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MURMURS®

ASIANS AT
HIGHER RISK FOR
HEART FAILURE



NHCS HEART TO HEART GALA 2016
RAISES MORE THAN \$650,000

POORER LONG TERM
OUTCOMES FOR
DIABETICS AFTER
BYPASS SURGERY

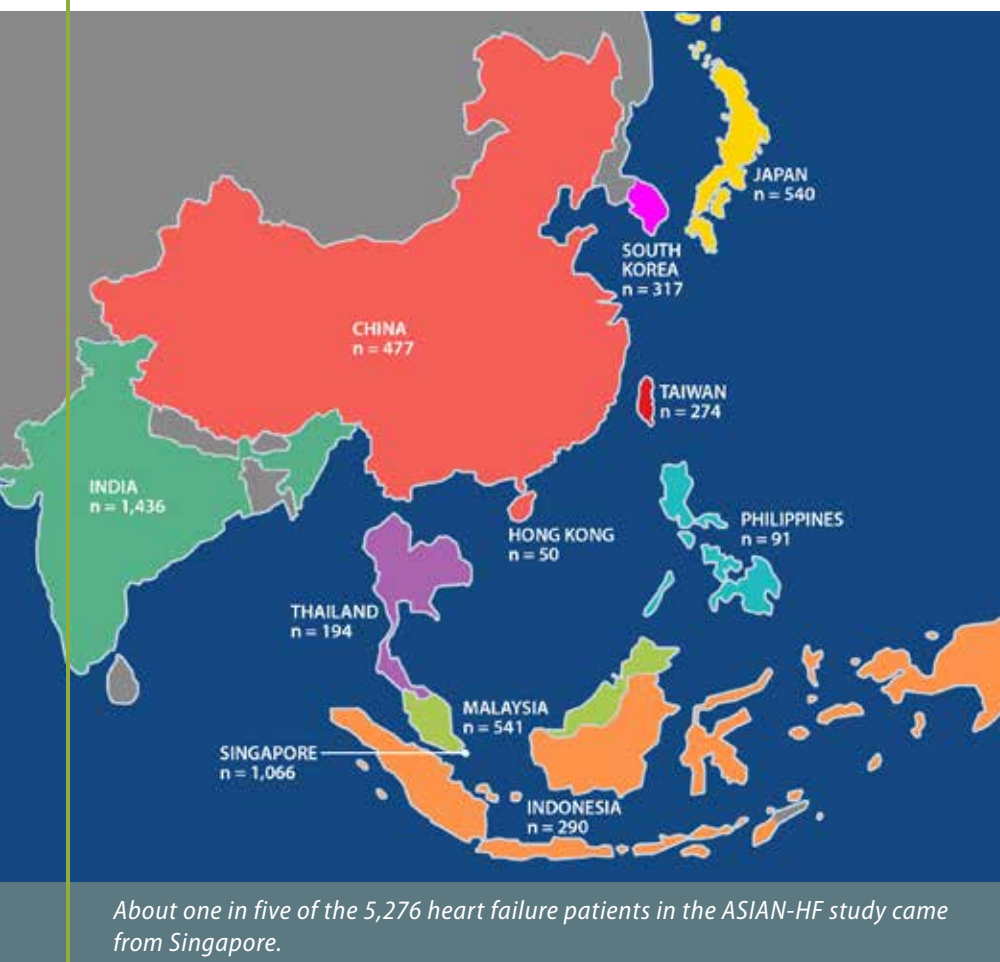
START YOUNG FOR A
HEALTHY HEART

CARDIOLOGIST
RETURNS FROM
NEW YORK WITH
FRESH IDEAS

WE WANT
TO HEAR
FROM YOU

ASIANS AT HIGHER RISK OF HEART FAILURE

LIFESTYLE DISEASES AT THE ROOT OF THE PROBLEM



Not many know that Asia has the largest population of heart failure patients in the world. Southeast Asia alone is home to nine million heart failure patients, while the United States only has six million.

