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**MEDIA RELEASE**

***For immediate release***

**National University Health System (NUHS)'s multi-disciplinary team study on 205 patients over four years, saw early detection of Heart Rhythm Disorder – a major cause of Fatal Stroke**

*Singapore, 21 October 2019* – The Heart Rhythm (Cardiac Electrophysiology) and Stroke teams at National University Hospital (NUH) and National University Heart Centre, Singapore (NUHCS), comprising neurologists, cardiologists and cardiac electrophysiologists, adopted a multi-disciplinary approach to detecting a heart rhythm disorder known as Atrial Fibrillation or AF.

2 Atrial fibrillation (AF) is when the upper chambers of the heart, or atria, beat very fast and irregularly such that the atria cannot pump blood effectively, leading to slow flowing blood that can form into clots. When these break off and travel to the brain, it results often in a stroke, which may be its first symptom. It is the most common heart rhythm disorder, and is an increasing condition with older people and our ageing population. Amongst stroke patients in Singapore, AF is a key modifiable risk factor, with population studies seeing a significant increase in the proportion of stroke patients with AF rising from 16% in 2007 to 20.6% in 2016. The chances of developing AF increases with age, such that approximately 1 in 6 over 80 years old have AF. AF can affect as many as one in 20 people, and is associated with 20% of all strokes in Singapore.

3 Strokes caused by AF are more disabling than strokes not caused by AF. Apart from increasing the risk of stroke by more than 500%, AF also doubles the risk of death. AF can be difficult to detect as the irregular heart beating can occur for a few minutes before returning to normal rhythm. At the initial stage, the silent AF may happen intermittently – which makes detection challenging – and progressively over time, become permanent. AF can also cause or worsen heart failure. More than 80% of patients have no symptoms and therefore are unaware of their condition.

4 Having a stroke also means one is at greater risk for having recurrent stroke. Determining the cause of the stroke will help the doctor take targeted steps to minimize the risk of recurrent stroke. Traditionally, patients presenting to hospitals with stroke will have ECG monitoring for 1-2 days, in hope of detecting AF. A normal ECG during routine medical check-ups does not rule out AF. It is logistically difficult and very costly to monitor patients in hospital for more than a few days. Short periods of monitoring will only identify less than 20% of AF patients. Hence it is often dubbed “a silent killer” and top cause of stroke, especially amongst patients whose reason for stroke is unexplained (also known as cryptogenic stroke). It is estimated that 25-30% of strokes are unexplained.

5 In Singapore's largest, single cohort of 205 patients, recruited since 2015, patients with insertable cardiac monitors (ICMs) to detect AF episodes, are monitored. The findings were published in last month's

September 2019 issue of the Journal of Stroke and Cerebrovascular Disease and shared at this morning's media conference. Dr Pipin Kojodjojo (Senior Consultant, Department of Cardiology, National University Heart Centre, Singapore cum Director and Senior Consultant, Department of Cardiology, Ng Teng Fong General Hospital) and Dr Seow Swee Chong (Senior Consultant, Department of Cardiology cum Director, Cardiac Electrophysiology and Pacing, Department of Cardiology and Programme Director of the Heart Rhythm Programme, National University Heart Centre, Singapore) will be presenting the study findings on 24 October 2019 at the 12th Asia Pacific Heart Rhythm Society Scientific Session 2019 in Bangkok, Thailand.

6 The insertion procedure is performed in a hospital where the ICM is injected, under local anaesthesia, left of the sternum (breast bone) just before the stroke patient is discharged home (see appendix). It is roughly the length of a AAA battery, but flatter. The entire process takes less than one minute. Following the insertion, the doctor will schedule regular, automatic data transmissions to take place during the time when the person usually sleeps. The ICM will record and analyse the patient's heart rhythm continuously 24/7 and for life. Once any heart rhythm disturbance including AF is detected, the recordings are sent via a personal transmitter or in the near future, a Bluetooth app installed on the patient's phone to the NUHS team from anywhere in the world. These transmissions are continuously monitored by the NUHS team, and the patient and referring neurologists will be notified as soon as possible for follow-up actions.

7 Patients with a diagnosis of cryptogenic (unexplained) stroke were recommended to have an ICM implanted and enrolled into the remote monitoring system to detect AF. They have had a normal transthoracic echocardiogram, duplex ultrasound of the carotid arteries, transcranial Doppler ultrasound of the intracranial vessels, inpatient continuous ECG monitoring for at least 24 hours, and outpatient ambulatory 24-hour Holter. The average episode lasted for only 32 minutes and almost all patients did not notice their AF. Therefore, it is not reliable to use symptoms to guide timing of ECG recordings and without the ICM, these patients' diagnoses of AF would have been missed. Traditionally, patients undergo an ECG and 1-2 days of Holter monitoring, but less than 20% of AF patients will be detected. They were then further recommended to undergo ICM testing for AF. Of the 205 patients who had participated, 12% had AF picked up by ICM, with the first AF episode detected about 4.5 months after their ICM was implanted.

8 If, however, no abnormalities are detected, no hospital visits for heart rhythm monitoring is necessary since the doctors are able to use the system to remotely monitor the patients' heart rhythm. This is how telemedicine can be used appropriately to provide highly responsive, quality patient care yet affording more convenience for patients and their carers, while incurring less time and expense from repeated hospital visits.

9 ICMs are more than 700% more effective to detect silent AF compared to traditional methods such as Holter monitoring in picking up silent AF. International guidelines recognize ICM as the "gold standard" for the detection of AF because of the continuous long term nature of the recordings. The introduction and use of ICM, had resulted in better detection of AF in patients with cryptogenic stroke or unexplained stroke. This programme will be extended to Ng Teng Fong General Hospital in December 2019. Nurses will perform the procedure next year.

