The next stage of heart function testing

11 October 2011

A new non-invasive technique for measuring how well the heart and blood vessels function in patients already suffering from coronary artery disease could, in a single test, identify which abnormally narrowed blood vessels are the most likely to lead to further cardiovascular complications. According to Dr. Aaron So, at Lawson Health Research Institute and Robarts Research Institute in London, Canada, and colleagues, their technique could reveal functional problems in the circulatory system below the limit of detection of the currently most sensitive method, invasive angiography (or blood vessel x-ray). The work is published online in Springer's journal *European Radiology*.

Dr. So and colleagues developed a quantitative non-invasive method - Dynamic Contrast-Enhanced CT (DCE-CT) with quantitative CT perfusion analysis - to assess the functional relevance of coronary artery stenosis, or abnormal narrowing of blood vessels i.e. which are the most likely to cause problems for patients in the future. Coronary stenoses that limit blood flow during exercise or drug-induced vasodilation diminish the amount of blood available to the cardiovascular system and are therefore likely to lead to significant coronary lesions.

A total of twenty-six 53- to 71-year-old patients with existing coronary artery disease took part in the study. The researchers assessed the degree of stenosis in their coronary arteries and classified them into one of four categories: non stenosed; moderately stenosed; severely stenosed; and severely stenosed with blood fed from an adjacent coronary artery. They then used their new DCE-CT technique to measure 'myocardial perfusion reserve' and 'myocardial volume reserve' - measures of blood flow during maximum coronary vessel dilation induced by exercise or drugs - and calculate the ratio of the two and its relationship with coronary stenosis classification.

Their results show that the ratio of 'myocardial perfusion reserve' to 'myocardial volume reserve' is the best predictor of severe stenosis. The new technique demonstrates an excellent sensitivity, able to detect 50 percent or greater narrowing of the coronary arteries.

The authors conclude: "This new technique could play an important role in the evaluation of the likelihood of future cardiac events in patients with intermediate to advanced risk of coronary artery disease, allowing timely and appropriate intervention."

More information: So A et al (2011). Non-invasive assessment of functionally relevant coronary artery stenoses with quantitative CT perfusion: preliminary clinical experiences. *European Radiology*. DOI 10.1007/s00330-011-2260-x

Provided by Springer