OPEN ACCESS Freely available online

ISSN: 2329-6925
Journal of Vascular Medicine & Surgery

Perspective

Machine learning of 12-lead Electrocardiograms Identified Inherited Risk and Vulnerability to Atrial Fibrillation

Avtar Singh*

Cardiovascular and Pulmonary Branch, National Heart, Lung, and Blood Institute, National Institutes of Health, California, USA

ABSTRACT

Artificial intelligence (AI) models applied to 12-lead ECG waveforms can predict atrial fibrillation (AF), a hereditary and pathological arrhythmia. We hypothesized that the ECGAI-based risk estimation may have a genetic basis. We applied the ECGAI model to predict atrial fibrillation in ECGs from 39,986 UK bio bank participants without atrial fibrillation. Next, we performed a Genome-Wide Association Study (GWAS) of predicted atrial fibrillation risk. Three signals (P <5E8) were identified at the established AF sensitivity loci marked by the sarcomere gene TTN and the sodium channel genes SCN5A and SCN10A. We also identified two new loci near the VGLL2 and EXT1 genes. In contrast, GWAS of risk estimation from clinical variable models revealed different genetic profiles. The predicted AF risk from the EKGAI model is affected by sarcomere, ion channels, and genetic variation that suggests ascending pathways. The ECGAI model can identify individuals at risk of disease through specific biological pathways.

Keywords: 12-lead Electrocardiograms; Vulnerability; Atrial fibrillation; Pathological arrhythmia

DESCRIPTION

Atrial Fibrillation (AF) is a heritable arrhythmia related to large morbidity, including stroke, coronary heart failure, dementia, and mortality. One out of three people at excessive hazard of developing AF might also additionally allow early detection of cardiac rhythm tracking and treatment, or behavioral change to save you AF altogether.

Understanding the biological basis of risk estimation from machine learning models can be helpful. Model interpretability, rationalization of model output, promotion of clinician confidence, and potential. Allows identification of individuals with specific mechanical signaling pathways leading to atrial fibrillation. We recently developed AI algorithms have been validated to predict the 5-year risk of developing atrial fibrillation. Use the 12-lead ECG ("ECGAI"). 7 In this study, we performed a genetic relevance test. Assess the genetic basis using AF risk estimates generated from the ECGAI model. It will be reflected in the output. As a comparative test, we evaluated the genetic basis of what has been widely validated.

Cardiovascular disease is the leading cause of death in the world1 and Electrocardiography (ECG) is an important tool in its diagnosis. With the transition from analog ECG to digital ECG, automated computer analysis of standard 12-lead ECG has become more important in the medical diagnostic process. However, the limited performance of traditional algorithms hinders its use as a stand-alone diagnostic tool and leaves it to a secondary role.

Deep Neural Networks (DNN) has recently achieved remarkable success in tasks such as image classification and speech recognition, and there are great expectations for how this technology can improve healthcare delivery and clinical practice. To date, the most successful applications have used supervised learning capabilities to automate the diagnosis of exams. A supervised learning model that learns to map inputs to outputs based on exemplary input / output pairs is a human in everyday workflow in diagnosing breast cancer and detecting retinal disease using a 3D optical coherent tomography scan specialist. Demonstrated better performance than. Although efficient, training DNNs with this setting requires a large amount of labeled data. This poses several challenges for medical applications, such as those related to the confidentiality and security of personal health information.

Hypertension and valvular heart disease are the most common and modifiable risk factors for atrial fibrillation. Other heart-related risk factors include heart failure, coronary artery disease, cardiomyopathy, and congenital heart defects. In low- and middle-income countries, valvular heart disease is often caused by rheumatic fever. Risk factors associated with the lungs include COPD, obesity, and sleep apnea. Other risk factors include heavy drinking, smoking, diabetes, and thyrotoxicosis. However, about half of the cases are not associated with any of the above risks. Health professionals may suspect atrial fibrillation after feeling a pulse and interpret an Electrocardiogram (ECG) to confirm

Correspondence to: Avtar Singh, Cardiovascular and Pulmonary Branch, National Heart, Lung, and Blood Institute, National Institutes of Health, California, USA, E-mail: avtarsingh@hotmail.com

Received: 07-Jan-2022, Manuscript No.JVMS-22-436; **Editor assigned:** 11-Jan-2022, Pre QC No. JVMS-22-436 (PQ); **Reviewed:** 21-Jan-2022, QC No JVMS-22-436 ; **Revised:** 24-Jan-2022, Manuscript No.JVMS-22-436(R); **Published:** 28-Jan-2022, DOI: 10.35248/2329-6325.22.10.439.

Citation: Singh A (2022) Machine learning of 12-lead Electrocardiograms Identified Inherited Risk and Vulnerability to Atrial Fibrillation. J Vasc Surg. 10: 436.

the diagnosis. Typical atrial fibrillation ECG shows a group of irregularly spaced QRS complexes without P waves.

Healthy lifestyle changes, Weight loss in people with obesity, increased physical activity, and decreased alcohol intake reduces the risk of atrial fibrillation and reduces the burden in the event of atrial fibrillation. I can. Atrial fibrillation is often treated with drugs that slow the heart rate closer to normal (known as rate control) or convert the rhythm into normal sinus rhythm (known as rhythm control). Cardio version can transform atrial fibrillation into a normal heart rhythm and is often required for emergency use in the event of a person's instability.