



National Heart
Centre Singapore
SingHealth



PATIENTS. AT THE HEART OF ALL WE DO.®

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MURMURS®



WE'RE MOVING!
WHAT YOU CAN EXPECT
AT THE NHCS NEW BUILDING

**NEW CONTACT
NUMBERS FOR
NHCS FROM
10 MARCH 2014**



**IMPROVING SURVIVAL
WITH CONTINUOUS
FLOW LVADS**

**NHCS SETS UP
BIOSPECIMEN BANK**

**NEW HEAD OF
CARDIOLOGY AT NHCS**

NHCS staff lauded for
outstanding achievements

**6th APHRS – Asia Pacific's
first and largest joint
arrhythmia conference**

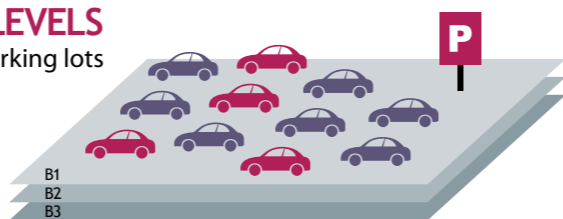
PLACING PEOPLE FIRST

AT THE NHCS NEW BUILDING FROM 10 MARCH 2014

National Heart Centre Singapore (NHCS) will be relocating to its new building at 5 Hospital Drive (opposite SGH Block 4). Here's a sneak peek at what's in store at our 12-storey new home.

THREE BASEMENT LEVELS

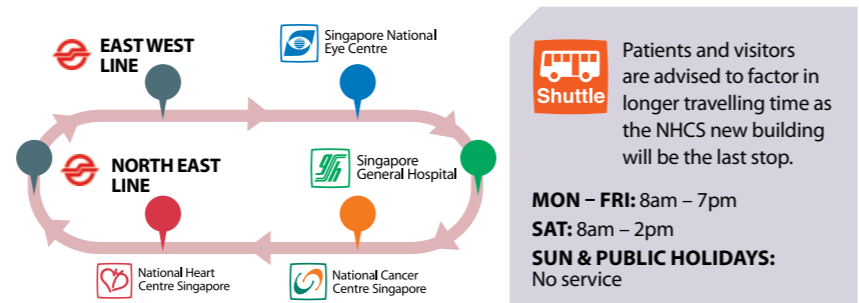
400 parking lots



This is the main entrance for vehicles to the **pick-up/drop-off** point, **shuttle bus** bay and **taxi** stand. Upon disembarking, patients and visitors will be greeted by a refreshing green wall made of climbing foliage. The new building will be the last stop in the shuttle bus route before the train stations.



FREE SHUTTLE BUS ROUTE AND OPERATING HOURS



Patients and visitors are advised to factor in longer travelling time as the NHCS new building will be the last stop.

MON - FRI: 8am - 7pm
SAT: 8am - 2pm
SUN & PUBLIC HOLIDAYS: No service



The **pharmacy** is conveniently located at Level 2 to allow the patients to make their way out easily after collecting their medications. It comes with a new retail section to offer patients the convenience of buying heart health-related products. The **clinical laboratory** where patients take their blood tests is also located at this floor together with the future cafeteria where patients can grab a quick bite after their tests as some may have been fasting the night before. As Level 2 is the main entrance for pedestrians, there is the **information counter** to assist with general enquiries.

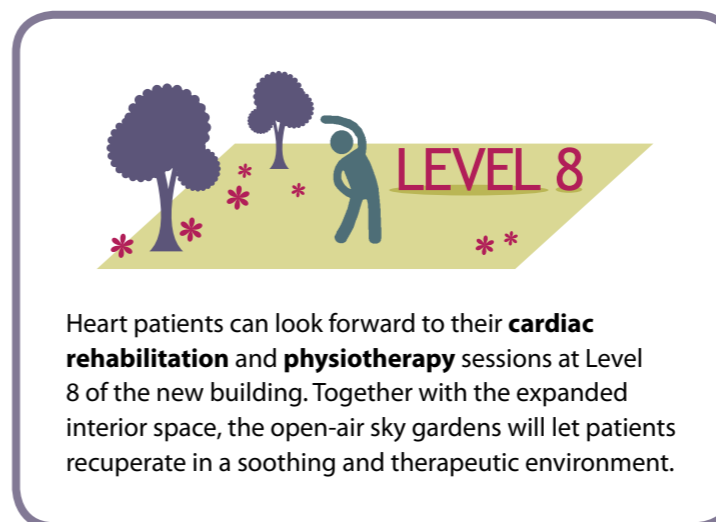
There are three **operating theatres (OTs)** for heart surgeries such as coronary artery bypass graft surgery and heart valve surgery. A sky bridge at Level 3 links the new building and SGH Block 4 to provide a seamless transfer of patients from the OTs to the NHCS inpatient wards at SGH (Wards 44, 56 and Cardiothoracic Surgery Intensive Care Unit) and vice versa.