10 Another important component of this NUHS study is on the appropriate prescription of anticoagulants. Without a diagnosis of AF, patients are usually discharged on less potent blood thinners such as aspirin. Unfortunately, aspirin or similar anti-platelet blood thinners are ineffective to prevent strokes caused by AF. Thus patients whose AF have yet to be detected, remain at high risk of getting a second stroke. Strokes caused by AF can only be prevented by specific blood thinners called oral anticoagulants. In Singapore, direct acting oral anticoagulants are licensed for stroke prevention in AF patients and are safer treatment compared to the traditional anticoagulant. These medications, used appropriately, can prevent strokes in AF patients.

11 On the other hand, a strategy to start all stroke patients on oral anticoagulants is unhelpful because it exposes stroke patients without AF to bleeding risks of taking oral anticoagulants. Hence, once AF is detected, patients are advised to switch from aspirin to an oral anticoagulant. All patients in whom AF was detected, were started on anticoagulants and have not had another stroke since.

12 Raising awareness, patient education and risk counselling of anticoagulants are important time spent with the patient in a clinic setting by a nurse. In the Netherlands, Canada and U.K., integrated AF-Clinic run only by nurses, have resulted in higher patient satisfaction, higher adherence and better management of AF-diagnosed patients with chronic conditions. The results have significantly reduced cardiovascular hospitalization, related emergency visits and patient compliance.

13 In Singapore, NUHS embarked on its first-in-Asia pilot and study of a similar nature a year ago, after Dr Lim Toon Wei (Senior Consultant, Department of Cardiology, National University Heart Centre cum Director, Coronary Care Unit, National University Heart Centre) piloted a nurse-led integrated clinic for AF at Bukit Batok Polyclinic. To-date, it has about 80 patients, aged between 70 and above. All 80 patients are diagnosed with pre-existing AF and at the same time, typically, all also suffer from at least four to five co-morbidities. Conditions frequently managed by Advanced Practice Nurse Liau Wei Fong in the polyclinic to prevent AF-related conditions are:

- Multiple cardiovascular and metabolic conditions such as hypertension, diabetes mellitus, obesity, and metabolic syndrome are commonly present in patients that develop AF;
- Other risk factors for AF include obstructive sleep apnoea, smoking, a sedentary lifestyle and thyroid disease.

These patients are cared for at the nurse-led, integrated AF clinic where they first attend a weekly follow-up session for AF, and at the same time, to monitor for their high blood pressure, sugar level, and pick up lifestyle intervention to manage one's weight, diet and lifestyle habits through a bilingual patient education website with QR code. The average frequency of the follow-up sessions is reduced to one in every 3-6 months.

14 The preliminary study was on 43 patients aged over 70. Data were collected over three time points (0-month, 6-months, 12-months) from this group. To explore patients' and healthcare providers' acceptance of the AF clinic, single-session face-to-face individual in-depth interviews were conducted. Preliminary findings

showed a great improvement in healthcare providers' adherence to AF management protocol and patient satisfaction. Initially, patients were apprehensive about seeing an APN for their AF condition. However, patients' attendance for follow-up visits have been good and patients' level of acceptance with the APN improved with time.

15 The other benefits of having an integrated, one-stop clinic for AF patients with multiple chronic conditions, are convenience, time and cost savings for the patient, who need not go to a Specialist outpatient clinic, and bloodwork is done through one draw. There is a longer consultation time with a familiar face (APN) regularly, and the management is comprehensive and holistic to ensure better and safer care of the patient. Besides workup and monitoring of results as well as patient education and counselling on lifestyle interventions for the chronic conditions, the nurse carries out medicine titration and medicine reconciliation because there will be interactions between anti-coagulants with medication for chronic conditions. Patients also have direct access to NUH or Ng Teng Fong General Hospital's cardiologists for follow-up, if needed, without need of referral letters. So far the clinic has seen high compliance in clinic follow-ups and attendances through the one-stop care management of both chronic and AF conditions in one sitting. Patient satisfaction had been high and the clinic is looking to expand its half-day sessions from once to twice a week, to cope with increased load.

16 These preliminary findings will be presented for the first time at the 2<sup>nd</sup> Asia Pacific Conference on Integrated Care held in Melbourne, Australia next month.

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**About the National University Health System (NUHS):**

The National University Health System (NUHS) aims to transform how illness is prevented and managed by discovering causes of disease, development of more effective treatments through collaborative multidisciplinary research and clinical trials, and creation of better technologies and care delivery systems in partnership with others who share the same values and vision.

Institutions in the NUHS Group include the National University Hospital, Ng Teng Fong General Hospital, Jurong Community Hospital and Alexandra Hospital; three National Specialty Centres - National University Cancer Institute, Singapore (NCIS), National University Heart Centre, Singapore (NUHCS) and National University Centre for Oral Health, Singapore (NUCOHS); the National University Polyclinics (NUP); Jurong Medical Centre; and three NUS health sciences schools – NUS Yong Loo Lin School of Medicine (including the Alice Lee Centre for Nursing Studies), NUS Faculty of Dentistry and NUS Saw Swee Hock School of Public Health.

With member institutions under a common governance structure, NUHS creates synergies for the advancement of health by integrating patient care, health science education and biomedical research.

As a Regional Health System, NUHS works closely with health and social care partners across Singapore to develop and implement programmes that contribute to a healthy and engaged population in the Western part of Singapore.

For more information, please visit <http://www.nuhs.edu.sg>.

**Appendix:**

