



# Murmurs



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## HIGHLIGHTS

- Advances in Non-Invasive Imaging at NHCS
- Fellowship in Cardiac Electrophysiology
- NHCS bags Singapore Health Award 2010 (Gold)



## New Robotic-Assisted Surgery for Lung Cancer Patients

When Mdm Goh Geck Khin saw her family doctor for symptoms of cough and chest discomfort in July 2010, he referred her to the National Heart Centre Singapore (NHCS) for a detailed checkup.

It turned out to be a lifesaving move. A chest X-ray showed a 3cm wide mass in her right lung. Suspecting that it might be cancerous, her doctors advised her to undergo surgery. As Mdm Goh was 71 years old, her family was concerned with the risks of an open surgery. Her surgeon-in-charge, Dr Su Jang Wen, Consultant, Department of Cardiothoracic Surgery, NHCS, suggested a new minimally invasive surgery known as robotic-assisted lobectomy.

### First in South-east Asia

On 25 August 2010, the surgical team led by Dr Su, removed the diseased lobe of Mdm Goh's right lung using the Da Vinci Si Dual robotic system. NHCS is the first centre in South-east Asia to introduce robotic-assisted lobectomy surgery and is one of around 25 centres in the world to offer this procedure to our patients.



After a short hospital stay of five days, Mdm Goh was discharged home. She has since recovered well with minimal pain and has resumed her daily routine. "My family was very worried about me going through surgery, but everything went well. I am happy to have only four small wounds and felt very little pain," said Mdm Goh.

### Improved Patient Safety and Shorter Hospitalisation

Explaining the advantages of robotic-assisted surgery, Dr Su said, "The average length of stay for robotic lobectomy is about 3 to 5 days, compared to 5 to 7 days for open surgery. The precision of the procedure also means enhanced safety for our patients. Results from other centres worldwide have shown that the procedure is comparable to the open surgery method and we are excited to be able to offer this option to our patients."

With the Da Vinci Si Dual robotic system, the robotic arms with seven degrees of movement can perform complex manoeuvres. It offers superior articulation of the instruments within the chest and the range of motion of the instruments actually exceeds that of a human hand. The high technology system also removes any trembling movement by human hands. Together with highly magnified 3-dimension view offered by the camera, the ergonomic design of the instruments allows surgery to be done with extremely high precision and safety.

*FAR LEFT: Patient-side surgeon – NHCS surgeons by the bedside, assisting in a robotic-assisted lobectomy. LEFT: Surgeon at the console – Dr Su Jang Wen performing the robotic lobectomy from the remote console of the Da Vinci robotic system.*

[Continued on Next Page]

## The Conventional Method

Lobectomy or resection of the lung is traditionally done via a long incision of about 10-15 cm through the chest with spreading of ribs in order to gain access to the chest cavity. While open surgery is still the gold standard, patients tend to suffer more pain, longer hospital stay, higher risk of infection and longer recuperation period before resuming routine activities. In addition, it also gives patients a long scar.

In the last five years, surgeons from NHCS have been performing video-assisted thoracoscopic surgery (VATS) for most early-stage lung cancer patients. This is a minimally invasive approach which operates through four small incisions with special long instruments, without needing to spread the ribs.

However, the VATS method has its limitations. It involves operating on the lung from outside the chest cavity while looking at a 2-dimension image on a computer screen. As a result, the perception of depth is lost. The technique is further limited by the long and stiff instruments with poor manoeuvrability. The operating surgeon also relies very much on the assisting surgeon holding the camera to capture good images from the inside of the chest cavity.

The robotic-assisted lung lobectomy is currently offered to patients with early-stage lung cancer but its application is expected to expand to more advanced-stage lung cancer surgery in the future.

# Advances in Non-Invasive Imaging at NHCS



by Dr Felix Keng, Senior Consultant, Department of Cardiology and Director, Nuclear Cardiology, NHCS

*Non-invasive imaging has formed the backbone of cardiac investigations for several decades. Many advances have improved the diagnostic accuracy of such tests tremendously, making them useful to the management of patients with all forms of cardiac diseases.*

## Nuclear Cardiology

Many new developments in this field have enhanced its position as the most widely used investigative tools for coronary artery disease. Since its inception at the National Heart Centre Singapore (NHCS) in 1994, the number of myocardial perfusion imaging (MPI) ordered has grown exponentially, reaching over 7,000 patient scans performed in 2010. Improvements in both software and hardware technology have further enhanced its role. These improvements have led to reduction in time required for imaging and artifacts, less radioactive tracer dose used, improved patient comfort and improvement in image resolution, resulting in increased sensitivity and specificity in diagnostic accuracy.

NHCS added the new generation solid state gamma camera in mid 2009 which has further improved the throughput. New applications in this field will include fusion of perfusion with anatomic data from other imaging modalities, development of new improved tracers and stressors that will further increase accuracy, the use of positron emission tomography at the NHCS in the near future, and widening our scope of research capabilities to further refine the role of nuclear cardiology in the management of cardiac diseases.