The **specialist outpatient clinics** and **cardiac laboratories** where cardiac diagnostic tests such as exercise treadmill electrocardiogram (ECG), echocardiogram, heart perfusion study and vascular investigations are conveniently sited at Levels 4 and 5 to minimise patient movement. The **Admissions Office/Pre-Admission Tests Centre** is also housed under the same roof at Level 4 to provide patients a hassle-free experience for their admissions.



The **cardiac catheterisation laboratories** and the new **Short Stay Unit (SSU)** are strategically placed on the same floor. The SSU is designed for patients who have undergone scheduled day procedures such as coronary angiography and coronary angioplasty, freeing up beds in the wards for more complex cases.



Heart patients can look forward to their **cardiac rehabilitation** and **physiotherapy** sessions at Level 8 of the new building. Together with the expanded interior space, the open-air sky gardens will let patients recuperate in a soothing and therapeutic environment.



Lecture theatre and tutorial rooms



Research facilities previously located off-site have been integrated at the new building with an expanded 1.5 floors of space. This enhances interaction between researchers and clinicians, creating a vibrant Academic Medicine culture that promotes the translation of research into clinical services to improve patient care.



KEY FACTS AT A GLANCE

48,000m²

The gross **FLOOR AREA** at the NHCS new building

2,200m² The total area of greenery

Eco-friendly features, saving energy and reducing wastage. The new building was awarded the **BCA GREEN MARK PLATINUM AWARD 2012**, the highest accolade for green building certification.



1Q1B

The 1 **QUEUE** 1 **BILL** system makes the outpatient experience simpler and faster for heart patients.



DIGITAL HEART HOSPITAL

harnessing IT to improve processes and care.

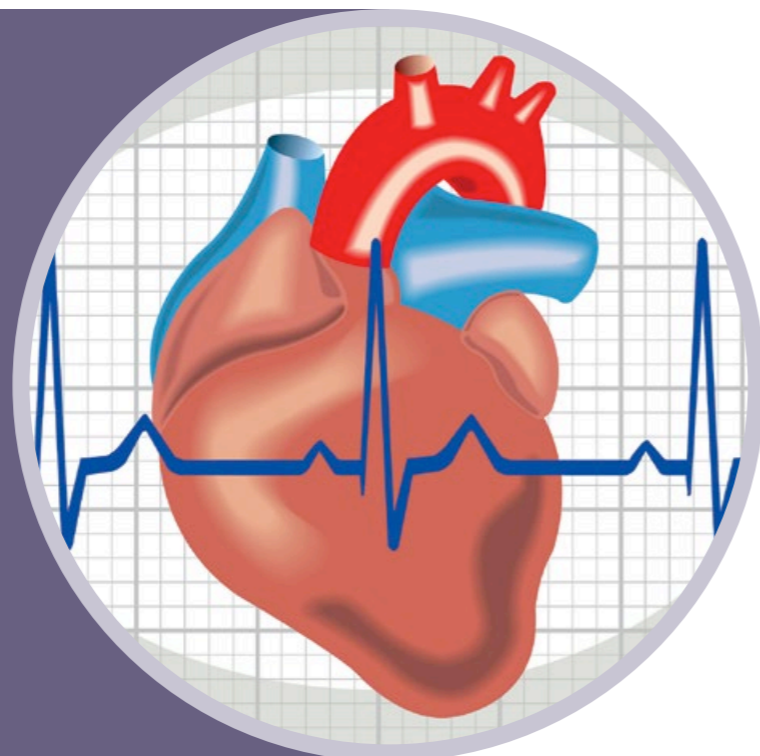
Age-friendly

environment that is safe, accessible and comfortable for the increasing number of elderly patients.



