

# Elevated Troponin a Red Flag in Heart Failure

*High serum levels of the protein can identify patients as high risk, data from the ADHERE registry show.*

BY SHERRY BOSCHERT  
San Francisco Bureau

SAN FRANCISCO — Patients seen in the emergency department for acute decompensated heart failure fared much worse if they had elevated serum troponin, W. Frank Peacock IV, M.D., said in a poster at the annual meeting of the American College of Emergency Physicians.

The results should have a profound impact on controversy about the clinical implications of elevating troponin in patients with heart failure, several speakers said at the meeting.

The analysis of data on 67,924 patients in the Acute Decompensated Heart Failure National Registry (ADHERE) showed that 6% had elevated troponin levels, and the rest were considered troponin negative. Patients with elevated serum troponin were more likely than troponin-negative patients to develop systolic heart failure (61% vs. 51%) or undergo coronary artery bypass grafting (4% vs. 1%), intra-aortic balloon counterpulsation (3% vs. less than 1%), mechanical ventilation (11% vs. 4%), or cardioversion (3% vs. 2%), said Dr. Peacock of the Cleveland Clinic and his associates.

Patients with acute decompensated heart failure and elevated serum troponin also had longer hospitalizations (median 5.1 vs. 4.1 days) and longer ICU stays (a median of 2.9 vs. 2.3 days) and were more likely to die in the hospital (8% vs. 3%) compared with troponin-negative patients.

The study defined elevated serum troponin as a level of at least 1 ng/ml for troponin I or at least 0.1 ng/ml for troponin T.

Patients with levels below those cutoffs were considered troponin-negative.

"This [study] is important, because cardiologists everywhere—particularly our heart failure cardiologists—tend to poo-hoo troponin leaks," said Judd E. Hollander, M.D., professor of emergency medicine at the University of Pennsylvania, Philadelphia.

Elevated troponin in heart failure does

as such," said Charles V. Pollack, Jr., M.D., chair of emergency medicine at the University of Pennsylvania.

Troponin is a structural protein, and elevated levels are produced by cell death, noted Brian J. O'Neil, M.D., of Wayne State University, Detroit. "These are not 'leaks,'" he said.

In a separate interview, cardiologist Christopher P. Cannon, M.D., agreed that some of his colleagues have been misled by the common use of elevated troponin levels as a marker for acute coronary syndrome. When catheterizations found no

Previous studies have shown that troponin is a biomarker for myocardial injury. In earlier studies of patients hospitalized for heart failure, troponin elevations have been associated with lower ejection fractions, worse functional status, repeat hospitalizations for heart failure, and death. Studies on the clinical implications of troponin in heart failure are few, however, and have been plagued by methodological problems.

Although speakers at the meeting lauded the current study for the number and breadth of patients in the database, Jerome R. Hoffman, M.D., pointed out one major limitation: possible incorporation bias. Higher rates of procedures and longer hospitalizations may be due to physicians' reactions.

"When somebody tells you a patient has a high troponin level, you might keep them in the hospital or ICU a little longer. It may be a self-fulfilling prophecy" and not necessarily an appropriate step, said Dr. Hoffman of the University of California, Los Angeles.

Sorin J. Brener, M.D., called the study "important and well executed" but agreed with Dr. Hoffman's criticism. A multivariate logistic regression analysis controlling for the differences between patients in the two troponin groups would be necessary to isolate the independent effect of elevated troponin on outcomes, he said in a separate interview.

"Elevated troponin levels are indeed a marker of adverse prognosis and cannot be ignored. Unfortunately, more often than not there is no specific intervention tailored to this finding in patients with decompensated heart failure that one would not apply in patients without elevated troponin," said Dr. Brener, director of the angiography core laboratory at the Cleveland Clinic. ■

## Adverse Outcomes Tied to Elevated Troponin in Heart Failure

Adverse event	Troponin-positive group	Troponin-negative group
In-hospital mortality	8%	3%
CABG	4%	1%
Intraaortic balloon counterpulsation	3%	1%
Cardiac catheterization	24%	10%
Mechanical ventilation	11%	4%
Cardioversion	3%	2%
Time in ICU/CCU	2.9 days	2.3 days
Length of hospitalization	5.1 days	4.1 days

Note: Based on ADHERE data on 4,240 troponin-positive and 63,684 troponin-negative patients with decompensated heart failure.