Despite the staggering numbers, comprehensive research on heart failure in Asia remains nascent and is decades behind Europe

and the United States. One of the major research milestones in this part of the world was the establishment of the Asian-HF registry in 2012. Aimed at bridging the wide knowledge gap, the registry gathers real world data on the demographics and risk factors of heart failure patients from 11 regions: China, India, Japan, South Korea, Indonesia, Malaysia, Singapore, the Philippines, Thailand, Taiwan and Hong Kong.

A study led by Associate Professor Carolyn Lam, Senior Consultant, Department of Cardiology, National Heart Centre Singapore (NHCS) analysed the prospective multinational

Asian data from the registry and the late-breaking findings were recently published in the European Heart Journal in August 2016. It found that aside from getting heart failure about ten years earlier than their Western counterparts, Asian heart failure patients are in fact very different from each other based on their ethnicity and the region they are living in. The study was initiated by the National University Heart Centre, Singapore, in partnership with NHCS and other centres.

Heart failure in Singapore

5,276 heart failure patients were recruited for the study. Of the 1,066 patients from Singapore, 62 per cent had coronary artery disease, 70 per cent had hypertension and 58 per cent had diabetes. The Singaporean heart failure patients had an average body mass index (BMI) of 25.9; a BMI exceeding 23 is known to increase one's risk for heart disease, diabetes and other health issues. Through the study, Singaporeans were also found to suffer from heart failure at the mean age of 61, a decade earlier than Caucasians.

"In Singapore, we have transitioned rapidly, and it is now the baby boomers who have reached that age of 60, and they are manifesting heart failure from these risk factors," explained Associate Professor Lam, who is also a Clinician Scientist with the SingHealth Duke-NUS Cardiovascular Sciences Academic Clinical Programme and an Associate Professor with the Programme in Cardiovascular & Metabolic Disorders at Duke-NUS Medical School.

Fortunately, much of what culminates in heart failure can be prevented.



Associate Professor Carolyn Lam (left), Senior Consultant, Department of Cardiology, NHCS, is the principal investigator for the ASIAN-HF study.

"The silver lining is that most cardiovascular risk factors are modifiable," said Associate Professor Lam, "There is a lot we can do to reduce or prevent the risk of hypertension, diabetes and coronary artery disease. By extension, this means that most of us will be able to lower our risk of developing heart failure if we keep to a healthy lifestyle through a sensible diet and regular exercise."

She added that simple acts like walking and taking the stairs more often can be effective in keeping heart failure at bay.

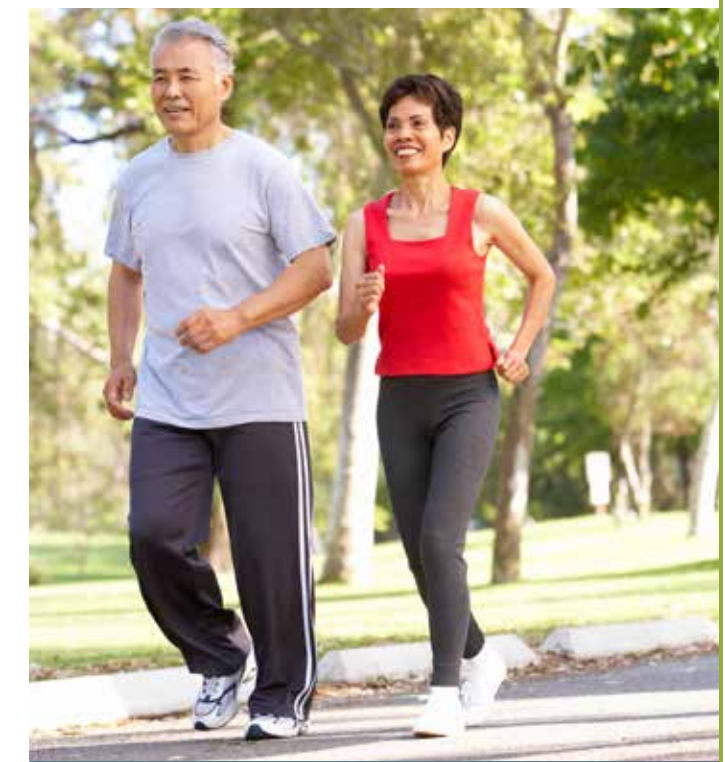
No single Asian phenotype for heart failure

The study also painted an interesting and diverse picture of the Asian heart failure population when it compared the three risk factors across geographic regions, regional income levels and ethnicity.