The new gamma camera helps to reduce scanning time, improve patient comfort and image quality.

In the field of research, NHCS has participated in several multicentre trials and performed a variety of studies which have resulted in numerous presentations at major conferences and participation in Young Investigator Competitions. NHCS also provides training opportunities for physicians from regional countries who are interested in the field of nuclear cardiology.

## Cardiac Computed Tomography

Cardiac computed tomography (CT) started at the NHCS in 2007. The service has grown considerably with increased demand, especially in the diagnosis and assessment of coronary artery disease severity. Its use in structural heart disease has also increased, with its significant role before atrial fibrillation ablation, pre- and post-percutaneous valve surgery, and in congenital heart conditions. With the installation of the 320-detector machine in mid 2009, the diagnostic accuracy and confidence has improved greatly, with the time required to acquire the images significantly shortened, resulting in reduced artifacts.

Studies on the use of cardiac CT in myocardial perfusion and viability imaging are also underway. NHCS is currently participating in a multicentre trial to investigate the accuracy of CT myocardial perfusion and viability imaging as compared to nuclear techniques. Other studies involving the use of cardiac computed tomography angiography and calcium scoring in the Asian population have also been instituted. NHCS is also a training centre for physicians and cardiologists interested in cardiac CT.



NHCS's new CT scanner with 320-row detector results in ultrafast scan times and greater accuracy.

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- Off-pump / beating heart surgery
- Congenital heart disease surgery
- Maze surgery for atrial fibrillation
- Left ventricular reconstructive surgery (also known as Dor or Saver surgery)
- Heart transplantation
- Valvular heart surgery including valve repair and replacement surgery
- Robotic-assisted surgery
- Endoscopic vein harvest

### Thoracic Surgery

- Complete muscle sparing thoracotomy
- Video-assisted thoracoscopic surgery (VATS)
- Robotic-assisted lung lobectomy for early-stage lung cancer
- Drainage of empyema
- Lung resection for cancer of the lung
- Lung transplantation for advanced lung disease
- Lung volume reduction surgery (LVRS) for chronic obstructive pulmonary disease (COPD)
- Mediastinoscopy for staging of lung cancer
- Minimally invasive (endoscopic) thoracic sympathectomy
- VATS pleurodesis for spontaneous pneumothorax
- Resection and reconstruction of chest wall tumour including locally advanced breast cancer
- Total oesophagectomy for cancer of oesophagus / other disorders
- VATS thymectomy for myasthenia gravis
- Trachea-resection and reconstruction
- Repair of pectus excavatum

### Aortic and Peripheral Vascular Surgery

- Abdominal aortic aneurysm surgery
- Peripheral vascular arterial surgery
- Thoracic and thoraco abdominal aorta surgery
- Surgery for acute and chronic arterial disorders
- Endovascular stent graft surgery for aortic aneurysm

### Mechanical Heart Assist Device

- Left ventricular assist device (LVAD)
- Biventricular assist device (BIVAD)
- Extra-corporeal membrane oxygenation (ECMO) for acute cardio respiratory failure

### Lung Cancer Multi-Modality Therapy

- Complete workup and full consultation with oncology and pulmonology consultants, prior surgical treatment

## Our Cardiothoracic Specialists

Dr Kenny Sin Yoong Kong	Head and Senior Consultant
A/Prof Chua Yeow Leng	Senior Consultant
Dr Lim Chong Hee	Senior Consultant
Dr Lim See Lim	Senior Consultant
Dr Tan Teing Ee	Senior Consultant
Dr Lim Yeong Phang	Senior Consultant
Dr Victor Chao Tar Toong	Consultant
Dr Su Jang Wen	Consultant
Dr Loh Yee Jim	Consultant (away for HMDP)
Dr Soon Jia Lin	Consultant (away for HMDP)

For a comprehensive list of NHCS services and specialists, please visit [www.nhcs.com.sg](http://www.nhcs.com.sg).



# Fellowship in Cardiac Electrophysiology

This issue, the Murmurs team chats with Dr Tan Boon Yew, Consultant, Department of Cardiology at National Heart Centre Singapore (NHCS) on his rewarding fellowship at the Johns Hopkins Hospital, Baltimore, Maryland, United States from July 2008 – June 2010.

## Why the Johns Hopkins Hospital

Johns Hopkins Medicine is a \$5 billion integrated global health enterprise and one of the leading health systems in the United States. The Johns Hopkins Hospital has been ranked number one in the United States for 20 consecutive years by the U.S. News & World Report. Each year, Johns Hopkins Medicine handles more than 263,000 emergency visits and more than 96,000 inpatient admissions. In 2009, Johns Hopkins scientists received federal research support totalling \$435 million, more than any counterparts in other U.S. medical schools. The enterprise also produced 20 Nobel laureates.

The Johns Hopkins Arrhythmogenic Right Ventricular Dysplasia/Cardiomyopathy (ARVD/C) programme was established by Dr Hugh Calkins in the late 1990s. Today, it is one of the biggest ARVD/C registries in North America. Johns Hopkins also has an outstanding cardiac electrophysiology fellowship training programme.



