

# Cystatin C May Predict Mortality in Inpatients

BY PATRICE WENDLING

CHICAGO — As in outpatients, cystatin C levels appear to offer additional prognostic information in patients admitted with heart failure exacerbations, according to an analysis of 240 consecutive inpatients.

Although there was no significant association between the serum protein levels on admission and the study's primary end point of length of hospitalization, cystatin C was more predictive of all-cause mortality and the combined end point of readmission or death than was creatinine, Dr. Daniel J. Brotman and his colleagues reported in a poster at the annual meeting of the Society of Hospital Medicine.

Patients in the highest quartile of cystatin C (mean 2.44 mg/L) were at significantly increased risk of death (hazard ratio 2.07) and of readmission or death (HR 1.61) during the first year after admission, compared with those in the lower three cystatin C quartiles (mean 0.66-1.43 mg/L).

The association between cystatin C and the risk of readmission or death remained significant on multivariate analysis after adjustment for age, race, gender, and creatinine level (HR 1.65), according to Dr. Brotman, director of the hospitalists program at Johns Hopkins Hospital in Baltimore. The relationship also remained significant when ejection fraction was included in the model.



Cystatin C level has been shown to be a stronger predictor of the risk of death and cardiovascular events in elderly patients, compared with creatinine level (N. Engl. J. Med. 2005;352:2049-60). Accumulating evidence also supports its use as an alternative and more sensitive endogenous marker, compared with serum creatinine, for the estimation of glomerular filtration rate.

In the current analysis, there was a trend toward increased risk of readmission or death (HR 1.44) for patients in the top quartile of creatinine (mean 2.0 mg/dL), compared with those in the lower three creatinine quartiles (1.0-1.3 mg/dL), but this difference did not reach statistical significance.

The combination of cystatin C and creatinine, however, was significantly more predictive of the combined end point of readmission or death than was either variable alone (HR 1.81).

"We are looking into whether serial changes in this biomarker during the course of hospitalization will have any potential clinical utility," Dr. Brotman said in an interview. Clinical application is currently limited, as most labs do not routinely test for cystatin C.

Dr. Brotman disclosed receiving research funding from Siemens Healthcare Diagnostics Inc., serving on the hospitalist leadership panel for Quantia Communications LLC, and being on the advisory boards of several pharmaceutical companies. ■

**The combination of cystatin C and creatinine was more predictive of readmission or death than was either one alone.**

DR. BROTMAN

# Simple Algorithm Proposed For Pulmonary Hypertension

BY DOUG BRUNK

SAN DIEGO — Combining an electrocardiogram with serum N-terminal pro-B-type natriuretic peptide measurements is a simple, non-invasive way to diagnose pulmonary hypertension, results from an Austrian study suggest.

"Current pulmonary hypertension diagnosis guidelines say that ECG alone is not useful in the diagnosis of pulmonary hypertension. This is true," Dr. Diana Bonderman said in an interview during a poster session at an international conference of the American Thoracic Society. "But if you combine ECG with NT-proBNP [N-terminal pro-B-type natriuretic peptide], it's going to be useful."

The finding is important, she said, because the growing awareness of pulmonary hypertension PH, a high prevalence of postcapillary PH, and the inability to discern between pre- and postcapillary PH by transthoracic echocardiography (TTE) "have led to unnecessary right heart catheterizations."

She and her associates prospectively analyzed data from 121 patients referred to the Medical University of Vienna between April 2007 and October 2008 for clinical and transthoracic echocardiographic suspicion of precapillary pulmonary hypertension (defined as having a systolic pulmonary artery pressure of at least 36 mm Hg). On admission, all patients underwent TTE, serum analysis including NT-

proBNP, a 6-minute walk test, and blood gas analysis.

The patients were then assigned to one of two predicted diagnostic groups: precapillary PH (defined as right ventricular strain on ECG and/or serum NT-proBNP of greater than 80 pg/mL) or no precapillary PH (defined as no right ventricular strain on ECG and NT-proBNP of 80 pg/mL or less). Next, all patients underwent invasive hemodynamic measurements by right heart catheterization, and a final diagnosis was established.

