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 in a session discussing cutting-edge research in emergency medicine 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%), intraaortic 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 poohpooh troponin leaks," said Judd E. Hollander, M.D., professor of emergency medicine at the University of Pennsylvania, Philadelphia.

Elevated troponin in heart failure does not necessarily indicate underlying coronary disease, he said. "It's not something that cardiologists can fix in the cath lab—and that's what cardiologists look for. 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.

Charles V. Pollack Jr., M.D., agreed: "Our colleagues in cardiology tend to talk about benign troponin leaks. We've got to be careful about that." 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 as such," said Dr. Pollack, 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 blockages or not," said Dr. Cannon of Brigham and Women's Hospital, Boston.

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 methodologic problems.

Although speakers at the emergency medicine 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.

Cardiologist 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

Abnormal Diastolic Sounds May Help Diagnose Heart Failure

BY SHERRY BOSCHERT
San Francisco Bureau

SAN FRANCISCO — Patients with decompensated heart failure were three times more likely than patients without heart failure to have S3 or S4 heart sounds detected by sensors in a study of 135 patients seen in emergency departments, Sean P. Collins, M.D., reported.

The sensor device, which attaches to an ECG machine, may allow quicker diagnosis and treatment.

DR. COLLINS

The add-on sensor device, which attaches to an ECG machine to analyze heart sounds, may allow quicker diagnosis and treatment of patients with heart failure, Dr. Collins said at the annual meeting of the American College of Emergency Physicians.

The abnormal diastolic heart sounds S3 and S4 indicate elevated ventricular filling pressures and suggest that the heart's ability to squeeze out blood is impaired.

Previous studies have shown that the Audicor sensor system detects more of the hard-to-hear S3 and S4 sounds than can be heard by cardiologists, said Dr. Collins of the University of Cincinnati. Inovise Medical Inc., which makes the Audicor system, funded the current study.

The prospective study of patients with signs and symptoms of decompensated heart failure compared the heart sounds detected by the Audicor system in patients with a primary or secondary diagnosis of heart failure or a non–heart failure diagnosis. The diagnosis was based on the attending physician's discharge summary, not on the Audicor data.

Of 46 patients with a primary diagnosis of heart failure, 19 (41%) had an S3 sound, and 8 (17%) had an S4 sound. Those rates were triple the prevalences seen in 68 patients with non–heart failure diagnoses, 9 (13%) of whom had an S3, and 4 (6%) of whom had an S4. Among 21 patients with a secondary diagnosis of heart failure, 6 (29%) had an S3 and 4 (19%) had an S4, Dr. Collins said. (See table.)

In general, about 80% of people with heart failure come through emergency departments, but 10%-20% are misdiagnosed. To have results from an ECG plus Audicor at the patient's bedside "would allow me to immediately treat them and not wait for other tests to come back" if the printout reports an S3 or S4, he added.

The Food and Drug Administration–approved Audicor system costs approximately $6,000, plus $40 per patient for the leads, Dr. Collins said.

Andy Jagoda, M.D., who moderated the press briefing on the research findings, praised the study and said the Audicor system has "a lot of potential." With approximately 800,000 patients per year seen in emergency departments for heart failure, anything to improve diagnostic accuracy would be welcomed, said Dr. Jagoda, professor of emergency medicine at Mount Sinai School of Medicine, New York. ■

S3, S4 Sounds Three Times More Common in Primary HF Patients

Heart Sound	Primary Heart Failure (n = 46)	Secondary Heart Failure (n = 21)	No Heart Failure (n = 68)
S3	41%	29%	13%
S4	17%	19%	6%
Neither	41%	52%	81%

Note: Totals may not equal 100% because of rounding.
Source: Dr. Collins

KEVIN FOLEY, RESEARCH