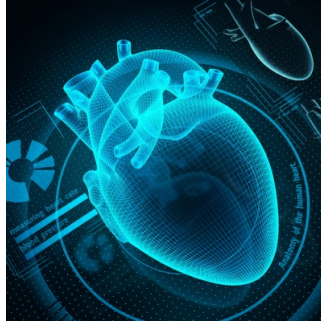## Deep Learning AI May Identify Atrial Fibrillation

A recent study published in *The Lancet* found that artificial intelligence (AI) technology was able to diagnose patients with intermittent atrial fibrillation even when their hearts were at a normal rhythm. The 10-second test could help identify patients at risk of unexplained heart attacks or strokes.

Atrial Fibrillation currently affects 2.7 to 6.1 million people in the USA. Intermittent atrial fibrillation can be difficult to detect and current monitoring for atrial fibrillation can take weeks to years. The challenge remains in detecting atrial fibrillation early in patients who have suffered from an unexplained stroke so that anticoagulation medicine can be administered. Although, this treatment can be harmful to patients who do not have atrial fibrillation.

The recent study used ECGs from 181,000 patients from December 1993 to July 2017 and used it to train an AI algorithm to detect atrial fibrillation to an accuracy of 83%. The ECGs were first divided based on whether the patient had atrial fibrillation or not. 70% were then used in the training phase for the deep learning algorithm, 10% were used in the internal validation and optimisation and the remaining 20% were used to test the accuracy of the AI's prediction.

By training a neural network – the inner workings of which are not known – researchers were able to detect ECG signals that would otherwise be invisible to the human eye. A common symptom of atrial fibrillation is the enlargement of the heart chamber, however, before this, the heart can undergo scarring (fibrosis) and also the electrical properties of the heart can be modified even after an episode. By tracking these subtle changes the AI technology was able to detect atrial fibrillation with a 79% accuracy based on a single scan which increased to 83% accuracy when multiple scans were analysed.

Dr. Paul Friedman of the Mayo Clinic, USA, explained the significance of AI being able to detect signals for atrial fibrillation even after the time of the event. However, he went on to say the limitations of the study, and where more research should be done, is in those with unexplained strokes as the AI was not trained to detect atrial fibrillation in these groups. Further limitations of the study are that the AI was trained to detect signals in a population of high atrial fibrillation prevalence, and researchers were unsure as to how the accuracy of the AI prediction would fair with data from the general population. Also, there could be undiagnosed patients in this cohort, and issues could have arisen if AI diagnosed what was previously unrecognised and vice-versa. The errors of interpretation could decrease the accuracy of this method.

Although further research is needed, this quick and inexpensive test could hold promise for the future of atrial fibrillation detection. As co-investigator, Dr. Xiaoxi Yao, predicts that this technology could be available in smartphones and other widely-distributed technologies.

Source: The Lancet

Image Credit: iStock

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