Assay Predicted Recurrent Pulmonary Embolism

Highly sensitive troponin T assay may add stratification value in normotensive patients.

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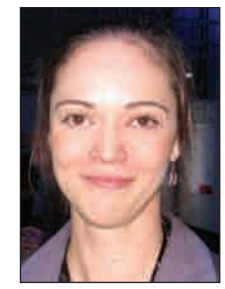
STOCKHOLM – New-generation, highly sensitive troponin T assays provide added value in the form of improved early risk stratification of normotensive patients who have acute pulmonary embolism, according to the results of a prospective head-to-head study.

"I think the most important finding of this study is that with this new high sensitivity troponin T assay, we could safely identify those patients who have a low 30-day risk of adverse events, with a sensitivity of 100% and also a negative predictive value of 100%," Dr. Mareike Lankeit said at the congress.



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DR. LANKEIT

In contrast, the conventional troponin T assay had a negative predictive value of only 50%. It would have missed half of the patients who experienced an adverse event (defined as death, endotracheal intubation, need for catecholamines, or cardiopulmonary resuscitation).

Moreover, of the three biomarkers that were studied, including N-terminal prohormone brain natriuretic peptide, only baseline highly sensitive troponin T (hsTnT) was a significant predictor of mortality risk during long-term prospective follow-up of nearly 3 years, added Dr. Lankeit of Georg-August University Göttingen (Germany).

Recent guidelines emphasize the need for early risk stratification of patients with acute pulmonary embolism. Consensus exists that patients who present with refractory hypotension or shock are at very high risk of early mortality and should undergo urgent recanalization.

Strategies for non–high-risk patients (that is, those who are normotensive on admission) remain controversial.

Dr. Lankeit's hypothesis was that the use of more-sensitive laboratory biomarkers in the emergency department would result in improved prognostic assessment of these normotensive patients with acute pulmonary embolism.

Patients who were identified in this way as low risk might be possible candidates for home treatment.

She presented a prospective study of 156 consecutive normotensive patients with confirmed acute pulmonary embolism in which she compared the prognostic value of baseline hsTnT, conventional TnT, and NT-proBNP testing.

An hsTnT cutoff value of 14 pg/mL, which 64% of patients met or exceeded, had a 100% prognostic sensitivity and negative predictive value for 30-day adverse outcomes. The NT-proBNP assay performed equally well, but the conventional TnT assay, using the cutoff value of 0.03 ng/mL, would have misclassified 50% of patients with an adverse early outcome as being at low risk.

Dr. Lankeit and her associates found that an elevated baseline hsTnT alone was associated with a twofold increased risk of adverse 30-day outcomes.

An elevated NT-proBNP was associated with a 2.3-fold risk. But when an hsTnT of at least 14 pg/mL was associated with evidence of right ventricular dysfunction on echocardiography, the 30-day adverse outcome risk was increased to 11.9-fold.

The prognostic power of echocardiographic evidence of right ventricular dysfunction plus an NT-proBNP of at least 1,000 pg/mL was even more impressive, with an associated 17.8-fold increased risk of an adverse 30-day outcome.

In contrast, the conventional TnT assay didn't provide additive prognostic information when it was combined with evidence of right ventricular dysfunction.

During a median follow-up of close to 3 years, 14.4% of patients died. The only baseline variables that were significantly associated with increased long-term mortality risk were an elevated hsTnT, malignancy, and heart failure. Thus, a baseline hsTnT of 14 pg/mL or greater identifies a subgroup of patients with acute pulmonary embolism who warrant closer long-term follow-up, according to Dr. Lankeit.

She said that in her hospital, where hsTnT is now part of the routine diagnostic laboratory panel that is administered in the emergency department to patients presenting with acute pulmonary embolism, the hsTnT results come back within 30 minutes.

Several of Dr. Lankeit's coinvestigators have received research funding and honoraria for lectures from Roche Diagnostics, which markets the hsTnT assay. Dr. Lankeit declared that she has no financial conflicts. ■