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PAVING THE WAY TO A CURE FOR LONG QT SYNDROME 2 – NHCS STUDY SHOWS POTENTIAL DISEASE REVERSAL

UPDATED GUIDELINES ON MANAGING STABLE CORONARY ARTERY DISEASE

GETTING PATIENTS TO PULL UP THEIR 'SOCKS'

ATRIAL SEPTAL DEFECTS: A QUESTION OF CLOSURE

LAUNCH OF NEW VISION AND MISSION STATEMENTS

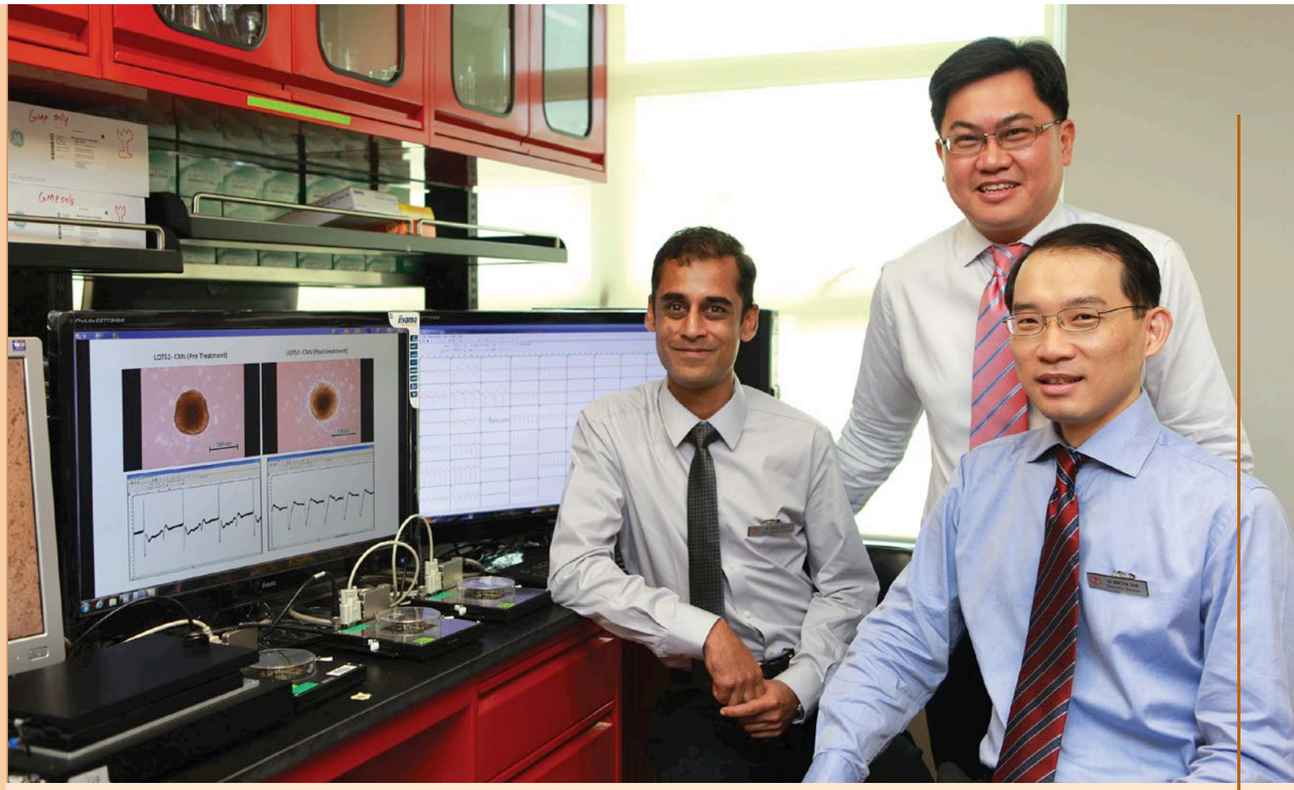
-40°C in Montreal, Canada – a one year fellowship in adult congenital heart disease

NHCS Deputy Medical Director wins prestigious National Outstanding Clinician Award 2013

NHCS STUDY SHOWS POTENTIAL FOR REVERSAL OF LONG QT SYNDROME 2

The National Heart Centre Singapore (NHCS) research team has made a world's first in developing a model of heart muscle cells from the skin of a patient with long QT syndrome 2, a potentially fatal heart rhythm disorder, and demonstrating the possibility of reversing the condition's abnormalities in isolated heart cells in the laboratory. After a year of rigorous testing on various drug compounds, the team found that a drug, known as ALLN, could reverse the effects of long QT syndrome 2 in heart cells. Their breakthrough work has earned them a best poster prize on 1 September 2013 at the prestigious ESC (European Society of Cardiology) Congress, the largest international cardiology meeting attended by close to 30,000 participants.

