PRESS RELEASE

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New non-invasive imaging research technique can identify patients with curable hypertension

Singapore, 6 September 2019 – Hypertension is a serious and underestimated silent killer in Singapore and around the world, with one in four adults[1] (25 years and above) here diagnosed with the illness. Left untreated, hypertension is a leading risk factor for heart, kidney disease and stroke.

The Global Burden of Disease 2017 report finds that hypertension accounts for about 48 per cent of deaths from cardiovascular disease in Singapore. Recent studies indicate that as many as 32.6 per cent of Singaporean adults diagnosed and treated for hypertension continue to have uncontrolled blood pressure (BP) readings despite medications (systolic BP $\geqslant$ 140 mmHg or diastolic BP $\geqslant$ 90 mmHg).[2]

While most patients with hypertension have no underlying curable cause, about 5% of patients may have a potentially curable form called primary aldosteronism, caused by an underlying hormone excess.[3] Recognising and treating this condition in patients with severe, treatment–resistant hypertension is important as treatment to cure hypertension is possible for about half of these patients.

A novel imaging technique can identify the source of the hormone excess in patients with primary aldosteronism, according to Professor Roger Foo from the Department of Medicine at the NUS Yong Loo Lin School of Medicine (NUS Medicine) and Senior Consultant Cardiologist at the National University Heart Centre, Singapore, and Adjunct Assistant Professor Troy Puar, Consultant Endocrinologist at Changi General Hospital (CGH). They believe that these findings are pertinent to Singapore and also relevant to patients worldwide.

Patients with primary aldosteronism will benefit from this scan

Hypertension can be explained by either excess salt in the body, or excess vasoconstriction (tightening of blood vessels) - two ends of the hypertension disease spectrum. Ideally, knowing where the patient lies on this spectrum will enable a more successful choice of medication that targets the underlying problem. Hormone measurement helps to tell where the patient is located along the spectrum.

This understanding has also led to the recognition that more patients than previously suspected have salt excess because of a hormone problem. This condition, primary aldosteronism, occurs when the adrenal glands (small glands above the kidneys) produce too much of the hormone aldosterone, resulting in hypertension. In half of these patients, tiny

benign growths occur in only one of the glands. Keyhole (laparoscopic) surgery to remove that abnormal gland cures the condition.

Primary aldosteronism may be suspected in patients with difficult-to-control hypertension, or those with low potassium levels. If suspected, the patients should then be referred to a specialist for evaluation, who will confirm the condition.

Currently, if hormone levels are high, patients with benign growths are identified through further testing using an invasive procedure called adrenal vein sampling. Notably, CGH has improved their sampling success to 100% over the last five years in more than 60 patients with primary aldosteronism. A majority of these patients have curable disease. However, sampling is invasive and still technically difficult.

Scan to detect curable hypertension in patients with primary aldosteronism

Working with the Clinical Imaging Research Centre (CIRC) at the NUS Yong Loo Lin School of Medicine, Prof Foo and Adjunct Assistant Prof Puar used a sensitive functional imaging scan to pick up these abnormal glands. This scan, called 11C-Metomidate PET/CT, is able to identify small (<1cm) growths in the gland, and show if the gland is producing too much aldosterone, and can be done in less an hour, without the need for hospitalisation.

Local studies so far have found that about 5 per cent of all patients studied with hypertension have primary aldosteronism. With this imaging technique, Prof Foo and Adjunct Assistant Prof Puar hope that many more patients may benefit from this scan. They emphasise that this is in clinical trial for now, and requires a larger patient cohort validation before this is ready for clinical use. The research study is being supported through a grant from National Medical Research Council.

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About the NUS Yong Loo Lin School of Medicine (NUS Medicine)

Established in 1905, the NUS Yong Loo Lin School of Medicine is the first institution of higher learning in Singapore and the genesis of the National University of Singapore.

The School offers one of the finest undergraduate medical programmes in the Asia Pacific region and enjoys international recognition and respect. The Times Higher Education World University Rankings 2019 by subject and Quacquarelli Symonds (QS) World University Rankings by Subject 2018 list NUS Medicine as a leading medical school in Asia.

It admits 300 students to the MBBS degree programme annually and its principal missions are to educate and train the next generation of healthcare professionals, and foster research that will help to advance the practice of medicine.

The 18 NUS Medicine departments in the basic sciences and clinical specialties work closely with the Centre for Medical Education, the Centre for Biomedical Ethics, the Centre for Healthcare Simulation as well as the restructured public hospitals to ensure that teaching and research are aligned and relevant to Singapore's healthcare needs. The School is a founding institutional member of the National University Health System.

For more information about NUS Medicine, please visit http://nusmedicine.nus.edu.sg

About Changi General Hospital

Changi General Hospital (CGH) is an award-winning public hospital with over 1,000 beds serving a community of more than 1 million people in eastern Singapore. CGH offers a comprehensive range of medical specialties and services, helmed by a highly experienced and skilled team of healthcare professionals who consistently deliver excellent health outcomes and care for patients. CGH is a member of the SingHealth cluster of healthcare institutions.

About Clinical Imaging Research Centre

Based at the National University of Singapore's Yong Loo Lin School of Medicine, the Clinical Imaging Research Centre (CIRC) jointly established by the Agency for Science, Technology and Research (A*STAR) and the National University of Singapore (NUS), is a dedicated state-of-the-art facility for Magnetic Resonance Imaging (MRI) and Positron Emission Tomography (PET). It is the only facility in Singapore to be Good Manufacturing Practice (GMP) certified for the manufacture of radiopharmaceuticals dedicated to clinical research and development.

The CIRC is a manufacturer of radioisotopes with access to imaging and data analysis. The centre also performs first-in-man studies and early-stage assessments for new molecules which aim to translate and improve Singapore healthcare.

https://www.circ.nus.edu.sg