AN INSIDER'S REPORT

ON THE 6TH ASIA PACIFIC HEART RHYTHM SOCIETY AND CARDIORHYTHM 2013 CONFERENCE



National Heart Centre Singapore (NHCS) participated in the 6th Asia Pacific Heart Rhythm Society (APHRS) and CardioRhythm 2013 conference held in Hong Kong S.A.R. from 3 to 6 October 2013. This four-day event is the first and largest joint arrhythmia conference in the Asia Pacific region.

A comprehensive 19-strong contingent from NHCS, comprising senior cardiologists, junior doctors and medical technologists attended the conference which was co-organised by the APHRS, Hong Kong College of Cardiology and the Chinese Society of Pacing and Electrophysiology. The senior cardiologists were invited as conference faculty to either chair or speak on their areas of expertise, while the residents and senior residents were invited to present oral or poster presentations. The medical technologists also presented their abstracts at this prestigious conference. This commendation is a testament of the quality of the medical technologist training programme at NHCS.

Depth, breadth and diversity in electrophysiology

An unprecedented total of 23 abstracts were presented by NHCS this year. Topics included barriers to implantable cardioverter defibrillator (ICD) implantation for the primary prevention of Sudden Cardiac Death in the Asian population, and a comparison study on new oral anticoagulants versus warfarin for peri-procedural anticoagulation following radiofrequency ablation for atrial fibrillation. Even within the specialised field of cardiac electrophysiology, the diversity of abstracts reflected the breadth of subjects covered by the cardiac electrophysiology and pacing subspecialty at NHCS, from teasing prognostic meaning from common 'simple' electrocardiograms to techniques in radiofrequency ablation.

Some of the topics that caught my interest were the genetic investigation on causes of Sudden Cardiac Death, novel anticoagulants and finding certain genetic profiles for channelopathies in electrophysiological diseases such as Brugada, long QT, and short QT syndromes. The sessions provided much insight into finding if there are any common denominations in patients with those conditions.

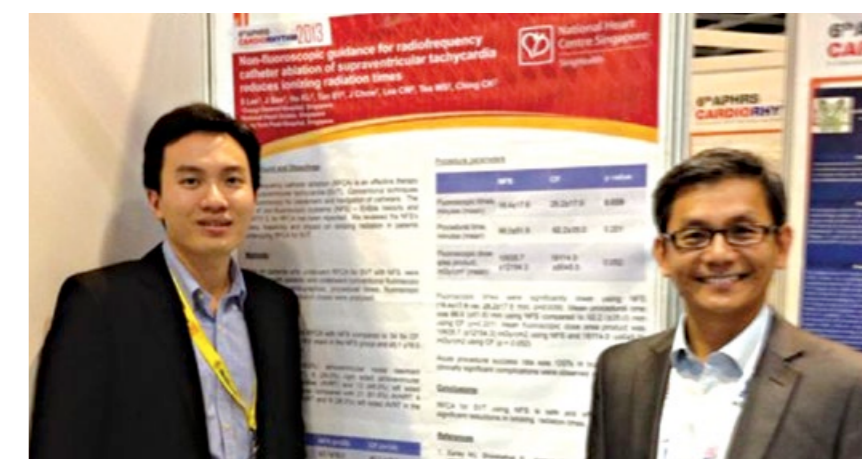
Beyond the conference

NHCS held a parallel event to the APHRS 2013 conference on 3 October 2013 that was centred on Brugada Syndrome, a potentially fatal inherited heart rhythm disease which is more prevalent in Asia. This event saw an overview of the NHCS Brugada registry which will consolidate data from the region and plans for further research in this area. With this, NHCS hopes to shed light in screening and treating this dangerous disease which can strike people in their prime. In addition, it was an opportunity to re-establish and strengthen ties with alumni from the NHCS Fellowship Programme, who are now experienced cardiologists in their home countries across the globe. This will hopefully facilitate more opportunities for collaboration and exchange, be it in training or research.



NHCS doctors and medical technologists presented their findings at the APHRS and CardioRhythm 2013 conference.