"For the first time, we have mimicked a patient's disease condition in a petri dish, understood the mechanism of long QT syndrome 2 on this platform, and successfully tailored a drug that reverses the entire condition," said Associate Professor Philip Wong, Director, Research and Development Unit (RDU), NHCS.



The team from NHCS' Research and Development Unit (RDU) behind the possible reversal of long QT syndrome 2 in patient-specific heart cells: (From left) Dr Ashish Mehta, Senior Research Scientist, Assoc Prof Philip Wong, Director, and Dr Winston Shim, Scientific Director.

Accelerating research discoveries through stem cells

To better study the disease and research on possible cures, skin cells were obtained from a patient clinically diagnosed with long QT syndrome 2 caused by a specific gene mutation. The NHCS research team used the skin cells to generate human-induced pluripotent stem cells which were then reprogrammed into beating heart cells. These heart cells created in a petri dish were found to mirror the patient's heart condition outside the body, and allow researchers to study the disease and test treatments accurately and repeatedly on the cells without any risk to the patient. This led to the team's demonstration of the ALLN drug's effectiveness in reversing long QT syndrome 2.

"With the efficacy aspect proven, we will be testing the therapy's safety profile as we move towards clinical applications," said Dr Ashish Mehta, Senior Research Scientist, RDU, NHCS, and lead investigator of the study.

Through the use of stem cell technology, the NHCS team was able to accelerate the drug development path, especially in the area of assessing the efficacy of new drug compounds. This could revolutionise how researchers look at specific treatments for various conditions in future.

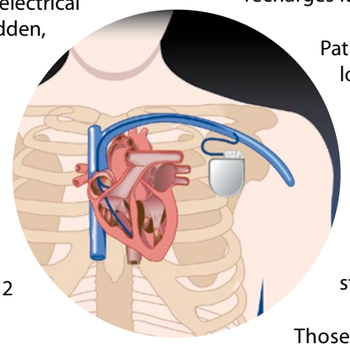
"Our study could potentially help to accelerate the development of new cures very much faster, perhaps within five to eight years. It is a shortcut compared to the conventional drug development route which could take 10 to 15 years," said Dr Winston Shim, Scientific Director, RDU, NHCS, "Moving forward, we can use similar disease models to introduce a gene that will correct that particular mutation in the body. If that is successful, there is a possibility of permanently reversing the genetic condition without the need for any long term condition."

The landmark research is supported by the National Research Foundation Singapore under its competitive Research Programme; the National Medical Research Council; and the Goh Foundation administered through Duke-NUS.

What is long QT syndrome?

Long QT syndrome is a disorder of the heart's electrical activity which may cause one to develop a sudden, uncontrollable, and dangerous heart rhythm. It is mainly an inherited condition, with a prevalence of about 1 in 5,000 people in Singapore. Non-inherited long QT syndrome may be brought on by certain medicines or other medical conditions. Left untreated, more than half of those with inherited long QT syndrome die within 10 years. There are about 13 gene mutations causing variations of long QT syndrome, with long QT syndrome 2 being one of the most common.

"Unexplained sudden cardiac death in the young is rare. But when it does occur, long QT syndrome is often one of the causes," said Assoc Prof Wong, "Most patients with long QT syndrome do not display any signs or symptoms, and they may only come to know of their condition if a family member has it, or when it was diagnosed by a doctor after a routine electrocardiogram (ECG) or recent fainting episode."



Our heartbeats are controlled by electrical impulses within the heart muscle, and this electrical system recharges itself after each heartbeat.

Patients with long QT syndrome will take longer than normal to recharge between heartbeats, and this delay may result in a fast and chaotic heart rhythm which leads to sudden fainting, seizures and, if prolonged, sudden cardiac death. The fainting spells may occur without warning when patients exercise, experience intense emotions or are startled by loud noises.

