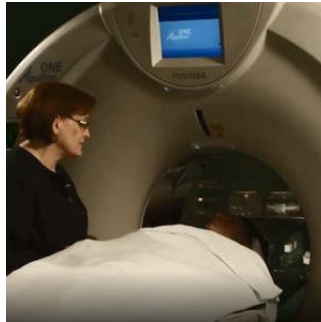## RSNA 2019: AI Helps Find Signs of Heart Disease on Lung Cancer Screens

With the help of artificial intelligence (AI), researchers have developed a tool that automatically measures coronary artery calcium – an important marker of heart disease – on chest CT images, according to a study being presented this week at the annual meeting of the Radiological Society of North America (RSNA).

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Low-dose chest CT is commonly used to diagnose lung cancer although coronary artery calcium (CAC), a measure of plaque in the arteries, can also be seen on CT scans. The CAC score derived from CT is a well-established measure that helps clinicians decide who should get cholesterol-lowering preventive medications called statins.

However, despite its prognostic value, CAC is not routinely measured in low-dose CT lung screening, as the measurements require dedicated software and add time to the interpretation.

Researchers from Massachusetts General Hospital (MGH) and Brigham and Women's Hospital (BWH), both located in Boston, developed an AI system for measuring coronary artery calcium in patients getting chest CT scans to screen for lung cancer.

The deep learning-system was trained on cardiac CTs and chest CTs in which calcification had been measured manually. The system was then tested on CT scans from thousands of heavy smokers, age 55-74, who were part of the National Lung Screening Trial (NLST).

The MGH-BWH study yielded these results:

- The deep learning-derived CAC scores corresponded closely to those of human readers; and
- There was a significant association between deep learning calcium scores and cardiovascular death over follow-up of 6.5 years.

Of note, the new AI system runs in the background, meaning there is no time added to the CT examination. This innovative tool can help evaluate large numbers of patients in a much less time than it would take human readers.

It could also have value outside of the lung screening population. In fact, the research team has demonstrated the tool's effectiveness in people with stable (PROMISE Trial) and acute (ROMICAT trial) chest pain.

"We have a tool that in the future can be used on almost every chest scan to generate very clinically relevant information for a large number of patients," said study co-senior author Hugo Aerts, PhD, director of the Artificial Intelligence in Medicine (AIM) Programme at BWH.

For example, if the tool detects a lot of coronary artery calcium in a patient, then that patient can be sent immediately to a specialist for follow-up.

"This would make it easier for patients to get appropriate treatment," lead author Roman Zeleznik, MSc, BSc, who is also affiliated with the AIM Programme, pointed out.

Source: Radiological Society of North America

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