Results showed that Chinese heart failure patients across the board were more than twice as likely to develop coronary artery disease as the Japanese or South Koreans. The team found differences when comparing patients of the same ethnicity who were living in different parts of Asia. For example, Indian patients living in higher income regions had five times the risk of developing diabetes than those from lower income regions.

The team plans to follow up with the patients for the next two to three years to see how they are faring and their outcomes.

The ASIAN-HF study is supported by grants from the Boston Scientific Investigator Sponsored Research Program, National Research Foundation Singapore under its Translational and Clinical Research Flagship Programme administered by the Singapore Ministry of Health's National Medical Research Council, the Asian Network for Translational Research and Cardiovascular Trials programme funded by the Agency for Science, Technology and Research, and Bayer.



Simple acts like walking and taking the stairs more often can help prevent or delay the onset of heart failure.



Adjunct Professor Terrance Chua (leftmost), Medical Director, NHCS, with Dr Vivian Balakrishnan, Minister for Foreign Affairs (centre) and the top bidders and sponsors at the NHCS Heart To Heart Gala 2016 auction.

GIVING FROM THE HEART

**NHCS HEART TO HEART GALA 2016
RAISES MORE THAN \$650,000**

The humble tree provides shade and fruit, and its fallen leaves nourish the earth which the roots feed from.

Inspired by the sylvan metaphor for the philanthropic cycle, the National Heart Centre Singapore (NHCS) held its second Heart To Heart Gala on 15 April 2016 to the theme of the enchanted forest.

Some 260 guests attended the magical evening at the Conrad Centennial Singapore's grand ballroom which was festooned with hanging vines and lush greenery at every table to create a memorable experience following the theme. From the small paper owls on the tables to the fresh "garden soil" made of nuts and seeds in the appetiser, no effort was spared in transporting the guests to an enchanted forest as they gathered to celebrate the important cause of raising funds for improved patient care and cardiovascular research.

Graced by guest-of-honour Dr Vivian Balakrishnan, Minister for Foreign Affairs, the evening opened with a brilliant number by the lithe ballerinas from The Ballet School Singapore whose young students are no strangers to international dance competitions. A whimsical four-course dinner crafted by the hotel's executive chef David Laval made sure to play on the senses while leaving a fond impression on the palate.



Bonsai master Mr Boh Twang Keng (left) explains the unique features of the *Blanchia Chunii* bonsai to Dr Vivian Balakrishnan, Minister for Foreign Affairs and guest-of-honour at the NHCS Heart To Heart Gala 2016. The bonsai fetched \$12,000 during the gala's auction.



Talented young ladies aged six to 11 years from The Ballet School Singapore enraptured guests with their elegant leaps and turns, much inspired by the birds and butterflies waltzing through their arboreal home.



Patient beneficiary Mr Andy Peh and his wife share how the NHCS Heart To Heart Fund has helped tide their family through difficult times after he underwent a life-saving surgery to implant a mechanical heart assist device.



Guests were treated to an intriguing and tantalising dining experience which evoked images of bubbling creeks and treasure-filled chocolate wheelbarrows.

11 items were put up for auction, and they ranged from a commissioned family portrait by famed celebrity photographer Bob Lee, to a tree sculpture mounted on a 200 million-year-old fossil base. Together with the generous donations from institutions and philanthropists such as Mr Kwee Liong Tek, Lee Foundation, Shaw Foundation, TOTE Board and the Stephen Riady Foundation, NHCS succeeded in raising more than \$650,000 from the gala. The funds will go towards much-needed translational research in cardiovascular medicine and helping heart patients who require financial assistance.

