PRESS RELEASE

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'Brain-age' biomarkers predict stroke recovery more accurately than chronological age, new study shows

(5 May 2022, Lyon, France) Stroke experts have identified how radiomics, an emerging image-quantifying technology, can be used to extract biomarkers from clinical brain MRI scans in stroke patients and estimate a patient's relative 'brain age'.[1] The technique demonstrates that using relative brain age, rather than chronological age, can enhance stroke surveillance and improve predictions on post-stroke recovery.

The study, presented today at the European Stroke Organisation Conference (ESOC 2022) analysed 4,163 ischaemic stroke patients across the US and Europe. It showed how stroke patients with 'older-appearing' brains, characterised by a higher predicted brain age than chronological age, were more likely to suffer from hypertension, diabetes mellitus, or have a history of smoking or prior stroke.

Patients with older appearing brains were also less likely to achieve a favourable post-stroke outcomes in comparison with their younger-looking counterparts.

Led by Dr Martin Bretzner from Harvard Medical School (Boston, USA), the research team considered that whilst chronological age measures the amount of time a person has lived, it is less likely to precisely capture how well a patient has aged. By estimating the age of a patient's brain, this novel biomarker provides insight into the resilience of a brain to time and cardiovascular risk factors, and how well patients recover from stroke.

The technique – radiomics – leverages advanced mathematical analysis to explore neuroimaging data available to clinicians, allowing experts to predict patients' relative brain age compared to other stroke survivors and analyse their overall brain health.

"Age is one of the most influential determinants of post-stroke outcomes, but little is known about the impact of neuroimaging-derived biological 'brain age'", commented Dr Martin Bretzner. "Our results show that quantifying relative brain age in stroke patients can be beneficial in assessing a patient's brain health globally, and useful in predicting how well the patient will recover from a stroke. It would also be very easy to communicate on this biomarker with clinicians and patients, as everyone instinctively understand the negative implications of an accelerated brain ageing process."

The study found that relative brain age impacted stroke outcomes independently from chronological age and stroke severity. Having previously suffered from a stroke was the most influential clinical factor that impacted relative brain age, followed by diabetes.

According to research, one in four stroke survivors will have another stroke[2] and yet up to 80 per cent might be prevented with the right treatments and lifestyle changes.[3] The number of people living with stroke is estimated to rise by 27% between 2017 and 2047 in the European Union, mainly due to an increase in the number of people over 70.[4]

"These findings stress the importance of minimising cardiovascular risk factors and also highlights how cardiovascular health and brain health are tightly intertwined", added Dr Bretzner. "Identifying potentially modifiable risk factors that impact brain health by using radiomics and relative brain age as a biomarker could lead to the development of stroke prevention interventions and aid recovery."

"We hope that this research will serve as a support to identify fragile stroke patients that require more intensive prevention techniques, treatments and surveillance in the future."

ENDS

Notes to Editors:

A reference to the European Stroke Organisation (ESO) Conference must be included in any coverage or articles associated with this study and research.

For more information or to arrange an expert interview, please contact Luke Paskins or Sean Deans on luke.paskins@emotiveagency.com, sean.deans@emotiveagency.com or press@eso-stroke.org, or call +44 (0) 208 154 6396.

About the Study Author:

Dr Martin Bretzner is a researcher from the Mass General Brigham, Harvard Medical School, Neurology, Boston, United States, and an interventional neuroradiologist at the Lille University Hospital. This study was funded by the ISITE-ULNE foundation, Mass General Brigham hospital, the French Society of Neuroradiology, the French Society of Radiology, the Thérèse and René Planiol foundation.

About ESO:

The European Stroke Organisation (ESO) is a pan-European society of stroke researchers and physicians, national and regional stroke societies, and lay organisations, founded in December 2007. The ESO is an NGO comprised of individual and organisational members. The aim of the ESO is to reduce the burden of stroke by changing the way that stroke is viewed and treated. This can only be achieved by professional and public education and making institutional changes. ESO serves as the voice of stroke in Europe, harmonising stroke management across the whole of Europe and taking action to reduce the burden.

Four Facts on Stroke:

1. In 2017, there were 1.12 million first strokes in the EU, 9.53 prevalent stroke cases and 460,000 stroke-related deaths[4]
2. In 2017, there were 7.06 million disability adjusted years lost due to stroke in the EU[4]
3. By 2047 it has been estimated there will be an additional 40,000 strokes per year in the EU (a rise of 3%)[4]
4. 80% of premature heart disease and stroke is preventable[5]

References:

1. Radiomics derived brain age predicts functional outcome after acute ischemic stroke, presented at the European Stroke Organisation Conference, 5 May 2022.
2. https://www.stroke.org/en/life-after-stroke/preventing-another-stroke
3. https://actionplan.eso-stroke.org/domains/secondary-prevention/
4. https://www.ahajournals.org/doi/10.1161/STROKEAHA.120.029606
5. https://www.euro.who.int/en/health-topics/noncommunicable-diseases/cardiovascular-diseases/data-and-statistics