Those at risk include people with a family history of long QT syndrome, sudden death, unexplained fainting or seizures. The disease can be managed through a combination of medications and lifestyle changes, such as avoiding vigorous sports. To prevent sudden cardiac death, patients with long QT syndrome may also be implanted with an automated implantable cardioverter defibrillator which delivers electrical shocks to reset the heart rhythm when the heart rate reaches dangerous levels.

MANAGING PATIENTS WITH STABLE CORONARY ARTERY DISEASE: KEY POINTS FROM THE ESC GUIDELINES UPDATE

Stable coronary artery disease (SCAD) now defines the different evolutionary phases of coronary artery disease (CAD) until the point where acute coronary syndromes set in. The concept of SCAD has been broadened to include the following patient groups:

- Those having stable angina pectoris or other symptoms felt to be related to coronary artery disease, such as shortness of breath
- Those previously symptomatic with known obstructive or non-obstructive CAD who have become asymptomatic with treatment and need regular follow-up
- Those who report symptoms for the first time and are judged to be already in a chronic stable condition

Traditional understanding of SCAD is that of a disease causing exercise- and stress-related chest symptoms due to narrowing in one or several of the major coronary arteries. In fact, there are different underlying mechanisms of known or suspected SCAD. These include fixed or dynamic plaque-related obstruction of epicardial arteries, focal or diffused spasm of normal or plaque-disease arteries, microvascular dysfunction, and left ventricular dysfunction caused by prior acute myocardial necrosis and/or hibernation. The current guidelines consider not only such atherosclerotic narrowings, but also microvascular dysfunction and coronary vasospasm in the diagnostic and prognostic algorithms. Accordingly, the latest European Society of Cardiology (ESC) guidelines now define the different evolutionary phases encompassing the various evolutionary phases of coronary artery disease (CAD) excluding the situations in which coronary artery thrombosis dominates clinical presentation (acute coronary syndromes, or ACS).

By Dr Ewe See Hooi

Consultant
Department of Cardiology

National Heart Centre Singapore

Dr Ewe's sub-specialty interest is in non-invasive multi-modular cardiovascular imaging. She did a two year fellowship in cardiac imaging, including echocardiography, cardiac computed tomography, magnetic resonance imaging and nuclear cardiology, as well as clinical research related to these areas at Leiden University Medical Center in the Netherlands. Dr Ewe is also the Medical Editor of Murmurs and she is currently pursuing a PhD in cardiac imaging.

Challenges in diagnosing SCAD

The guidelines recognise that the manifestations of chest pain are very variable, even within a single patient, which make the distinction between symptoms caused by an epicardial stenosis and that by functional disease at the level of microvasculature or vasospasm less certain. Although there is limited epidemiological data on microvascular and vasospastic angina, recent data suggest that abnormal coronary vasomotion is present in two-thirds of patients with SCAD. In fact, close to 40 per cent of patients were found to have normal or near-normal coronary arteries at diagnostic angiography in a recent study. Accordingly, the current guidelines hope to make practitioners dealing with patients with stable chest pain and other forms of SCAD think more often of functional coronary disease, and not just coronary artery stenosis, which then should be managed and treated appropriately.

The guidelines also recognise that it is often challenging to distinguish between SCAD with superimposed attacks of vasospasm causing chest pain at rest and true unstable angina pectoris (UAP, considered an ACS). In view of this, if patients present with manifestations suggestive of UAP (outlined below), they should be referred to the emergency department to be monitored and managed as per ACS guidelines.

UAP may present in a few ways:

- As rest angina (prolonged period of >20 minutes of characteristic pain at rest)
- New onset (de novo) of moderate-to-severe angina (CCS class II or III)
- Recent destabilisation of previously stable angina with at least CCS class III angina (crescendo angina) over a short period of four weeks or less

Pretest probability of SCAD

Exercise electrocardiogram (ECG) is recommended as the initial test for establishing a diagnosis of SCAD in patients with symptoms of angina and intermediate pretest probability (PTP) of CAD.

Despite its well-known low sensitivity of about 50 per cent and higher false positive test results compared to other stress imaging tests, exercise ECG is completely non-invasive, radiation-free and easily available at a relatively low cost. Thus, the current guidelines decided to keep this well-established and time-honoured test in the algorithm for patients with intermediate PTP (15 to 65 per cent) of CAD, provided they have a normal resting ECG and are able to exercise. Moreover, exercise ECG provides additional information such as heart rate response, blood pressure response, symptoms and workload achieved, which have both diagnostic and prognostic implications.

