National University Hospital

# MEDIA RELEASE

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## AI-POWERED TRIAGE TOOL HELPS DOCTORS TREAT STROKES FASTER

*National University Hospital is first in Singapore to adopt RapidAI software that has been clinically validated in multi-site clinical trials*

SINGAPORE — Doctors at the National University Hospital (NUH) are using an artificial intelligence (AI) triage tool to expedite the process of identifying appropriate stroke patients for endovascular treatment, shaving off precious minutes and helping to improve patients' outcomes.

Since this February, the care of all suspected stroke patients at NUH includes the use of RapidAI. To date, more than 400 patients' treatment have involved the use of this AI tool, which has been clinically validated through a number of worldwide studies, showing how it can improve clinical workflow and hasten clinicians' decision-making, thereby reducing the door-to-puncture time for patients. This integration of AI into clinical care paves the way for a new standard of care for stroke patients in Singapore.

NUH is among the early adopters of RapidAI for stroke care in South-east Asia and is the first among hospitals in Singapore. Hospitals in Hong Kong, Taiwan, Vietnam, Thailand, Philippines and India, as well as those in Europe and America, are already using the AI platform.

In most stroke patients, one of the major blood vessels in the brain is blocked, depriving the brain of oxygen and nutrients, leading to the death of brain tissue. This condition, also known as acute ischemic stroke, is the biggest cause of disability in Singapore and worldwide.

In most acute ischaemic stroke patients, restoring blood flow is the most effective treatment. Those with blockages in the large arteries of the brain are put through an endovascular treatment, known as mechanical thrombectomy, that physically removes a clot from the brain to "unblock" the artery. The beneficial effect of such a treatment is highly time-dependent, hence selecting suitable patients with the use of advanced imaging is crucial.

At NUH, after a suspected stroke patient comes through the Emergency Department, he/she goes for an emergency computerised tomography (CT). This imaging data from the scan automatically flows to the RapidAI platform.

In less than a minute, RapidAI processes the imaging data and generates easy-to-interpret colour-coded images with relevant quantitative information and notifies the medical team – stroke neurologists and interventional radiologists – through their secured e-mails.

The software makes clinical decision-making objective and time-efficient. It can quickly tell doctors the amount of brain that has been damaged by stroke and the volume at risk that can potentially be saved with mechanical thrombectomy.

In the past, radiographers had to manually perform the post-processing of CT scans and this might take up to 20 minutes before the information is available for doctors to review, either by physically going to an imaging workstation or logging in to their hospital laptops to study these images.

Adjunct Associate Professor Anil Gopinathan, Head and Senior Consultant, Division of Interventional Radiology, Department of Diagnostic Imaging, NUH, said: “Before we adopted this AI platform, it was impossible to expect all this information to be made so promptly available for the senior clinicians to review and make a decision. AI has the potential to completely change the speed at which therapeutic decisions are made, thereby reducing the amount of brain cells lost and improving the likelihood of a stroke patient walking out of the hospital.

“The role of diagnostic imaging is extremely important in stroke care as it is the cornerstone of diagnosis and selection of appropriate treatment strategies for patients. With endovascular treatment being a game changer in stroke management in recent years, we should do all we can to give our patients the best shot at survival and reduced disability,” he added.

Dr Leonard Yeo, Senior Consultant, Division of Neurology, Department of Medicine, NUH, said the hospital has set itself a target of getting at least half the patients with acute ischemic stroke to receive appropriate treatment within an hour of arriving. He believes NUH can significantly improve on this target and shorten the door-to-puncture time for patients with the new AI-powered platform.

Dr Yeo said: “With each minute of delay in opening a blocked artery, the patient could lose 1.9 million brain cells, hence ‘time is brain’. The earlier we unblock the artery, the better will be the patient outcome.

“NUH is using the power of AI to shave life-saving minutes off an emergency like a stroke. This can avoid the extent of brain damage that can cause paralysis and loss of speech and cognitive functions,” he added.

A/Prof Gopinathan emphasised that the technology is an adjunct – and not an alternative – to human processing and interpretations of patients’ imaging results to speed up the clinical decision-making process.

Mr Karim Karti, Chief Executive Officer of RapidAI, said: “We are thrilled to see RapidAI put to work at NUH, as part of this crucial and groundbreaking partnership that advances our goal of helping more patients globally.

“Our technology was designed to enable hospitals, physicians and care teams to overcome the universal and global challenge of inefficiency in stroke care. It's exciting to know that NUH physicians are the first in the country to leverage the power of our clinically-validated AI to make better decisions at the point of care and ultimately improve outcomes for patients in Singapore and throughout the region.”

A retrospective study of 132 patients, published in the Journal of NeuroInterventional Surgery in 2018[1], found that the door-to-puncture time was significantly shorter for patients in a group who were transferred from medical facilities where CT perfusion using automated Rapid software was routinely performed (median time of 12 min), compared with patients in another group transferred from facilities that did not perform perfusion imaging (median time of 48.5 min).

The stroke team at NUH manages more than 1,000 ischaemic stroke patients annually, with one in six cases being treated with endovascular treatment.

In Singapore, stroke is the fourth leading cause of death, with a prevalence of 4 per cent among adults aged 50 years and above, according to the Ministry of Health. With Singapore's ageing population, the burden of stroke is expected to rise.

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## Chinese Glossary

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| National University Hospital (NUH) | 国立大学医院（国大医院） |
| Adjunct Associate Professor Anil Gopinathan<br>Head and Senior Consultant<br>Division of Interventional Radiology<br>Department of Diagnostic Imaging<br>National University Hospital | Anil Gopinathan客座副教授<br>主任兼高级顾问医生<br>介入性放射学科<br>影像诊断科<br>国立大学医院 |
| Dr Leonard Yeo<br>Senior Consultant<br>Division of Neurology, Department of Medicine<br>National University Hospital | 姚亮立<br>高级顾问医生<br>神经内科，内科部门<br>国立大学医院 |
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## About the National University Hospital (NUH)

The National University Hospital (NUH) is Singapore's first university hospital. While the hospital at Kent Ridge first received its patients on 24 June 1985, our legacy started

[1] Amin Aghaebrahim, Eric Sauvageau, Pedro Aguilar-Salinas, Gustavo Cortez, Roberta Santos, Ricardo A Hanel. Referral facility CT perfusion prior to inter-facility transfer in patients undergoing mechanical thrombectomy. Journal of NeuroInterventional Surgery, 2018 Sep;10(9):818-822.

from 1905, the date of the founding of what is today the NUS Yong Loo Lin School of Medicine. NUH is the principal teaching hospital of the medical school.

Our unique identity as a university hospital is a key attraction for healthcare professionals who aspire to do more than practise tertiary medical care. We offer an environment where research and teaching are an integral part of medicine, and continue to shape medicine and transform care for the community we care for.

We are an academic medical centre with over 1,200 beds, serving more than one million patients a year with over 50 medical, surgical and dental specialties. NUH is the only public and not-for-profit hospital in Singapore to provide trusted care for adults, women and children under one roof, including the only paediatric kidney and liver transplant programme in the country.

The NUH is a key member of the National University Health System (NUHS), one of three public healthcare clusters in Singapore.