFilippi said at the sci-
entific sessions.

Assessing cTnT’s role as a risk predic-
tor became possible with the recent avail-
ability of high-sensitivity assays. Previous studies using conventional cTnT assays found roughly 4% of the general elderly
population had detectable levels; in Dr. deFilippi’s new study, 66% of commu-
ity-dwelling U.S. adults with a median age of 71 had detectable cTnT levels. The

Over 12 years, the rates of heart failure and cardiovascular death tracked along with baseline cTnT levels.

DR. DEFILIPPI

high-sensitivity test produces “about a 10-fold increase in the number of people with detectable cTnT; that’s what gives us a dynamic range,” said Dr. deFilippi, a cardiologist at the University of Mary-
land in Baltimore.

Results from two other studies pre-
sented at the meeting and a third study published in early December showed similar links between baseline levels of cTnT and cardiovascular events, cardiac struc-
ture, and death (see box).

The consistent findings from all these studies show that cTnT “is a pretty good risk predictor. Cardiac troponin offers a very easy way for a physician to say that a person is at high risk” for new-onset heart failure, cardiovascular death, or other cardiovascular disease events, Dr. deFilippi said in an interview.

“I look at cardiac troponin T as early biochemical evidence of pathology. Find-
ing a high level in a person could be a wake-up call. It gives some of the earli-
est, direct evidence with a cardiac-spe-
cific molecule that pathology is taking place,” independent of traditional risk
markers, he said.

“Cardiac troponin T could be the sum-
mation of all other risk factors. We use cholesterol level as a motivator, even
though it is much less effective for mea-
suring risk,” Dr. deFilippi explained.

Another attractive feature of measur-
ing cTnT is that the evidence collected by Dr. deFilippi and his associates suggest that in some people high levels are re-
versible, and when levels drop a person’s risk drops.

In the analyses so far, the strongest cor-
relation with a lowered serum level of cTnT has been a person’s level of activ-
ity and exercise, he said. The high-sensitivity cardiac troponin T test has not yet received marketing ap-
proval from the Food and Drug Admin-
istration, but it is commercially available in Europe.

To examine the prognostic ability of cTnT, Dr. deFilippi and his associates used serum specimens collected from 4,221 community-dwelling Americans aged 65 or older enrolled in the Cardio-
vascular Health Study. At baseline, 2,794 (66%) of the particip-
ants had a detectable level of cTnT, at least 3 pg/mL, and their median age was 71.

During a median follow-up of almost 12 years, the incidence of heart failure and cardiovascular death tracked along with baseline levels of cTnT. Among the one-third of patients with an un-
detectable level at baseline the rate of new-onset heart failure during follow-
up averaged 1.6% per year. Among people in the highest quintile of cTnT lev-
el, greater than 12.9 pg/mL, the incident heart failure rate averaged 6.4% per year. “It’s a huge difference,” he said.

In an analysis that adjusted for demo-
graphic differences and traditional risk factors including systolic blood pressure, smoking status, serum creatinine, and left ventricular size, people with baseline cTnT levels above the median all had a significantly increased risk for both end points.

The quintile of people with the high-
est cardiac troponin T level had a 2.5-
fold increased risk of new-onset heart failure and a threefold increased risk of cardiovascular death compared with those who had an undetectable level at baseline.

Even when also adjusted for baseline levels of NT-pro brain natriuretic peptide and C-reactive protein, people in the highest quintile for baseline level had about a twofold higher rate of heart fail-
ure compared with a threefold increase during fol-
low-up, Dr. deFilippi reported.

Records on follow-up cTnT levels, measured 2-3 years after baseline in 86% of the study participants, showed that among those with a detectable cTnT level at baseline, nearly two-thirds stayed at about the same level, 22% in-
creased by more than 50%, and 14% de-
creased by more than 50%.

The high increasers had their subse-
quent heart failure and cardiovascular death rates rise by about 50% compared with people with more moderate changes.

In contrast, among those whose lev-
els fell by more than 50% during follow-
up subsequent event rates dropped by about 25% compared with those with less change in their cTnT level.

Other Studies Using High-Sensitivity Test Support cTnT’s Risk-Marker Role

CHICAGO – In addition to the re-
port by Dr. deFilippi, three other re-
search groups recently reported finding
significant links between elevated serum levels of cardiac troponin T and an increased risk for cardiovascu-
lar events:

► Researchers measured cardiac tro-
ponin T (cTnT) using a high-sensi-
tivity assay in 10,820 Americans aged 53-75 without prevalent cardio-
vascular disease enrolled in the Ath-
erosclerosis Risk in Communities (ARIC) study. In these people, with an average age of 63 years, 61% had a detectable level of serum cTnT at baseline using the high-sensitivity test. During an average follow-up of 10 years, Researchers found a signifi-
cant link between detectable levels at baseline and death and hospital-
ization for heart failure during follow-
up, Dr. Justin T. Saunders from Baylor College of Medicine in Hous-
ton reported at the scientific ses-
sions.

► In a second, independent study, researchers measured serum cTnT with the high-sensitivity assay in women enrolled in the Women’s Health Study. The current analysis focused on 512 women with dia-
betes at the time of their serum sampling and 564 women without diabetes. Among the women with diabetes, detectable levels of cTnT existed in 56% of those who had cardiovascular disease events during follow-up and in 42% of the women who did not later have an event, a statistically significant difference. The event that seemed most respon-
sible for this difference was cardio-
vascular disease death. Among the women without diabetes, detectable levels of cTnT appeared to have no significant relationship to subse-
quent cardiovascular disease events.

Detectable cTnT appeared in 34% of the women with a subsequent event and in 30% of those without a later event, Dr. Brendan M. Everett from Brigham and Women’s Hospital in Boston reported at the scientific ses-
sions.

► In the third study, researchers ran high-sensitivity cTnT measures on 3,346 people aged 30-65 enrolled in the Dallas Heart Study. They found detectable levels in 25% of the par-
ticipants. The prevalence of de-
tectable levels depended on age and gender. People younger than 40 had a prevalence rate of 14% compared with a prevalence of 58% in people aged 65 or older. Men had a preva-
ience rate of 37%, compared with a rate of 33% in women. During a median follow-up of 6.4 years, in an analysis that adjusted for a series of baseline variables and risk factors, people in the highest quintile for serum cTnT level had a statistically significant, greater than fourfold in-
creased risk for both all-cause death and cardiovascular death, said Dr. James A. de Lemos, from the Uni-
versity of Texas Southwestern Med-
ical Center, and his associates in a report published in the Dec. 8, 2010, issue of JAMA (2010;304:2503-
12).

Dr. Saunders had no disclosures. Dr. Everett said he had received re-
search grants from Roche Diagnos-
ics.

Dr. de Lemos said that he has re-
ceived research grants from Roche Diagnostics and Biosite, and consult-
ing fees, lecture honoraria, or both from Tethys Biomedical, Johnson & Johnson, Roche Diagnostics, Biosite/Inverness, Siemens, As-
traZeneca, Pfizer, Bristol Myers Squibb/Sanofi Aventis, and Merck.

–Mitchel L. Zoler