All in all, APHRS 2013 was an excellent platform for NHCS doctors and cardiac technicians to learn and exchange ideas with international key players in the field of cardiac electrophysiology and arrhythmia, such as Professor Silvia G. Priori from NYU Langone Medical Center, USA, Dr Bruce Wilkoff, from the Cleveland Clinic, USA, and Professor John Camm from St. George's University of London, UK. It was a fantastic opportunity for junior cardiologists to present their findings and research on a world stage as well. We certainly look forward to our continued participation and contribution to APHRS in the coming years.



The APHRS conference was also a good platform for young doctors to forge better learning ties with their mentors at NHCS.



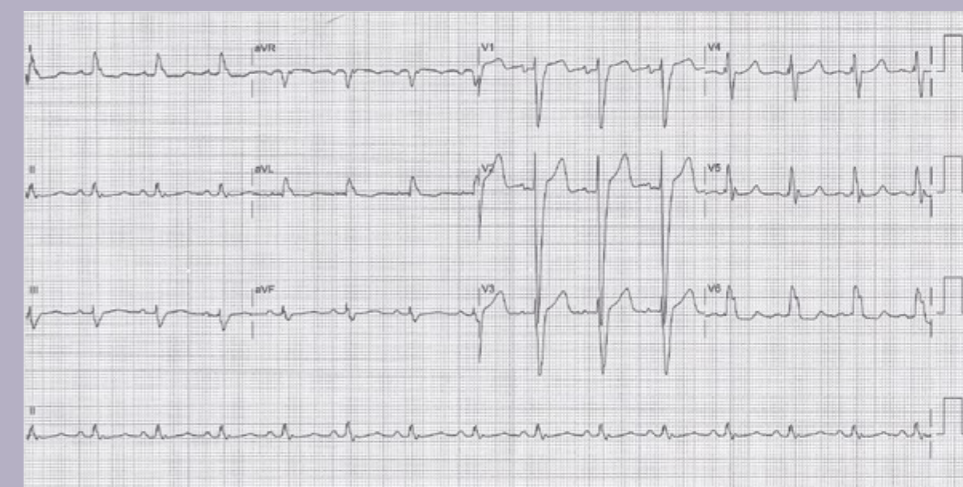
By Dr Lohendran Baskaran
Registrar
Department of Cardiology
National Heart Centre Singapore

Dr Lohendran graduated with his Bachelor of Medicine and Surgery and Bachelor of Science (1st Class Honours) in Medical Physics from University College London. His research interests include non-invasive imaging and Medical Technology development.

ANALYSE THIS

WHAT ECG ABNORMALITY CAN BE READ FROM LEADS V1 AND V6?

Refer to page 10 for the answer.



CONTINUOUS FLOW LEFT VENTRICULAR ASSIST DEVICES

A NEW AND HIGHLY EFFECTIVE TREATMENT FOR ADVANCED HEART FAILURE

The most significant milestone in the treatment of Advanced Heart Failure (AHF) in recent years is arguably the advent of continuous flow Left Ventricular Assist Devices (LVADs) in 2008. Compared with the first generation pulsatile devices, new generations of LVADs have vastly improved survival, morbidity rates and quality of life¹. It has become the mainstream treatment for AHF in many countries, and worldwide use is increasing quickly. As of May 2013, more than 17,000 patients worldwide have already been implanted with the new devices.

The two most commonly used devices are the second generation HeartMate II and the third generation HeartWare HVAD. They are both small pumps that fit in the palm of the hand and suit the smaller Asian physique much better than earlier devices. The continuously spinning rotor runs silently at thousands of revolutions per minute and hence, patients do not have an arterial pulse. They are implanted in a pocket inferior to the heart (HeartMate II) or within the pericardial cavity (HVAD), with an inflow conduit that takes blood from the left ventricular cavity through a hole in the left ventricular apex and an outflow conduit that returns blood back to the ascending aorta. There is an electrical cable that exits from the abdomen and is connected to an external controller and batteries. The batteries last around eight to 10 hours. Patients need to dress the exit site daily. They also need anticoagulation with warfarin and antiplatelet agents for life.



Dr Tan Teing Ee
Senior Consultant,
Department of Cardiothoracic Surgery
Director,
Cardiothoracic Surgery Intensive Care Unit
National Heart Centre Singapore

Dr Tan's sub-specialty interest is in adult cardiac surgery, robotics surgery, heart lung transplant and mechanical heart assist devices. He graduated with his Bachelor of Medicine and Surgery from the National University of Singapore in 1989. Dr Tan did his fellowship in Cardiothoracic Surgery at the Westmead Hospital, NSW, Australia in 2001 and Mount Sinai Hospital, New York, USA in 2002. He has been a Fellow of the Royal College of Surgeons, Edinburgh since 1995 and Fellow of the Academy of Medicine Singapore since 2003.



