(65.4% vs 95.7%; $P < .01$). Mortality for patients treated with hypothermia was 52.7% compared with 68.2% for no hypothermia ($P = .04$). There was a trend for neurologic benefit among patients treated with hypothermia: 40% in this group had a cerebral performance category scale of 1 or 2, compared with 28.9% not treated with hypothermia ($P = .05$). Establishment of an IABP had no effect on mortality ($P = .6$), which was 70.0% in those with and 63.6% in those without an IABP established.

Copeptin May Be Useful in Quickly Ruling Out NSTEMI in Some Patients

Written by Maria Vinall

Acute myocardial infarction (AMI) carries a high risk of death, but diagnosis in patients with a pacemaker or a left bundle branch block (LBBB) is difficult through an electrocardiogram alone. While cardiac troponin (cTn) is essential in the diagnosis of AMI, it is possible that other biomarkers may improve diagnosis in patients who present early or may have other causes of troponin elevation [Klimczak A et al. *Cardiol J.* 2007]. Francisco Javier Martin-Sanchez, MD, Hospital Clínico San Carlos, Madrid, Spain, presented results of a study indicating that copeptin may be a useful biomarker to rule out NSTEMI among patients who present to the emergency department (ED) with acute chest pain but have a pacemaker and a normal troponin value at baseline.

The definition of myocardial infarction based on specific cTns has been universally accepted since 2007. A recent meta-analysis of 14 studies that assessed the incremental value of copeptin for rapid rule-out of AMI suggests that copeptin levels can identify patients at risk of all-cause mortality and that, when added to troponin, it improves the sensitivity and negative likelihood ratio for diagnosis of AMI when compared with troponin alone [Lipinski MJ et al. *Am J Cardiol.* 2014].

The multicenter cohort-based COPeptin in ED [COPED] was an observational longitudinal study designed to evaluate the usefulness of copeptin in ruling out NSTEMI in patients who present to the ED with nontraumatic chest pain suspected to be related to myocardial ischemia. Prof Martin-Sanchez provided results of a retrospective subanalysis from COPED that sought to assess the predictive capacity of copeptin to rule out NSTEMI in ED adult patients with acute ischemic chest pain and previous history of pacemaker or LBBB on an electrocardiogram. Patients were excluded if they arrived at the ED ≥ 12 hours after pain onset, had troponin levels first determined to be positive, or had STEMI and noncoronary chest pain according to the current European Society of Cardiology guidelines. Copeptin was determined in all patients upon arrival at the ED. The cutoff for a positive result was ≥ 14 pmol/L. The primary study outcome was diagnosis of NSTEMI by an emergency physician blinded to copeptin value.

Of the 2292 patients in COPED, 119 were eligible for the present study (81 with LBBB; 38 with pacemaker). More than 50% of the patients were men; most were aged ≥ 74 years. More than 80% were hypertensive; > 50% had a diagnosis of dyslipidemia. The time of the current episode ranged from 90 minutes in the pacemaker group to 120 minutes in those with LBBB. Fourteen patients (3 in the pacemaker group; 11 in the group with LBBB) were diagnosed as having NSTEMI. Of these, 11 (78.6%) were copeptin positive at baseline.

The capacity of copeptin to rule out NSTEMI was lower in patients with LBBB than in those with a pacemaker. Using a copeptin cutoff level ≥ 25 pmol/L (vs ≥ 14 pmol/L) improved the specificity, negative predictive value, and negative likelihood ratio.

While these data suggest that copeptin may play a role in excluding AMI in patients who present early after symptom onset (< 12 hours), the results will require further confirmation in setting of emerging higher-sensitivity troponin assays. In addition, the exploratory cut point of 25 pmol/L will require verification in other data sets.

Precipitants of ADHF Affect 90-Day Outcome

Written by Phil Vinall

Patients with acute decompensated heart failure (ADHF) are frequently treated in the emergency department (ED) prior to being admitted to the hospital. Òscar Miró, MD, Hospital Clínic, Barcelona, Catalonia, Spain, reported data from the PAPRICA-2 study showing that, in almost 75% of these patients, it is possible to identify ≥ 1 precipitant of the decompensation, and these factors can be used to predict mortality risk and the probability of ED readmission.