Source: Dr. Peacock

not necessarily indicate underlying coronary disease, he said. "What this doesn't tell us is whether there's something we can fix in the hospital to decrease that mortality" associated with elevated troponin, he added.

Particularly in older patients, elevated troponin has been a marker for sick patients in studies of sepsis, shock, chest pain, or congestive heart failure. "It's a worrisome marker and should be treated

arterial blockage in some patients with elevated troponin, the marker gained a reputation for false positives.

"We've learned that there are other things that cause elevations in troponin. We're all learning how to use this in these other patient groups. People are realizing it's a good marker of high-risk patients independent of whether the arteries have blockages or not," said Dr. Cannon of Brigham and Women's Hospital, Boston.

# Social Factors Predict Onset of Depression in Heart Failure

BY BRUCE JANCIN  
Denver Bureau

NEW ORLEANS — A brief checklist of social and health factors predicts onset of depressive symptoms in heart failure patients, Edward P. Havranek, M.D., said at the annual scientific sessions of the American Heart Association.

The four-item checklist consists of living alone, alcohol abuse, poor health status as measured by the Kansas City Cardiomyopathy Questionnaire (KCCQ), and the patient's perception that his or her medical care poses a substantial economic burden. A heart failure patient's risk of developing depression within 1 year rises in stepwise fashion as the number of applicable risk factors increases (see box), said Dr. Havranek of Denver Health Medical Center.

The checklist was developed as part of a multicenter prospective cohort study involving 245 outpatients with heart failure (HF) and a left ventricular ejection fraction less than 40% who were free of depression at baseline. During 1 year of follow-up, 21.5% of patients developed clinically sig-

nificant symptoms of depression as defined by a score above 0.06 on the widely used Medical Outcomes Study Depression Scale.

Multivariate analysis identified four independent predictors of onset of depression in this HF population. Alcohol abuse was associated with a 3-fold elevated risk, living alone conferred a 2.8-fold risk, and medical care being seen by the patient as a substantial economic burden carried a 2.9-fold increased risk. In addition, the risk of depression rose by 22% for each 10-point decrement on the KCCQ (J. Am. Coll. Cardiol. 2004;44:2333-8).

The KCCQ is a self-administered 23-item multiple-choice instrument that investigates the impact of HF on daily life. For example, the KCCQ asks patients how much swelling in their feet, ankles, or legs has bothered them in the last 2 weeks, how many times during that period they have been forced by shortness of breath to sleep sitting in a chair propped up by at least three pillows, and how much HF has limited their enjoyment of life during the last 2 weeks.

The range of possible scores on the KCCQ is 0-100. Higher scores indicate

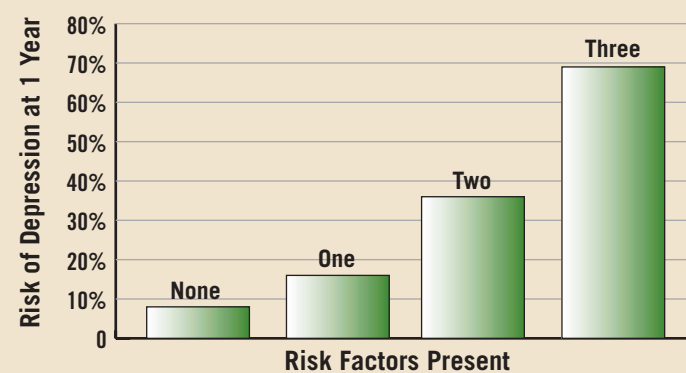
less disease impact. Study participants with a baseline score greater than 75 had a 13% incidence of depression onset within 1 year. The incidence of depression rose to 20% among those with a baseline score of 51-75, 42% in those who scored 26-50, and 44% with a score of 25 or less.

The impetus for developing a tool for predicting onset of depression stems from prior studies that established depression in patients with HF is quite common and is associated in this population with decline in health status, more frequent hospitalization, and increased mortality.

"Routine screening of high-risk patients with

heart failure followed by psychosocial intervention to reduce the incidence of depression is a strategy that deserves study," Dr. Havranek said. "This would be consistent with the Institute of Medicine position that one of the changes necessary for American health care is for the system to anticipate patient needs rather than simply to react to events." ■

## Depression Incidence Climbs With Risk Factors



Source: Dr. Havranek