However, in view of the superior diagnostic performance associated with stress imaging test and its ability to quantify and localise ischaemia, stress imaging test is recommended as an initial test where local expertise and availability permits and in patients with higher intermediate PTP of 65 to 85 per cent. Finally, the guidelines stress that the choice of initial test should be based on PTP, resting ECG, physical ability to perform exercise, patient's suitability for the test and local expertise.

SCAD in diabetic patients

The guidelines agree that despite the fact that there is a higher prevalence of silent ischaemia in diabetic patients, routine screening in asymptomatic diabetic patients is not recommended as it does not improve outcomes as long as risk factors of cardiovascular disease are treated, based on recent studies showing that intensive Optimal Medical Therapy (OMT) may provide equal outcomes to invasive revascularisation and that silent ischaemia may reverse over time. In addition, there is no clinical benefit in routine screening of asymptomatic patients with type 2 diabetes and normal ECGs.

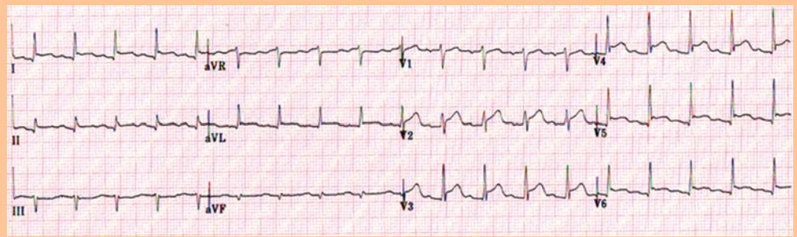
Accordingly, the current guidelines caution the role of new non-invasive CAD screening tests such as cardiac computed tomography in asymptomatic diabetic patients, as their routine use leads to radiation exposure and may result in unnecessary invasive testing. With regard to revascularisation, percutaneous coronary intervention (PCI) is recommended in diabetics with single vessel disease and coronary artery bypass graft surgery in those with multivessel disease. Heart team assessment, however, is suggested especially for those with double vessel disease or without left anterior descending involvement. If PCI is performed, drug-eluting stents should be considered as it has been shown to be more efficacious in preventing restenosis in diabetics.

How the changes apply to primary care

Primary care physicians have a key role to play in managing patients with SCAD. They ensure patients understand the benefits of medical therapy, lifestyle changes and risk factors optimisation. They evaluate patients' compliance to therapy, appraise their risk factors and monitor for changes in clinical status on a regular basis. Early re-assessment and referral for further evaluation are initiated in patients who experience symptoms suggestive of ongoing myocardial ischaemia, despite OMT and lifestyle intervention. A shared care system between general practitioners and cardiologists will be most ideal, where prompt review by cardiologists or early access to further tests or interventions can be arranged, while SCAD patients can continue to be managed optimally in a familiar primary care setting.

ANALYSE THIS

BASED ON THE ECG SHOWN HERE, WHAT CONDITION MIGHT THE PATIENT HAVE?



Refer to page 10 for the answer.

BAG LETS PATIENTS GLIDE TO RECOVERY

Post-surgical patients can now have a safer and quicker recovery – all with the help of a plastic bag.

A multidisciplinary team at National Heart Centre Singapore (NHCS) has developed a simple yet effective way of putting on tight anti-embolism compression stockings for patients, which involves covering the patient's foot with a plastic bag before pulling the stocking over. The plastic provides a lubricating layer for the cotton-based stocking to glide smoothly over the toes and ankle – the two "tight" areas on the foot where the stocking fabric tends to get snagged.

This new method succeeded in getting 70 per cent of open-heart surgery patients to continue wearing their anti-embolism stockings after being discharged from hospital, a marked improvement from the 17 per cent compliance rate before. The team's innovative solution has earned them the ninth place at the Team Excellence Best Team Award Competition in July 2013, out of some 400 project submissions.

Representatives of the team from Ward 56, NHCS, that won the Team Excellence Best Team Award for their anti-embolism stocking initiative: (from left) Mr Chang Choong Kek, Nurse Clinician, Ms Norazlinda Binte Abdul Malek, Principal Enrolled Nurse, Ms Pearl Wee, Nurse Clinician, and Mr Chia Li Sen, Patient Care Assistant.