Madam Helen Tan (extreme right) is the first patient in Singapore to be implanted with the third generation LVAD in September 2012. She has since resumed her normal lifestyle and taking care of her grandchildren.

Image courtesy of Singapore Health.

Patients suitable for LVAD are those with AHF³. These patients are characterised by:

- Severe symptoms (NYHA class III to IV) for more than two months
- Recurrent admissions (>3 in the past one year) for congestive heart failure
- Objective evidence of severe cardiac dysfunction (shown by two-dimensional echocardiography or right heart studies)
- Severe impairment of functional capacity (demonstrated by either the inability to exercise, a 6-minute walk test distance of <300m or a peak oxygen uptake of <12–14 ml/kg/min in a cardiopulmonary exercise test)
- Evidence of deteriorating end organ (renal or liver function) due to low cardiac output, and;
- Inability to improve despite compliance with optimal medical therapy or an implanted cardiac resynchronisation therapy device.

This group of patients has a compromised quality of life, a high risk of clinical events and poor prognosis. The average survival is often around one to two years, equivalent to many common cancers.

In summary, continuous flow LVADs can dramatically improve the survival and quality of life for patients with AHF. AHF patients should be referred early, before they reach a stage of multi-organ failure or cardiogenic shock, to a specialised heart failure unit for further evaluation, advanced therapies and consideration for LVAD implantation.



The HeartWare HVAD is implanted at the apex of the heart and is connected to an external controller and batteries via a cable that exits the body through a small open wound at the abdomen.

Image courtesy of HeartWare International, Inc.

National Heart Centre Singapore (NHCS) started implanting the HeartMate II in May 2009 and the HVAD in September 2012. We have performed a total of 44 continuous flow LVAD implantations – seven patients have been transplanted and one has recovered enough to be explanted. Mean duration of support is 16.5 months. The longest duration is 4 years and 8 months, and the patient is still doing well. Operative mortality is at 4.5 per cent and overall survival is 84 per cent. One-year survival was 89 per cent, which is twice that of the first generation LVAD, and three to four times better than medical therapy for this group of AHF patients.

The most common complications that occur are drive-line infection, gastrointestinal bleeding and stroke.

As at December 2013, there are currently 29 patients at NHCS who are undergoing support with an LVAD. At three months post-implantation, all the patients are in New York Heart Association (NYHA) classes I or II – a system of classifying the extent of heart failure in patients, with class I being the best and class IV the worst. 10 have resumed their full time jobs, two have gone back to school, and the rest have returned to an almost normal lifestyle. There was an average improvement of 50 points on the Minnesota Living With Heart Failure Questionnaire which evaluates the physical, emotional, social and mental dimensions in assessing the quality of life. At six months, more than 68 per cent were able to exceed 400m on the 6-minute walk test. Patients can shower with adequate waterproof covering of the driveline and external electrical components.

Patients travelling on public transport look just like any other ordinary passenger. More than half the patients have travelled overseas for holidays.

The efficacy of LVADs has totally transformed our transplant programme at NHCS, which is the only heart transplant centre in Singapore. It has become uncommon for patients to die while waiting for a heart transplant, and patients arrive for a transplant in a better physical condition. Almost all patients on the heart transplant waiting list are now on LVAD support. Because of the longer survival made possible with the LVAD, our waiting list and waiting time for a transplant are also getting longer. There are only around two to four suitable donor hearts a year but the waiting list has more than tripled from around six in 2008 to more than 20 patients in 2013.

Recent papers suggest that LVADs improve survival and quality of life for older patients too.²

¹ Slaughter MS, Rogers JG, Milano CA, et al. Advanced heart failure treated with continuous-flow left ventricular assist device. *N Engl J Med.*2009;361:2241-2251

² Park, SJ et al. Outcomes in advanced heart failure patients with left ventricular assist devices for destination therapy. *Circ Heart Fail.* 2012; 5(2):241-8.

³ ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2012: The Task Force for the Diagnosis and Treatment of Acute and Chronic Heart Failure 2012 of the European Society of Cardiology. *European Heart Journal* (2012) 33, 1787–1847.