The mean age of the patients was 62 years and 59% were female, reported Dr. Bonderman, a cardiologist at the Medical University of Vienna.

By right heart catheterization, 64 (53%) patients were diagnosed with precapillary PH. Precapillary PH was ruled out in 57 (47%) patients. By the diagnostic algorithm, 15 patients (12%) had been correctly allocated to the group without precapillary PH (true negatives). None of the allocations was a false negative.

"In the diagnostic pathway of PH, integration of the proposed algorithm subsequent to TTE may increase specificity from 0% to 19.3%, with a sensitivity of 100%," the researchers wrote. "The incorporation of ECG and NT-proBNP into the workup of PH provides incremental diagnostic value and may significantly reduce the number of invasive assessments."

The researchers had no conflicts to disclose. ■

# Score Predicts Delayed Cardiac Events in Geriatric Syncope

BY BRUCE JANCIN

NEW ORLEANS — A simple predictive instrument may improve emergency department disposition decisions regarding asymptomatic elderly patients who present with syncope.

The Syncope Risk Score defines a 10-fold gradient in the risk of delayed cardiac events among elderly ED patients with syncope, Dr. Benjamin Sun said at the annual meeting of the Society for Academic Emergency Medicine.

Patients whose score puts them in the low- or intermediate-risk categories may be reasonable candidates for discharge or a rapid ED observation unit. In contrast, those whose Syncope Risk Score places them in the high-risk group, with a 20% risk of a cardiac event during the next 30 days, probably should be admitted to the hospital, according to Dr. Sun of the University of California, Los Angeles.

The score relies upon one negative and six positive risk factors. All seven elements are readily obtainable in the first hour of an ED evaluation. A patient is as-

Syncope risk score category	Percent of patient population	30-day risk of cardiovascular events
Low (-1 or 0)	31%	2.5%
Intermediate (1-2)	58%	6.3%
High (3-6)	11%	20.0%

Source: Dr. Sun

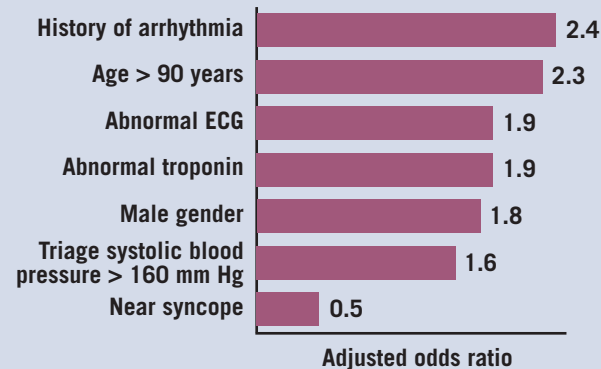
signed 1 point for each of the six factors conferring increased risk of delayed cardiac events, and minus 1 point for near syncope (see charts). The points are added up. A total score of 3-6 signifies high risk, 1-2 is intermediate, and 0 or -1 indicates low risk.

Dr. Sun developed the Syncope Risk Score through a retrospective cohort study of 2,871 asymptomatic geriatric patients, mean age 77 years, who visited any of three Southern California Kaiser Permanente EDs because of syncope and who did not have a serious underly-

ing condition identified during their ED evaluation.

During the next 30 days, 170 patients experienced acute myocardial infarction, arrhythmia, coronary revascularization, or another delayed cardiac event. The seven independent predictors of these adverse outcomes that make up the Syncope Risk Score were derived via a multivariate logistic regression analysis that included more than 50 variables extracted from patients' medical charts.

## Independent Predictors of Delayed Cardiac Events in Elderly Syncope



The Syncope Risk Score is an attractively simple, quick tool, but before it is ready for prime-time clinical use in EDs it must be validated in an independent prospective study, Dr. Sun noted.

His development of the score was supported by the National Institutes of Health and the American Geriatrics Society. ■