

Artificial intelligence could prevent unneeded tests in patients with stable chest pain

May 12 2019



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Artificial intelligence (AI) could prevent unnecessary diagnostic tests in patients with stable chest pain, according to research presented today at ICNC 2019. A decision support system saved one hour of testing per

patient.

The International Conference on Nuclear Cardiology and Cardiac CT (ICNC) is co-organised by the American Society of Nuclear Cardiology (ASNC), the European Association of Cardiovascular Imaging (EACVI) of the European Society of Cardiology (ESC), and the European Association of Nuclear Medicine (EANM).

Study author Dr. Marco Mazzanti, of the Royal Brompton Hospital, London, UK, said: "We know that doctors overtest [patients](#) and ignore recommendations about when a [test](#) justified about two-thirds of the time. Our 'super brain' [decision](#) support system, called ARTICA, strictly follows ESC guidelines and does not advise unnecessary examinations."

The study enrolled 982 patients with stable chest pain, a frequent cause of visits to emergency departments and general practitioners. The researchers compared decisions on which tests to perform made by a cardiologist and by ARTICA on the same day. ARTICA advised no further testing in 658 (67%) patients whereas a cardiologist decided that only 45 (4.6%) patients did not need more tests.

A computed tomography angiography (CTA) scan showed that 639 (97%) of the patients ARTICA said did not need tests had no significant coronary artery disease, meaning the decision was correct. Avoiding these tests would save staff one hour and patients two hours on average.

Dr. Mazzanti said: "AI has the potential to save costs and staff time by identifying patients with chest pain who do not have significant coronary artery disease and therefore do not need expensive cardiac imaging."

To take one example, a CTA scan, used to look for blocked blood vessels, costs €200-400. Cardiologists recommended it for 816 (83%) patients while ARTICA recommended it for just 95 patients (10%).

Dr. Mazzanti said: "As doctors we order a lot of tests which cost a lot of money and waste time. ARTICA is like a second set of eyes to make sure we follow recommendations."

He noted that ARTICA recommended exercise testing or functional imaging for 224 (23%) patients while cardiologists recommended it for just 100 (10%) patients. "We know that when ARTICA says don't do a test it is almost 100% right because the CTA scan confirmed no blocked arteries," said Dr. Mazzanti. "When ARTICA decides a test is needed, we are less certain that this is correct. By adding more data to the super brain these decisions will become more accurate and enable us to deliver more personalised care."

ARTICA, which stands for ARTificial Intelligence for clinical Cardiac nAvigation, is a [decision support system](#) created by the researchers. It uses machine learning, a type of AI, to make decisions that adhere to recommended practice. The researchers inputted guidelines for patients with stable [chest pain](#) and routinely collected medical data. A [machine learning](#) algorithm analysed the information repeatedly until it learned to identify who needed a test (and which test) and who did not.

More information: The abstract 'Cost analysis of cardiac imaging using artificial intelligence in subjects with stable chest pain. Results from the ARTICA database' will be presented during the Best oral abstract session on Sunday 12 May at 10:05 to 10:55 WEST in room Porto.

Montalescot G, Sechtem U, Achenbach S, et al. 2013 ESC guidelines on the management of stable coronary artery disease. *Eur Heart J*. 2013;34:2949–3003. doi:10.1093/eurheartj/eh296

Provided by European Society of Cardiology

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