A LITTLE BLOOD GOES A LONG WAY

HEART PATIENTS CAN NOW DONATE A SMALL AMOUNT OF BLOOD OR SALIVA TO BOOST RESEARCH IN CARDIOVASCULAR DISEASE

The National Heart Centre Singapore (NHCS) has set up a databank to gather and store biospecimens and clinical data from heart patients. Named the NHCS BioBank, the bio-repository serves to collect blood and saliva samples from heart patients in an organised manner, and these samples will be used by researchers for future research in molecular, imaging and outcome studies on cardiovascular disease.

Catalyst for tomorrow's medicine

The NHCS BioBank is the brainchild of Prof Stuart Alexander Cook, Distinguished Clinician Scientist and Senior Consultant, Department of Cardiology, NHCS. Prior to joining NHCS, he pioneered a similar project in the United Kingdom where some 4,000 samples were collected from patients suffering from various heart diseases, such as atherosclerosis, dilated cardiomyopathy and those at risk of developing Sudden Cardiac Death. He and his team of researchers at NHCS and Duke-NUS Graduate Medical School hope to amass a sizeable number of samples in the NHCS BioBank that will allow them to unravel the mysteries behind the 130 genes related to cardiovascular disease, and in turn, discover better methods to prevent, diagnose and treat heart conditions. Discoveries are now within closer reach as science and technology have made the modern research process several hundred times faster than that in the past.

“With current technology, we can go through the 130 genes involved in heart disease in hours,” said Prof Cook, “It used to take six months to get the result of just one gene.”

The NHCS BioBank is of significant relevance to the Singapore population as heart disease accounts for one in five deaths in the country in 2011, according to statistics from the Ministry of Health. That makes heart disease the number two killer in Singapore. Each year, NHCS sees more than 10,000 inpatients, 100,000 outpatients and performs more than 7,000 interventional and surgical procedures, a percentage of which will be translated into invaluable research data in the bio-repository.

Donation process for heart patients

Patients who agree to donate their biospecimens to the NHCS BioBank will first be introduced to a coordinator who will explain the donation procedure and assist in clarifying any queries. A donor's identity will be kept confidential and his or her biospecimen sample will be issued a unique research identification number tagged only to the patient's clinical data.

After obtaining the heart patient's signed consent, 20ml or about two tablespoons of the patient's blood will be drawn via a process similar to a normal blood test. For patients who are unable to donate blood, a saliva sample can be collected instead. In addition to these, tissue samples from heart patients who undergo coronary artery bypass graft surgeries at NHCS will also form part of the collection in the NHCS BioBank to give researchers a better picture on the development of cardiovascular disease.

Interested heart patients may contact our NHCS BioBank coordinator at (65) 9159 7029 or biobanking_enquiries@nhcs.com.sg from Mondays to Fridays (except public holidays), 8.30am to 5.30pm.



National Heart
Centre Singapore
SingHealth

CONTACT US

NEW CONTACT NUMBERS EFFECTIVE FROM 10 MARCH 2014

GP FAST-TRACK APPOINTMENT Tel 6704 2222

NHCS CALL CENTRE Tel 6704 2000 Fax 6222 9258
Email central.appt@nhcs.com.sg

GENERAL ENQUIRIES Tel 6704 8000 Fax 6844 9030
Email nhcs@nhcs.com.sg

NHCS CARDIOTHORACIC SURGICAL PROCEDURES

- Coronary artery bypass graft surgery (on and off-pump)
- Heart transplant and mechanical heart assist device implantation
- Valve replacement/repair surgery
- Lung transplant
- Lung resection for tumour
- Aortic aneurysm and dissection repair
- Peripheral vascular arterial surgery
- Minimally-invasive cardiothoracic surgery

OUR SPECIALISTS (CARDIOTHORACIC SURGERY)

Assoc Prof Kenny Sin	Head and Senior Consultant Director, Quality Management
Assoc Prof Chua Yeow Leng	Senior Consultant Deputy Group Director, International Cooperation, SingHealth
Assoc Prof Lim Chong Hee	Senior Consultant Director, Mechanical Circulatory Support, Heart and Lung Transplant Unit Programme Director, National Cardiovascular Homograft Bank
Dr Tan Teing Ee	Senior Consultant Director, Cardiothoracic Surgery Intensive Care Unit
Dr Lim See Lim	Senior Consultant
Dr Victor Chao	Senior Consultant Director, Vascular Laboratory
Dr Soon Jia Lin	Consultant

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

RESEARCH HIGHLIGHT

Am J Cardiol. 2013 Aug 15;112(4):560-6. doi: 10.1016/j.amjcard.2013.04.025. Epub 2013 May 15.