When rolling up the anti-embolism stocking, care must be taken to ensure there are no wrinkles in the stocking.

The plastic bag used to cover the toes and ankle is removed after the stocking is properly rolled up in place.

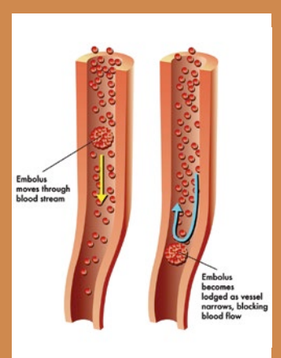
Images courtesy of Singapore Health

These stockings could save your life

All open-heart surgery patients at NHCS are required to wear anti-embolism compression stockings continuously for four to six weeks following their surgery. The stockings serve to thwart the onset of serious but easily preventable complications, namely leg swelling, oozing of leg wounds and pulmonary embolism. Pulmonary embolism occurs when a blood clot travels to the lungs and blocks a lung artery, resulting in permanent damage to the affected lung and organ damage.

"The tightness of the stockings exert pressure on the leg veins and help blood to flow better through the legs, preventing the formation of blood clots in the leg veins, also known as venous thromboembolism," Dr Loh Yee Jim, a member of the team and Visiting Consultant, Department of Cardiothoracic Surgery, NHCS, explained, "Depending on the size and number of clots, the condition can become life-threatening."

What is pulmonary embolism?



Pulmonary embolism occurs when one or more arteries in the lungs are blocked due to blood clots formed in another part of the body which travel to the lungs, and this condition can become life-threatening. The risk of death, however, can be minimised by wearing anti-embolism compression stockings to prevent the formation of blood clots in the legs. Symptoms of pulmonary embolism include shortness of breath, chest pain and coughing that produces blood-streaked sputum.

A simple solution to a difficult task

Most open-heart surgery patients will not be able to bend over while seated to put on the stockings themselves during the initial recovery phase due to their chest wounds. These patients will generally need a caregiver to help them with the uphill task. Additional care when rolling up the stockings is also essential for those who had a leg vein removed for use as graft in heart bypass surgeries, which leaves a long wound that can extend along the entire length of the leg down to the ankle.

The team brainstormed for possible ways to facilitate the wearing of the anti-embolism stockings, and eventually arrived at the humble yet cost-effective plastic bag as the ultimate solution. Ideas on using talcum powder or cream to ease the wearing process were discarded along the way as they were deemed too messy and unfeasible for patients with leg wounds.

Following the introduction of the new "plastic bag" method in May 2013, healthcare workers, patients, and caregivers were all taught how to use a plastic bag to help ease on the tight anti-embolism stockings. Patient education on the importance of wearing the stockings was emphasised at the various touch points of interaction between patients and healthcare workers, including daily ward rounds and outpatient clinic consultations by doctors, wound dressing by nurses and patient care assistants, as well as review sessions by physiotherapists.

Not only did the compliance rate rise by 53 percentage points, the time taken to put on the compression stockings dropped from 10 to four minutes after switching to the use of plastic bags. The project also helped to save manpower costs by about $50,000 a year and the time freed can be focused on other areas of patient care.

Heart patient Mr Mohamed Ismail Bin Aziz, 65, had his bypass operation done in early September 2013 and, together with his wife, found the method easy to learn. "I think it is a good idea to introduce this to everyone," he said.

ATRIAL SEPTAL DEFECTS: A QUESTION OF CLOSURE

Apart from bicuspid aortic valve, atrial septal defects (ASDs) are one of the most commonly encountered congenital heart problems. In fact, they make up six to 10 per cent of all cardiac malformations. They are more common in females with a 2:1 preponderance. Well-recognised associations of ASDs are Trisomy 21 and Holt-Oram syndrome.

Anatomical classification: A confusing case of misnomers

We classify ASDs based on three main categories:

i. Anatomical location
ii. Size of the defect
iii. Haemodynamic significance

Contrary to their name, secundum ASDs are really deficiencies of the septum primum, which forms the base of the fossa ovalis, and makes up 60 per cent of all ASDs. Other rarer forms of ASDs include primum ASDs (20 per cent), which are actually defects of the endocardial cushions, rather than the septum primum. Primum ASDs form one end of the spectrum of atrioventricular septal defects (AVSDs). Sinus venosus (15 per cent) and coronary sinus defects (5 per cent) arise from un-roofing of the sinus venosus and coronary sinus, respectively.

