

Scientists develop new technique that could improve heart attack prediction

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An award-winning research project, funded by the British Heart Foundation (BHF), has tested a new imaging method which could help improve how doctors predict a patient's risk of having a heart attack.

Scientists from the University of Edinburgh, a BHF Centre of [Research Excellence](#), in collaboration with the University of Cambridge are the first to demonstrate the potential of combining PET and CT scanning to image the disease processes directly in the coronary arteries that cause heart attacks.

There are nearly 2.7 million people living with [coronary heart disease](#) (CHD) in the UK and it kills 88,000 people each year. Most of these deaths are caused by a [heart attack](#). Each year there are around 124,000 heart attacks in the UK.

The research, published in the [Journal of the American College of Cardiology](#) (*JACC*), involved giving over 100 people a CT calcium score to measure the amount of calcified or hardened plaques in their coronary arteries. This is a standard test, which is commonly used to predict CHD risk but cannot distinguish calcium that has been there for some time from calcium that is actively building up.

The patients were also injected with two tracers, special molecules that show up on certain imaging scans and can be used to track substances in the body.

One of these tracers, ^{18}F -sodium fluoride (^{18}F -NaF), is a molecule taken up by cells in which active calcification is occurring. The ^{18}F -NaF can then be picked up and measured on PET scans.

The researchers wanted to see if they could identify patients with active, ongoing calcification because these patients may be at higher risk than patients in whom the calcium developed a long time ago.

The results showed that increased ^{18}F -NaF activity could be observed in specific [coronary artery](#) plaques in patients who had many other high-risk markers of cardiovascular disease.

Dr Marc Dweck, lead author on the research paper and a BHF Clinical Research Fellow at the University of Edinburgh, said:

"Predicting heart attacks is very difficult and the methods we've got now are good but not perfect. Our new technique holds a lot of promise as a means of improving heart attack prediction although further ongoing work is needed before it becomes routine clinical practice.

"If we can identify [patients](#) at high risk of a heart attack earlier, we can then use intensive drug treatments, and perhaps procedures such as stents, to reduce the chances of them having a heart attack."

Dr Shannon Amoils, Research Advisor at the (BHF), which funded the study, said:

"For decades cardiologists have been looking for ways to detect the high-risk plaques found in coronary arteries that could rupture to cause a heart attack, but it's been difficult to develop a suitable imaging test that can focus in on these small vessels.

"This research is a technical tour de force as it allows us to assess active

calcification happening right in the problem area – inside the wall of the coronary arteries and this active calcification may correlate with a higher risk of a heart attack."

The research follows on from recent work Dr Dweck did using PET/CT that provided greater insight into the aortic valve disease – aortic stenosis. With the support of the BHF, Dr Dweck and his colleagues at Edinburgh also intend to translate this technique into predicting a patient's risk of a stroke.

More information: Dweck M et al (2012). Coronary arterial 18F-Sodium Fluoride Uptake. *Journal of the American College of Cardiology*. Currently available online: [content.onlinejacc.org/cgi/con.../abstract/59/17/1539](http://content.onlinejacc.org/cgi/content/full/59/17/1539)

Information about this research is available here:
www.bhf.org.uk/default.aspx?page=14021

Provided by University of Edinburgh

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