Accuracy of three-dimensional versus two-dimensional echocardiography for quantification of aortic regurgitation and validation by three-dimensional three-directional velocity-encoded magnetic resonance imaging.

Ewe SH¹, Delgado V, van der Geest R, Westenberg JJ, Haecck ML, Witkowski TG, Auger D, Marsan NA, Holman ER, de Roos A, Schalij MJ, Bax JJ, Sieders A, Siebelink HM.

ABSTRACT



Quantitative assessment of aortic regurgitation (AR) remains challenging. The present study evaluated the accuracy of 2-dimensional (2D) and 3-dimensional (3D) transthoracic echocardiography (TTE) for AR quantification, using 3D 3-directional velocity-encoded magnetic resonance imaging (VE-MRI) as the

reference method. Thirty-two AR patients were included. With color Doppler TTE, 2D effective regurgitant orifice area (EROA) was calculated using the proximal isovelocity surface area method. From the 3D TTE multiplanar reformation data, 3D-EROA was calculated by planimetry of the vena contracta. Regurgitant volumes (RVol) were obtained by multiplying the 2D-EROA and 3D-EROA by the velocity-time integral of AR jet and compared with that obtained using VE-MRI. For the entire population, 3D TTE RVol demonstrated a strong correlation and good agreement with VE-MRI RVol ($r = 0.94$ and -13.6 to 15.6 ml/beat, respectively), whereas 2D TTE RVol showed a modest correlation and large limits of agreement with VE-MRI ($r = 0.70$ and -22.2 to 32.8 ml/beat, respectively). Eccentric jets were noted in 16 patients (50%). In these patients, 3D TTE demonstrated an excellent correlation ($r = 0.95$) with VE-MRI, a small bias (0.1 ml/beat) and narrow limits of agreement (-18.7 to 18.8 ml/beat). Finally, the kappa agreement between 3D TTE and VE-MRI for grading of AR severity was good ($k = 0.96$), whereas the kappa agreement between 2D TTE and VE-MRI was suboptimal ($k = 0.53$). In conclusion, AR RVol quantification using 3D TTE is accurate, and its advantage over 2D TTE is particularly evident in patients with eccentric jets.

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

ANALYSE THAT

Continued from page 5.

Leads V1 and V6 indicate QRS prolongation and left bundle branch block (LBBB). In patients with heart failure, a QRS duration of ≥ 120 ms is common and is associated with a significant increase in mortality. Similarly, LBBB is associated with increased all-cause and sudden death mortality.

PASSION FOR THE HEART

This issue, Murmurs speaks to the new Head of the Department of Cardiology at the National Heart Centre Singapore, Dr Aaron Wong, who took over the reins from Associate Professor Lim Soo Teik in November 2013.



“Our emergency PCI (percutaneous coronary intervention) team has been able to treat the majority of patients who are wheeled in with acute blockage in the coronary artery within 60 minutes – a good 30 minutes faster than the international standard,” said Dr Aaron Wong, Head, Department of Cardiology, National Heart Centre Singapore, who will continue to hold his concurrent appointment as Director, Interventional Cardiology.

Dr Aaron Wong is a trained interventional cardiologist whose clinical skills and knowledge have earned the respect of many of his peers in the field. Since joining National Heart Centre Singapore in 1997, he has treated an average of 400 to 500 patients each year after he returned from his one-year fellowship training at Brigham and Women’s Hospital in the US. He was also instrumental in pushing clinical practices at NHCS to new fronts by championing the improvement in door-to-balloon time in the Cardiac Catheterisation Laboratory and NSTEMI pathway.