One such patient is Mr Andy Peh who received a monthly stipend from the NHCS Heart To Heart Fund, defraying part of the cost of his household needs and allowing his children to continue going to school while he was recovering from his major heart surgery.

"I am very grateful to the NHCS Heart To Heart Fund as the assistance extended has been of very great help to my family. Once I have fully recovered, I would really like to get back to working life again," said Mr Peh.

BETTER LONG-TERM SURVIVAL FOR NON-DIABETICS AFTER BYPASS SURGERY

A study done by a team of National Heart Centre Singapore (NHCS) surgeons has found that patients without diabetes who undergo coronary artery bypass graft (CABG) surgery tend to do better in the years that follow.

This was deduced from a retrospective study of 5,720 patients with more than one blocked artery who underwent CABG surgery for the first time between August 1982 and December 1999. No other concurrent procedures were performed on these patients during the operation.

The study, where one in three patients involved had diabetes mellitus, looked at the effect of diabetes on long-term survival outcomes for CABG patients in our local population. The team found that once past the five-year mark following surgery, a patient's risk of death from cardiac causes grows over the years if he or she is diabetic.

Fortunately, aggressive treatment for diabetes can improve survival. This includes a healthy diet, taking medications as prescribed, going for regular eye, urine and neurological checks to ensure proper diabetic management, and maintaining optimal blood sugar levels.

“Evidence-based medicine has shown that diabetic patients who undergo CABG surgery tend to have better outcomes than those who are treated with solely medications or stenting procedures,” said Adjunct Associate Professor Kenny Sin, Deputy Medical Director, Head and Senior Consultant, Department of Cardiothoracic Surgery, NHCS, and senior author of the study, “It is recommended that diabetics do not shun bypass surgery when their doctors advise them to go for it, and following surgery they should continue to take extra care in managing their condition to minimise complications and arterial blockages from recurring in the long run.”

Diabetic patients are also strongly encouraged to quit smoking if they have the habit. Smoking is a major risk factor for heart disease and it increases the risk of lung complications after CABG in addition to disrupting wound healing. Hence, smoking cessation is essential in improving the long-term survival of CABG diabetic patients.

For CABG patients, diabetes can adversely affect the inner lining of blood vessels and increase blockage in the arteries due to inflammation and clot formation. Over time, this blockage may occur in the bypass grafts as well. The study also found the incidence of fatal stroke during follow-up to be 2.5 times higher in diabetic patients.

“Patients with untreated or poorly controlled diabetes who undergo CABG also face an increased risk of wound infection,” said Dr Philip Pang, Associate Consultant, Department of Cardiothoracic Surgery, NHCS and first author of the research paper published in the March 2016 issue of ANNALS, the medical journal of the Academy of Medicine, Singapore. The paper won the 2015 Young Surgeon's Award.

Post-surgical wound infection for diabetics can be fatal. The resulting complications include multiple end-organ damage, kidney failure, stroke and gangrene which may call for amputation.

Narrowing down the difference and improving survival rates

The average age of the patients in the study was 59 years at the time when they underwent the CABG surgery, and more than three-quarters of the 5,720 were men.

To ensure a fairer comparison, 561 non-diabetic patients were matched with 561 diabetics in a subgroup study across eight clinical characteristics, including age, gender and medical history.

Patients with untreated or poorly controlled diabetes face an increased risk of wound infection when they undergo coronary artery bypass graft surgery.

“One-to-one propensity matching gives a more accurate picture of how the diabetic patients fared against the non-diabetics following CABG,” said Dr Pang.

An analysis of the subgroup showed that with the difference narrowed down to just having diabetes or otherwise, diabetics had a 50 per cent higher risk of late cardiac mortality. At the end of two decades, 58 per cent of the diabetic patients did not die of heart-related causes such as a heart attack or heart failure, while the same went for 70 per cent of the patients without diabetes.

As such, doctors stress the importance of proper diabetic management in improving long-term survival and that CABG surgery remains the better treatment option for diabetic patients who need it.



