Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Spotlight on Special Topics

AI ENHANCED ECG ENABLED RAPID NON-INVASIVE EXCLUSION OF SEVERE ACUTE RESPIRATORY SYNDROME CORONAVIRUS 2 (SARS-COV-2) INFECTION

Poster Contributions
Monday, May 17, 2021, 9:45 a.m.-10:30 a.m.

Session Title: Spotlight on Special Topics: COVID 7
Abstract Category: 61. Spotlight on Special Topics: Coronavirus Disease (COVID-19)

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Background: Rapid identification of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection is critical to management of the pandemic. We sought to investigate the use of artificial intelligence applied to the ECG to rule out acute COVID-19.

Methods: A global, volunteer consortium from 4 continents identified patients with ECGs obtained around the time of PCR confirmed COVID 19 diagnosis. Clinical characteristics and raw ECG data were collected. A convolutional neural network was trained using 26,153 ECGs (33.2% COVID positive), validated with 3,826 ECGS (33.3% positive) and tested on 7,870 ECGs not included in other sets (32.7% positive). Performance under different prevalence values was tested by adding control ECGs from a single high-volume site.

Results: The area under the curve (AUC) for detection of acute COVID 19 infection in the test group was 0.767 (95% CI: 0.756 to 0.778) (sensitivity 98%, specificity 10%, positive predictive value 37%, negative predictive value 91%). When 50,905 normal controls were added to adjust the COVID prevalence to approximately 5% (2,657/58,555), resulting in an AUC of 0.780 (95% CI: 0.771 to 0.790) with a specificity of 12.1% and a negative predictive value to 99.2%.

Conclusion: Infection with SARS-CoV-2 results in electrocardiographic changes that permit the AI-ECG to be utilized as a rapid screening test with a high negative predictive value (99.2%). This may permit the development of ECG-based tools to rapidly screen individuals for pandemic control.