ASDs larger than 10mm or more than half of the diameter of the left ventricular outflow tract are considered significant. Any evidence of right atrial or right heart enlargement, after excluding other causes, is considered haemodynamically significant.

First signs and investigations

Most patients with large ASDs have the condition picked up by a paediatrician at birth. These infants are often breathless and even present with heart failure or recurrent chest infections.

Those who fall through the cracks usually have smaller defects and have no symptoms. They may be picked up later in life, such as during an obstetrician's check-up for pregnant women.

By Dr Kenneth Guo

Associate Consultant
Department of Cardiology

National Heart Centre Singapore

Dr Guo's sub-specialty interest is in Adult Congenital Heart Disease (ACHD) and he recently completed a year-long fellowship at the Royal Victoria Hospital's MAUDE unit, part of McGill University Health Centre and one of Canada's largest ACHD centres in Montreal.

Sometimes, patients may present late with symptoms of breathlessness or palpitations of atrial fibrillation. They are usually patients with borderline-sized ASDs who did well in their younger days. As they age, hypertensive or ischaemic heart disease sets in, resulting in a stiffer left ventricle.

The rise in the left ventricular end-diastolic pressure from this diastolic dysfunction is transmitted to the left atrium, resulting in more left-to-right shunting and pulmonary congestion. Very rarely, we see patients with significant pulmonary hypertension or Eisenmenger's physiology.

Closure of ASDs

Small defects (less than 10mm), with no evidence of right heart enlargement, pulmonary hypertension or atrial fibrillation, can be conservatively managed. The majority of patients sail through life without any problems.

Indications to close an ASD are as follows:

i. The patient is symptomatic and other causes have been excluded
ii. Defects larger than 10mm in size
iii. Evidence of right heart dilatation
iv. Significant flow demonstrated across the defect by a right and left heart study, with a ratio of pulmonary-to-systemic flow of more than 1.5
v. History of thrombo-embolic events resulting from paradoxical embolus
vi. Occupational requirements, e.g. professional deep sea divers

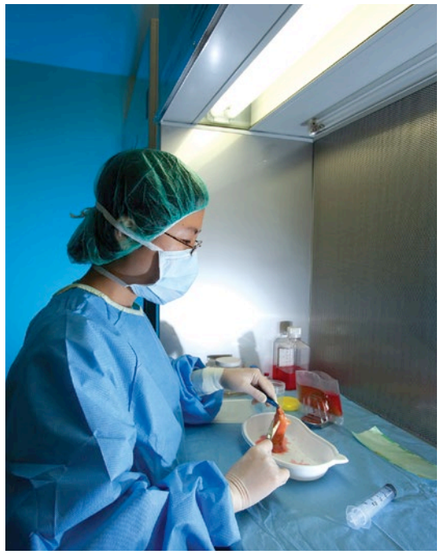
Secundum ASDs with adequate margins can be closed percutaneously with septal occluders. Suitability for device closure will have to be assessed by trans-oesophageal echocardiogram, during which the margins are evaluated, multiple fenestrations excluded, and all pulmonary veins accounted for. Very rarely, the right upper pulmonary vein may drain into the superior vena cava. In the presence of this anomalous connection, inadequate margins or multiple fenestrations, a surgical correction is recommended instead.

Post-percutaneous device closure, the patient is kept on dual antiplatelets for two months, followed by a single antiplatelet for another four months. At six months, a repeat trans-thoracic echocardiogram is performed to confirm the absence of any residual shunt. In the rare eventuality that a small leak remains, it is recommended that the patient be kept on a single antiplatelet agent. Early and intermediate results are excellent after device closure for most cases. The intermediate results are comparable to surgery, with a high rate of shunt closure and few major complications.

A paper published in the New England Journal of Medicine in 1990 by Gordon K Danielson showed a mortality benefit if a haemodynamically significant ASD is closed before the age of 25. The expected survival was found to be similar to the age- and sex-matched control population. In addition, closure before the age of 40 is associated with a lower incidence of pre-operative and late atrial fibrillation or flutter.

Both the American Heart Association/American College of Cardiology and the British National Institute for Health and Care Excellence guidelines no longer recommend the routine use of antibiotic prophylaxis for the prevention of bacterial endocarditis in patients with ASDs. Exceptions to this rule include a prior history of infective endocarditis, during the immediate six months post-device closure, or in the presence of a residual shunt post-device closure.