Diabetic patients should quit smoking as it increases the risk of lung complications and disrupts wound healing following surgery.



Adhering to the prescribed medication regime is one way of improving survival for diabetics after surgery.

START YOUNG FOR A STRONG HEART THAT LASTS

BUT IT IS NEVER TOO LATE TO GET ON THE RIGHT TRACK OF HEALTH

P Prevention is better than cure.

As hackneyed as it sounds, this old saying will always ring true when it comes to keeping the heart healthy.

The rule of thumb to extending the durability of our heart and making sure it works properly even in our later years is a healthy mix of a balanced diet and exercise. Nonetheless, there are certain things which predispose some of us to heart disease.

"Factors beyond our control include age, gender, and family history," said Dr Lim Choon Pin, Consultant, Department of Cardiology, National Heart Centre Singapore (NHCS), "But take heart – there are many factors we can control."

20s to 30s: Pivotal point for the heart

Setting aside any congenital heart conditions or structural defects in the heart for patients who are born with them, people in their 20s and 30s will generally be in the pink of health, at least for the heart.

Though this is the time the heart is probably at its best and free of blockage in the arteries, this is also when cholesterol plaque begins forming in the arteries. Left unchecked, this blockage will culminate in a massive heart attack 20 years later. Similarly, how strong a presence cigarettes, alcohol and erratic sleep patterns has in our young lives will determine whether we will be saddled with diabetes, high blood pressure, high cholesterol and heart problems when we hit our 50s and 60s.

There is, however, no need to go for routine tests if you are young, unless you have a family history of heart disease or have experienced related symptoms. 30 minutes of moderate-intensity exercise such as brisk walking, cycling or dancing five times a week, or 25 minutes of high intensity workouts such as jogging, swimming or tennis thrice a week will help keep you and your heart in good shape.

Coupled with a balanced diet comprising plenty of vegetables, fruit and whole grains, young adults should strive to stay within the 18.3 and 23 range for their BMI. They should also eschew smoking, drink moderately if they must, and get at least six hours of sleep. Research has shown that people who stint on their shuteye have almost a 48 per cent chance of dying from heart disease and 15 per cent higher risk of stroke when they reach middle age.



70s to 80s: Time and tide waits for no man



Wear and tear is inevitable with age. Even if they have been taking good care of their overall health thus far, people in their 70s and 80s may still develop health problems such as high blood pressure and the physiological stiffening of the heart muscle. They are also at a higher risk for an abnormal heart rhythm due to blockage or scarring in parts of the heart. They will then need to be implanted with a pacemaker to correct their heart rate.

Septuagenarians may develop atrial fibrillation which can lead to stroke, or their heart valves may harden or leak due to ageing, which will then need to be replaced or repaired. Fortunately, medical advancement has seen the introduction of minimally invasive treatments which are suitable for some elderly patients.

At the end of the day, Dr Lim advises: "Take care of your heart early in life, and you will reap the rewards as you age. Generally speaking, if you do, you can expect your heart to remain healthy and strong for most of your life."

40s to 60s: Keep a close eye on your health

Upon reaching 40 years of age, the heart should still be working fine but we will have to contend with ischaemic heart disease. Age is an inherent risk factor and, on average, the chances of men developing coronary artery disease increases when they turn 45, and women will have the same risk at 55. Women are affected later as they are protected by oestrogen in their pre-menopause years.

Even if they feel fine, people in their 40s to 60s should start going for regular checks on their blood sugar, cholesterol and blood pressure levels. When these three are unregulated and exceed healthy levels, the blood vessel walls may get damaged and encourage clots to form, which may result in subsequent heart attacks or stroke.

"While it is normal to have a healthy and unblocked heart, it is becoming increasingly less common," warned Dr Lim.