PAPRICA-2 was a retrospective study based on data from the Epidemiology of Acute Heart Failure in the Emergency Departments Registry. The study included 3535 patients (mean age, 80 years; about 58% were women) with ADHF treated in the ED and listed in the registry during 2007, 2009, and 2011 for whom a precipitating event was recorded and an outcome was available. The study end points were 90-day all-cause death and 90-day ED reconsultation for ADHF.

Table 1. Precipitating Factors Identified in PAPRICA-2

Precipitant	Definition	Patients, No. (%)
Infection	Fever or infection requiring antibiotics	1369 (39)
Rapid atrial fibrillation	HR > 120 bpm	636 (18)
Anemia	Hemoglobin < 100 g/L	263 (7)
Hypertensive emergency	SBP > 160 mmHg requiring treatment	255 (7)
Dietetic-therapeutic transgression	Attending physician criteria	167 (5)
ACS without ST elevation	If concurrent with ADHF episode	112 (3)

ACS, acute coronary syndrome; ADHF, acute decompensated heart failure; bpm, beats per minute; HR, heart rate; SBP, systolic blood pressure.

Most patients were NYHA functional class I or II at baseline. About 78% of all patients included in the study were admitted to the hospital. At least 1 precipitating factor was identified for 72% of patients (2562 of 3535). Multiple factors were identified in 6% (228 of 3535) of patients. Infection was the most common precipitant, followed by rapid atrial fibrillation (HR > 120 beats per minute; Table 1).

Overall 90-day mortality among the study participants was 12%. The overall rate of 90-day ED reconsultation for ADHF was 43%. Non–ST elevation acute coronary syndrome (NSTE-ACS) was associated with significantly higher 90-day mortality ($P < .001$). Infection was associated with a significant lower probability of 90-day ED readmission ($P < .01$), whereas rapid AF as a precipitant of ADHF was associated with a significantly lower probability of 90-day ED readmission and death. Anemia, hypertensive emergency, and dietetic therapeutic transgression had no significant association with 90-day outcomes.

Current CDVs for cTn Produce Misdiagnosis of AMI

Written by Phil Vinall

According to Karin Susanne Wildi, MD, Basel, Switzerland, about 20% of patients presenting to the emergency department (ED) with acute myocardial infarction (AMI) receive an inconsistent diagnosis when using the approved clinical decision values (CDVs) for cardiac troponin (cTn).

Of the 10% of ED patients with symptoms suggestive of AMI, only 10% to 20% are diagnosed with AMI. Misdiagnosis of AMI may significantly harm patients and may result from inappropriate CDVs for cTn because of limitations in the current regulatory process. Manufacturers are asked to establish the 99th percentile for cTn in a healthy reference population. Because there is a lack of consensus regarding the term "healthy," and the effects of age and gender have not been determined, the current regulatory process is under scrutiny.

Dr Wildi presented the results of a study designed to quantify inconsistencies in the diagnosis of AMI related to limitations in the definition of CDVs for high-sensitivity cTn assays (cardiac troponin T, hs-cTnT; and troponin I, hs-cTnI). This was a prospective international multicenter study of 2300 consecutive patients presenting to the ED with suspected AMI. All patients had a routine clinical assessment and cTn measurement performed at presentation; cTn was measured serially as long as clinically indicated. Final diagnosis was adjudicated over by 2 independent cardiologists.

AMI was the adjudicated diagnosis in 473 of 2300 (21%) patients. Among these, 86 patients (18.2%) had inconsistent diagnoses using the approved uniform CDV. Nearly all of these inconsistencies were related to underdiagnosis of AMI with hs-cTnI. Using gender-specific CDVs, 14.1% of female and 22.7% of male patients with AMI had inconsistent diagnoses, again nearly all of them related to underdiagnosis of AMI with hs-cTnI. Use of biologically equivalent CDVs, calculated by regression analysis, reduced inconsistencies to 10% ($P < .001$).

These findings were confirmed with parallel measurements of other hs-cTn assays. The incidence of inconsistencies was only 7.0% for assays with CDVs that were nearly biologically equivalent. Dr Wildi concluded that currently approved CDVs are not biologically equivalent and contribute to major inconsistencies in the diagnosis of AMI. One of 5 AMI patients will receive a diagnosis other than AMI if managed with the alternative hs-cTn assay.