RESEARCH HIGHLIGHT



J Cardiovasc Electrophysiol. 2013 Sep;24(9):995-1001. doi: 10.1111/jce.12174. Epub 2013 May 23.

Adenosine testing in atrial flutter ablation: unmasking of dormant conduction across the cavotricuspid isthmus and risk of recurrence.

Morales GX, Macle L, Khairy P, Charnigo R, Davidson E, Thal S, Ching C, Lellouche N, Whitbeck M, Delisle B, Thompson J, DI Biase L, Natale A, Nattel S, Elayi CS.

ABSTRACT

BACKGROUND: Adenosine-induced hyperpolarization may identify pulmonary veins at risk of reconnection following electrical isolation for atrial fibrillation. The potential role of adenosine testing in other arrhythmic substrates, such as cavotricuspid isthmus (CTI)-dependent atrial flutter, remains unclear. We assessed whether dormant conduction across the CTI may be revealed by adenosine after ablation-induced bidirectional block, and its association with recurrent flutter.

METHODS AND RESULTS: Patients undergoing catheter ablation for CTI-dependent flutter were prospectively studied. After confirming bidirectional block across the CTI by standard pacing maneuvers, adenosine (≥12 mg IV) was administered to assess resumption of conduction, followed by isoproterenol (ISP) bolus. Further CTI ablation was performed for persistent (but not transient) resumption of conduction. Bidirectional block across the CTI was achieved in all 81 patients (63 males), age 61.2 ± 11.0 years. The trans-CTI time increased from 71.9 ± 18.1 milliseconds preablation to 166.2 ± 26.4 milliseconds postablation. Adenosine elicited resumption of conduction across the CTI in 7 patients (8.6%), 2 of whom had transient recovery. No additional patient with dormant conduction was identified by ISP. Over a follow-up of 11.8 ± 8.0 months, atrial flutter recurred in 4 (4.9%) patients, 3/7(42.9%) with a positive adenosine challenge versus 1/74 (1.3%) with a negative response, P = 0.0016 (relative risk 31.7).

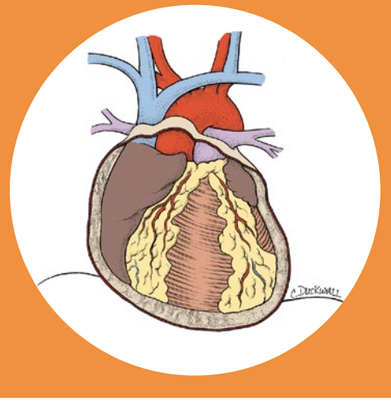
CONCLUSION: Adenosine challenge following atrial flutter ablation provoked transient or persistent resumption of conduction across the CTI in almost 9% of patients and identified a subgroup at higher risk of flutter recurrence. It remains to be determined whether additional ablation guided by adenosine testing during the index procedure may further improve procedural outcomes.

For the full list of NHCS publications, please refer to ***www.nhcs.com.sg****.*

ANALYSE THAT

Continued from page 5.

The ECG indicates pericarditis, with the typical features of widespread concave ST elevation in all leads except aVR. Pericarditis can mimic ischaemic and pleuritic pain, and be relieved by sitting up and leaning forward.



GLEANING THE BEST PRACTICES FROM MONTREAL

The ACHD team at the MAUDE unit, McGill University Health Centre: (front row, from left) Dr Judith Therrien and Dr Natalie Bottega; (back row) Dr Renee Schiff, Dr Kenneth Guo, Prof Ariane Marelli and Dr Darren Mylotte.

After spending one year in Montreal, Canada, for his fellowship, Dr Kenneth Guo, Associate Consultant, Department of Cardiology, National Heart Centre Singapore, is now able to take a patient's cardiac history in reasonable French. Find out what else he learnt during his fellowship.

How has the training benefitted you?

I was attached to the McGill Adult Unit for Congenital Heart Disease, better known as the MAUDE Unit which is part of the McGill University Health Centre (MUHC), one of the largest Adult Congenital Heart Disease (ACHD) centres in Canada. I had the opportunity to work with world renowned ACHD specialists like Professor Ariane Marelli and Dr Judith Therrien. The unit also has close collaborations with other sub-specialties, such as electrophysiology, heart failure and transplant, and obstetrics. Their services span across four tertiary hospitals, one of which is the Royal Victoria Hospital where the MAUDE Unit resides.