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NHCS INTERVENTIONAL CARDIOLOGY PROCEDURES

- Coronary angiography/cardiac catheterisation
- Percutaneous coronary intervention (PCI) – angioplasty, stent implantation and rotoblator treatment
- Percutaneous device closure of atrial septal defect (ASD)/patent foramen ovale (PFO)
- Percutaneous closure of the left atrial appendage using the Watchman device
- Percutaneous balloon valvuloplasty of mitral, aortic and pulmonary valves
- Transcatheter aortic valve implantation
- Intraaortic balloon counterpulsation
- Intravascular ultrasound imaging (IVUS)
- Pressure wire measurement
- Percutaneous cardiopulmonary bypass
- MitraClip procedure for severe mitral regurgitation
- Renal denervation
- Peripheral vascular intervention

OUR SPECIALISTS (INTERVENTIONAL CARDIOLOGY)

Adj Prof Koh Tian Hai	Senior Advisor and Senior Consultant
Adj Assoc Prof Lim Soo Teik	Deputy Medical Director and Senior Consultant Director, Cardiac Catheterisation Laboratory
Adj Assoc Prof Aaron Wong	Head and Senior Consultant Director, Interventional Cardiology
Adj Asst Prof Jack Tan	Deputy Head and Senior Consultant Director, Coronary Care Unit
Assoc Prof Philip Wong	Senior Consultant
Adj Assoc Prof Yeo Khung Keong	Senior Consultant
Asst Prof Chin Chee Tang	Senior Consultant
Asst Prof Ho Kay Woon	Senior Consultant
Dr Fam Jiang Ming	Consultant
Dr Chin Chee Yang	Associate Consultant

For the full list of NHCS services and specialists, please visit www.nhcs.com.sg.

RESEARCH HIGHLIGHT

Long-term Prognosis in Patients with Diabetes Mellitus after Coronary Artery Bypass Grafting: A Propensity-Matched Study

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¹National Heart Centre Singapore, Singapore



ABSTRACT

INTRODUCTION: We aimed to determine the impact of diabetes mellitus (DM) on long-term survival after coronary artery bypass grafting (CABG) in patients with multivessel coronary artery disease.

MATERIALS AND METHODS: A retrospective review was conducted for 5720 consecutive patients who underwent isolated first CABG between 1982 and 1999. Outcomes were reviewed to include in-hospital mortality and long-term survival. Mean follow-up was 13.0 ± 5.8 years. To obtain comparable subgroups, 561 diabetic patients were matched with 561 non-diabetic controls based on estimated propensity scores.

RESULTS: Mean age was 59.3 ± 9.1 years with 4373 (76.5%) males. Amongst 5720 patients, 1977 (34.6%) had DM. Hypertension and dyslipidaemia were the most common cardiovascular comorbidities, present in 2920 (51.0%) and 2664 patients (46.6%) respectively. Emergency surgery was performed in 563 patients (9.8%). In-patient mortality occurred in 115 patients (2.0%), 48 (2.4%) in the DM group and 67 (1.8%) in the non-DM group, ($P = 0.102$). In the unmatched cohort, overall 20-year survival rates were $30.9 \pm 1.6\%$ in diabetics and $49.2 \pm 1.0\%$ in non-diabetics ($P < 0.001$). Freedom from cardiac mortality at 20 years was $56.0 \pm 2.0\%$ in diabetics and $68.4 \pm 1.0\%$ in non-diabetics ($P < 0.001$). In the propensity-matched group, overall 20-year survival rates were $35.4 \pm 2.5\%$ in diabetics and $48.9 \pm 2.9\%$ in non-diabetics ($P < 0.001$). Freedom from cardiac mortality at 20 years was $57.8 \pm 3.0\%$ in diabetics and $70.2 \pm 2.9\%$ in non-diabetics ($P = 0.001$). Multivariable Cox regression analysis identified age (hazard ratio (HR): 1.03/year), female gender (HR: 1.43), DM (HR: 1.51), previous myocardial infarction (HR: 1.54) and left ventricular ejection fraction (LVEF) $< 35\%$ (HR: 2.60) as independent factors influencing long-term cardiac mortality.

CONCLUSIONS: Despite low operative mortality, long-term survival and freedom from cardiac death are significantly lower in patients with DM compared to non-diabetics. Aggressive treatment of DM, cardiovascular comorbidities and smoking cessation are essential to improve long-term survival in diabetic patients.

