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LETTER

EAR/NOSE/THROAT

Voice and the new coronavirus

The new coronavirus has become a global health concern with over 6 million infected and more than 350 000 deaths[1] Researchers around the world are looking for solutions for early detection, monitoring of the evolution of viral infection, for aetiological or pathophysiological treatment.

Voice is a unique human attribute. Voice has the potential to provide an easily obtained, non-invasive way to monitor physiological changes throughout the body. To produce the sounds, we need a system: the respiratory tract, the phonator, and the articulators. Respiration is necessary to produce the pressure and vibration necessary for phonation: the air passes through the larynx, tissues vibrate to produce sound waves, and articulators are the shaping of raw sound into recognisable speech. Normal voice production depends on power and airflow supplied by the respiratory system. Any disturbance in one of the three subsystems of voice production may lead to a voice disturbance. Recognising associations amongst these factors, along with patient history, may help in identifying the possible causes of the voice disorder.[2]

Voice-related features were found to have a predictive value for different pathologies. A glottal-flow spectrum and vocal jitter were found to discriminate near-term risk suicidal subjects.[3] Some studies that have attempted to quantify voice parameters (acoustic amplitude and frequency variations) with the purpose of characterising the idiopathic Parkinson's disease by dysphonic symptoms.[4] Wheezing and coughing, trouble breathing, coughing up mucus and shortness of breath are just a few COPD symptoms and many patients experience voice changes as a result of COPD.[5] Murton et al[6] analysed the voices of heart failure (HF) patients as they underwent treatment for decompensated HF and returned to a stable clinical state.

How the voice acoustical analysis can help us identifying respiratory and breathing problems, the main concern today regarding patients with COVID-19? Voice processing has become a fast-growing field. Voice disorder databases can be used in clinics as well as in automatic voice disorder detection systems to study the acoustic behaviour of the voices. Audio recording is the most important basic requisite for voice quality assessment.[2] Coordination between the larynx and lower airways is essential for normal voice production. While 81% of people with COVID-19 develop only mild or uncomplicated illness,[7] approximately 14% develop severe disease that requires hospitalisation and oxygen support, and 5% require admission to an intensive care unit.[8] In severe cases, COVID-19 can be complicated by acute respiratory distress syndrome (ARDS), sepsis and septic shock, multiorgan failure, including acute kidney injury and cardiac injury.[9] It may be possible to monitor a person's health remotely—using smartphones—by recording short speech samples and analysing them for disease biomarkers. A vocal test app on a smartphone could be used as a tool to identify patients most at the risk of respiratory failure. For health care providers with experience in the clinical management of patients with COVID-19 and other viral infections, including SARS and MERS, as well as sepsis and ARDS, the application of acoustical voice analysis may be useful for optimised supportive care to ensure the best possible chance for survival. Projects have already been launched worldwide to develop an artificial intelligence system—machine learning algorithms based on sounds analysis—that can detect the "signature" of COVID-19 infection in the human voice[10–12] or from the sound of voice, breathing, and coughing.[13]

DISCLOSURES

None declared.

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