Given the MUHC's long and illustrious history and a large patient pool that includes geriatric ACHD patients, I had the chance to see and manage very complex cases that I would unlikely encounter in Singapore. My training also included cardiac magnetic resonance imaging for complex ACHD cases, where I was privileged to be trained under Dr Luc Jutras, one of the most experienced imaging specialists for ACHD in Canada.

I was also impressed with the excellent research set-up at MUHC. The MAUDE Unit had a team of epidemiologists and statisticians whom we worked closely with, and there were weekly research meetings where every research project was discussed and tracked. I wrote and published a few abstracts and papers during my time there.

What are your plans?

The ACHD patient pool has been growing rapidly at NHCS so I hope to expand the ACHD services here. We are planning to extend the ACHD services at NHCS to other hospitals. I think NHCS has a lot to offer in terms of ACHD training, and I believe we should encourage specialty training in ACHD for nurses, as well as a fellowship programme for overseas cardiologists.

Any memorable experience?

The temperature – it fluctuates by up to 70°C! Winter lasted for eight months, with temperatures dipping to –40°C, and snowfall of up to 40 cm a day. On 27 December 2012, the snow was falling so heavily that cars were buried in it! For anyone intending to spend winter in Montreal, I would recommend getting a Canada Goose jacket, which is commonly worn for Arctic expeditions. The air was so frigid that I had cold burns on my face and legs.

I also spent a lot of time with my wife who took six months of unpaid leave to visit me. Through our time together, she has overtaken me as a cook. In addition to winning over my heart, she has also won over my stomach.

TRAILBLAZER IN NUCLEAR CARDIOLOGY WINS PRESTIGIOUS NATIONAL AWARD

Assoc Prof Terrance Chua, Deputy Medical Director, National Heart Centre Singapore (NHCS), received the illustrious National Outstanding Clinician Award 2013 from Health Minister Gan Kim Yong (right) at the National Medical Excellence Awards ceremony on 24 July 2013. The award recognises physicians who have made exceptional contributions to clinical work that advances the safety and quality of patient care. Prof Chua established Singapore's first cardiac-dedicated nuclear imaging laboratory in 1994, together with the department of nuclear medicine at Singapore General Hospital. Under his stewardship, the number of nuclear cardiology imaging tests performed each year has grown tremendously from 2,000 annually back when the service was first introduced, to over 9,000 each year now – making NHCS one of the highest cardiac nuclear imaging volume centres in the world.

Three cheers for healthcare management

The three teams from NHCS received their prizes on 20 August 2013 during the Singapore Healthcare Management Congress 2013.

NHCS bagged three awards at the Singapore Healthcare Management 2013 poster competition, organised by SingHealth to showcase the best innovations and ideas for improvement in the areas of operations, finance, human resource, service quality, communications and risk management. The BEES Team from Cardiac Laboratory came in tops in the Operations category for their excellent work in streamlining non-invasive cardiac investigation reporting and archiving. The PACE Team from Ward 44, NHCS, received 2nd prize for their project on tracking cardiac patients on the hospital grounds via radio frequency identification technology. The initiative on improving the rate of wearing anti-embolism stockings for heart surgery patients earned Ward 56's CTS Team a Merit prize.

Launch of new vision and mission statements

In keeping abreast with our Academic Medicine journey and the changing landscape of public healthcare, NHCS has given a facelift to the vision and mission statements that were conceived when the institution became autonomous in 1999. The new concise statements underscore NHCS' commitment to patient care, education and research, and aim to resonate with staff members in their daily work.

VISION: The leader in heart care.

MISSION: A people-centred organisation serving patients through passion and innovation in cardiovascular care, research and education.

APPOINTMENT WITH NUS YONG LOO LIN SCHOOL OF MEDICINE

ASSOC PROF KENNY SIN
Clinical Associate Professor
Department of Surgery

ADVISOR Assoc Prof Koh Tian Hai
MEDICAL EDITOR Dr Ewe See Hooi
EDITORIAL TEAM Yvonne Then, Jessica Koh, Lim Peizhen

We value your feedback. For comments or queries on Murmurs, please email us at ***nhcs@nhcs.com.sg****.*