Ann Acad Med Singapore 2016; 45:83-90

NEW EXPERIENCES, NEW PERSPECTIVES

Dr Lohendran Baskaran recently returned from a one-year fellowship training on advanced computed tomography (CT) in the "Big Apple", New York, the United States of America. The Associate Consultant with the Department of Cardiology, National Heart Centre Singapore shares his experience working and learning alongside some of the best in the field.

What was your training like?

I did my fellowship at New York's Weill Cornell Medical College under the supervision of Dr James Min, Professor of Radiology at the college, which is world-renowned for their use of cutting-edge CT technology and spearheading multicentre trials in collaboration with world-class institutions in various fields.

My day at Weill Cornell Medical College starts with a meeting with my supervisor and team mates at around 7.30am in the morning. We discuss the progress of current projects and future plans, and we will go on to work on our research projects. In addition, I was at the core imaging centre for a number of clinical trials, so I had the opportunity to interpret CT scans from all over the world. We will have weekly lunchtime meetings to keep abreast of our clinical and research work, and we get to learn from international experts from different fields when they are invited to speak at Weill Cornell Medical College. At the end of the day, usually late in the evening, we would often have a debrief and brainstorming session. I learnt how to work in a team and collaborate with other teams, the different approaches to clinical research, and greatly improved my skills in interpreting CT scans have greatly improved.

I enjoyed exploring the sights and sounds of New York in my free time. I have made some good friendships with the New Yorkers who are very forthcoming and friendly, many of whom I plan to keep in touch with. New York has also a wealth of experiences, from the obvious to the hidden, and exploring them all helped a great deal.



Dr Lohendran Baskaran presents his research at the Society of Cardiovascular CT 2016 scientific session.

What were your most memorable moments?

I was a finalist at the Siemens Outstanding Academic Research awards at the Society of Cardiovascular CT 2016 scientific session. It was great having investigator meetings and dialogues with hallmark names in the field. We also had a great group of people in the institute from all corners of the earth and from a variety of fields, and they were a rich source of ideas that I treasured very much.



Dr Lohendran (right) relaxes after a hard day's work with his colleagues from Weill Cornell Medical College.

How has the experience helped you?

The fellowship has shown me the vast opportunities available and the potential to expand within the CT field. I am truly grateful to my mentors at the National Heart Centre Singapore and SingHealth in supporting the stint. Over my one year in New York, I have improved my clinical and academic skills, and have enhanced my collaborative skills.

I see great potential in the expansion of non-invasive imaging, specifically in CT and nuclear cardiac imaging. This includes risk prognostication, which will enhance healthcare efficiency in order to impact patient and society's health in the leanest, most effective manner.

MURMURS REVAMP AROUND THE CORNER

We want to hear from you on how to make the newsletter better!



Simply follow the QR code or visit www.nhcs.com.sg/murmurs-survey to participate in our short survey. Alternatively, you may fill in your responses below and fax the page to (65) 6278 6193 or email a scanned copy to nhcs@nhcs.com.sg. Survey closes 15 October 2016.

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APPOINTMENT AND PROMOTIONS



**ADJ ASST PROF
TAN TEING EE**

Deputy Head and Senior Consultant, Department of Cardiothoracic Surgery
Subspecialty interests: Cardiac surgery (adult), robotic surgery, mechanical heart assist devices, heart and lung transplantation



**ADJ ASSOC PROF
EWE SEE HOOI**

Senior Consultant, Department of Cardiology
Subspecialty interest: Non-invasive multi-modular cardiovascular imaging



**DR MATHEW
CHAKARAMAKKIL JOSE**

Consultant, Department of Cardiothoracic Surgery
Subspecialty interest: Cardiac surgery (adult)



DR ERIC LIM

Consultant, Department of Cardiology
Subspecialty interest: Electrophysiology and pacing

Do you have any other suggestions to make the *Murmurs* newsletter better?

Thank you for participating in the survey!

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