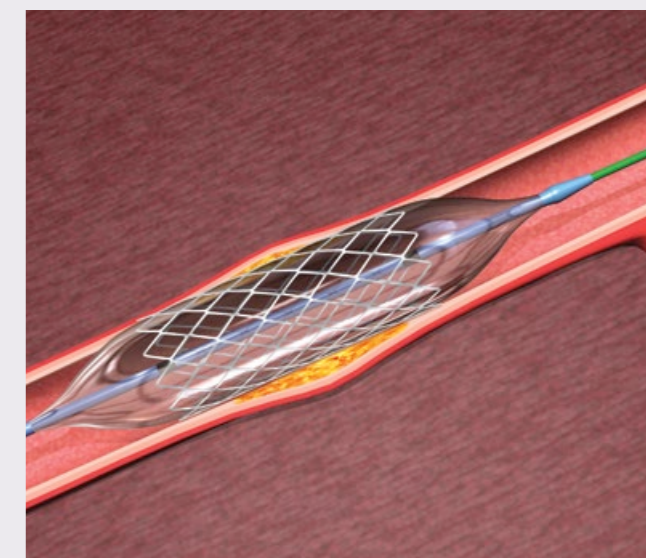
Following his heart

When he was a young doctor, Dr Wong had an interest to specialise in neurology as well, but he decided to become a cardiologist due to the rapid and exciting advancement of medicine in this field. At that time, neurology was growing at a less dynamic pace and treatment options for patients then were limited.

“I feel that cardiologists and cardiothoracic surgeons have the ability to bring heart patients back from the brink of death, and the improvement in their condition is almost instantaneous,” said Dr Wong, **“This was another reason that made me want to join the team in saving these patients.”**

Dr Wong also takes time out of his busy schedule to volunteer in rural communities in the region, such as those in Chiangmai, Thailand. He has participated in four of these mission trips between 2001 and 2004.

One of the main tasks Dr Wong has undertaken as the new Head of Department is to support the institution’s push towards Academic Medicine. Nonetheless, patient care is still very much at the core of his daily practice. He recalls treating an 88-year-old male patient who left a deep impression on him.



A minimally invasive alternative to open heart surgery to unblock a clogged artery involves inserting a catheter either through the groin area or wrist and inflating a balloon at the affected part of the artery.

“The patient had three blocked coronary arteries but was willing to undergo the high risk bypass surgery, in order to continue to care for his wife who was suffering from stroke. I felt a very profound sense of satisfaction when I was able to treat the patient successfully, and help him recover and resume his role as a caregiver.”

NHCS STAFF RECOGNISED FOR OUTSTANDING ACHIEVEMENTS



Congratulations to Ms Abirami D/O Nagarasan, Principal Enrolled Nurse, Ward 44, NHCS, for winning the Certificate of Merit (Special Commendation) at the 7th Tan Chin Tuan Nursing Award for Enrolled Nurses held on 11 November 2013 at Della and Seng Gee Guild Hall, Kent Ridge Guild House, National University of Singapore. She was among the top three enrolled nurses presented with a gold medallion by the Guest-of-Honour, Member of Parliament Dr Lam Pin Min (right). A total of 10 nurses were honoured at the event where Mr Sebastian Tan (left), board member of the DS Lee Foundation, delivered the welcome address.



In recognition of his work in the field of transcatheter valves, Dr Soon Jia Lin (left), Consultant, Department of Cardiothoracic Surgery, NHCS, was awarded the 2013 Association of Thoracic and Cardiovascular Surgeons of Asia (ATCSA) Travelling Fellowship at the 23rd Annual Congress of the ATCSA gala dinner held on 12 October 2013 at Singapore's Raffles City Convention Centre. Dr Soon was the lead surgeon in the team that performed Asia's first successful transapical transcatheter mitral valve-in-valve implantation at NHCS in 2012. The award will contribute to his further pursuits in surgery with the use of transcatheter valves.



Dr Paul Chiam, Senior Consultant, Department of Cardiology, NHCS, won the SingHealth Publish! Award in the Medical Research category in November 2013. The annual award recognises the achievements of SingHealth researchers who have published quality research articles in internationally acclaimed and peer-reviewed scientific or medical journals.

PROMOTIONS



DR AARON WONG
Head and Senior Consultant
Department of Cardiology
Sub-specialty interest:
Interventional Cardiology



DR JACK TAN
Deputy Head and Senior Consultant
Department of Cardiology
Sub-specialty interest:
Interventional Cardiology



DR YEO KHUNG KEONG
Senior Consultant
Sub-specialty interest:
Interventional Cardiology



DR KENNETH GUO
Consultant
Sub-specialty interest:
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