冠動脈石灰化スコアは中等度リスクの患者を再分類するのに役立つ

Heinz Nixdorf Recall Study：冠動脈石灰化は伝統的なリスクファクターよりも心血管疾患の予知因子して優れている

Heinz Nixdorf Recall Study: Coronary artery calcium better predictor of cardiovascular disease than classic risk factors

冠動脈石灰化（CAC）スコアは標準的な心血管リスクファクター（米国コレステロール教育プログラム[NCEP]の定めた）よりも、中等度リスクの患者のうち誰が心筋梗塞（MI）を起こしやすいかまたは心疾患にて死亡しやすいかの予知因子として優れている、と2009年第58回American College of Cardiology学会で発表された。CACスコアが最も高い4分の1に入る者と最も低い4分の1に入る者を比較すると、心疾患イベントの相対リスクは女性で3.16（p=0.009）であり、男性で11.09（p<0.0001）であった。受信者動作特性曲線（ROCカーブ）を作成し、この曲線の下部領域（AUC）により検査の臨床イベント予知能が計測できた（スコア1.0が最も望ましい）。NECPリスク分類およびCACスコアのAUCはそれぞれ0.667および0.740であり、NECPリスク分類とCACスコアを組み合わせるとAUCは0.754であった。NECPリスク分類とCACスコアの両者を含めた他の解析では、NECPリスクの最も高い者を最も低い者と比較するとMIまたは心臓死のオッズは3.19であった（p<0.0001）。CACスコアのリスク層別能はそれよりも優れ、冠動脈石灰化スコアが最も高い4分の1の者は最も低い4分の1の者と比較しオッズ比が4.26であった。

Full Text

Coronary calcium scoring can help predict who is likely to have a myocardial infarction or die of cardiac disease, according to a late breaking clinical trial presented at the American College of Cardiology's 58th Annual Scientific Session.

To assess a patient's risk for cardiovascular disease, most doctors rely on classical risk factors such as cholesterol levels, blood pressure, family history, age, sex, and diabetes. The Heinz Nixdorf Risk Factors Evaluation of Coronary Calcium and Lifestyle (Heinz Nixdorf Recall) study found that the coronary artery calcium score was a better predictor of cardiovascular disease than classic risk factors at predicting risk over five years. When the two sets of information were added together, predictive strength was better still. The findings were drawn from an observational study in a general population, roughly half of whom were women.

"Our results demonstrate that prediction of coronary events can be improved when calcium scoring is performed, especially in persons in the intermediate-risk category," said Raimund Erbel, M.D., director of cardiology at University Clinic Essen, University Duisburg - Essen, Germany. "This means that persons at intermediate risk with a high coronary calcium score should be recommended intensive lifestyle changes and maybe risk-modifying medication, while persons at intermediate risk with a low coronary calcium score have a more favorable prognosis."

Coronary calcium levels are detectable long before other symptoms of coronary disease. The total coronary calcium burden is considered a measure of the extent of atherosclerotic disease. In addition, it is currently believed that a large amount of coronary calcium indicates a high likelihood of rupture-prone plaque somewhere in the coronary arteries. This may explain the link between the coronary calcium score and increased rates of cardiac events.

For the study, Dr. Erbel and colleagues recruited 4,487 randomly selected subjects without known coronary disease. Study participants ranged in age from 45 to 75 years, and 52 percent were women. Patients were placed into risk categories on the basis of standard cardiovascular risk factors, as defined by the National Cholesterol Education Program (NCEP). Electron-beam CT was used to measure the coronary calcium score.

Of the 4,137 study participants with complete follow-up data, 93 suffered cardiac death or nonfatal heart attack, including 28 women. When coronary calcium scores in the highest one- fourth were compared to those in the lowest one-fourth, the relative risk of a cardiac event was 3.16 (p = 0.009) for women and 11.09 (p<0.0001) for men.

Researchers then developed receiver operating characteristic (ROC) curves, in which true- positive and false-positive results are calculated and plotted in relation to each other. The area under the curve (AUC) measures the ability of a test to predict a clinical event, with a score of 1.0 being ideal. The area under the curve for the NCEP risk categories was 0.667, while the AUC for coronary calcium scoring was 0.740, and the AUC for a combination of NCEP risk categories and coronary calcium scoring was 0.754. In another analysis that included both NCEP risk categories and coronary calcium score, the odds of a heart attack or cardiac death among study participants in the highest NCEP risk category, as compared to the odds in the lowest risk category, was 3.19 (p<0.0001). Coronary calcium scoring did an even better job differentiating risk, with an odds ratio of 4.26 when the highest one-quarter of coronary calcium scores was compared to the lowest (p<0.0001).

"Calcium scoring has now been validated and reached a place in preventive cardiology," Dr. Erbel said.

The research team plans to follow-up on patients for the next five years so they can analyze the 10-year risk prediction capability of coronary calcium scoring and other factors.