The Johns Hopkins Hospital

## The Rewarding Experience

My first year at Johns Hopkins focused on research, under the tutelage of Dr Daniel P. Judge. The research project had three aims:

1. Genetic testing of desmosome genes in ARVD/C patients who have not yet been analysed
2. Identification and testing of other novel candidate genes for this condition
3. Investigation of the role of inflammation in the pathogenesis of ARVD/C

The first aim involved training in genetic testing, familial segregation, and genotype-phenotype correlation to determine the role of genetic variants in developing ARVD/C. In addition to finding mutations in affected individuals in the registry, this will involve classification of DNA sequence variants into specific categories of "mutation" or "polymorphism" based on conservation of affected amino acids, presence or absence among unaffected controls, co-segregation of the variant in families with other affected individuals, and determination of both penetrance and variable expressivity of gene mutations.

The second aim involved utilising any large families with ARVD/C for genome-wide linkage analysis, as well as candidate gene sequence analysis for novel genes in which mutations may result in this condition.

The last aim followed several reports suggesting that mutations in desmosome genes are not sufficient to cause ARVD. Other factors such as viral infection or auto-immunity may result in inflammation in the heart, and desmosome mutations may act synergistically with this to result in cell death and fibro-fatty scar formation. The end of my first year culminated in publication of my results in the Journal of Cardiovascular Translational Research (J. of Cardiovasc. Trans. Res. 2010 3:663-673).

The second year of my training was in clinical electrophysiology and ablation of complex tachyarrhythmia, as well as advanced device-based therapy for cardiac arrhythmias. My principal tutor was Dr Hugh Calkins, but I also had the honour of working with renowned electrophysiologists such as Dr Gordon Tomaselli, Dr Ronald Berger, Dr Saman Nazarian, Dr Joseph Marine, Dr Charles A. Henrikson and many more.



Dr Tan Boon Yew (far right) and his son, Marcus with his principal tutor, Dr Hugh Calkins.

Johns Hopkins Hospital being one of the large referral centres in the U.S., virtually guarantees a constant flow of complex arrhythmic cases referred for further management. Dr Hugh Calkins in particular, has an interest in atrial fibrillation and is one of the foremost world experts in ARVD/C.

## Memorable Experience

Walking through the lobby of the domed Billings Administration Building at the Johns Hopkins Hospital for the first time, I was confronted with the 10-and-a-half-foot Carrara marble "Christus Consolator" statue. I realised that for the next two years, I would become a part, however small it may be, of this prestigious hospital and its 121-year history of world-class healthcare. It is truly a humbling experience.

## What's next

I think that there is still much to learn about the genetics of sudden cardiac death (SCD), especially in South-east Asia. I hope to establish a registry, similar to the ARVD programme at Johns Hopkins Hospital for Singaporeans and their families with SCD. By studying the genotypic and phenotypic correlations of these patients, I hope to further extend our knowledge of this disease, and in doing so, help in our ability to risk stratify these patients. While we still are unable to directly manipulate the genetic make-up of an individual, we can certainly prevent sudden cardiac death with devices such as an Implantable Cardioverter Defibrillator.

*A devoted father, Dr Tan Boon Yew loves to spend every possible waking moment with his two kids, and simply be the "goofy" Dad during his free time. Walking the talk on healthy lifestyle, the lean and toned cardiologist hits the gym three to four times a week to stay fit.*



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### ASSOCIATE CONSULTANT

Dr Daniel Chong

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## Research Publications Jul - Dec 2010

Moe MM, Koh A, Chin CT. Severe unexplained heart failure in a young person. *Kardiol Pol.* 2010 Dec;68(12):1374-5.

Ewe SH, Ajmone Marsan N, Pepi M, Delgado V, Tamborini G, Muratori M, Ng AC, van der Kley F, de Weger A, Schali J, Fusari M, Biglioli P, Bax JJ. Impact of left ventricular systolic function on clinical and echocardiographic outcomes following transcatheter aortic valve implantation for severe aortic stenosis. *Am Heart J.*

Koh AS, Flores JL, Keng FY, Tan RS, Chua TS. Evaluation of the American College of Cardiology Foundation/American Society of Nuclear Cardiology appropriateness criteria for SPECT myocardial perfusion imaging in an Asian tertiary cardiac center. *J Nucl Cardiol.* 2010 Nov 24.

Ong ME, Wong AS, Chan KP, Bergin AR, Sultana P, Lim SH, Chua TS, Lim ST, Chin CT, Pek PP, Venkataraman A. Improving door-to-balloon times in Asia for acute ST elevation myocardial infarction via direct activation by emergency physicians of percutaneous coronary intervention. *Int J Cardiol.* 2010 Oct 13.

Shao Y, Liew R, Guan B, Wong PE, Shim WS, Chua Y, He G. Different expression of large conductance calcium-activated K<sup>+</sup> channels in human internal mammary and radial arteries. *Cardiovasc Res.*

Shim W, Mehta A, Lim SY, Zhang G, Lim CH, Chua T, Wong P. G-CSF for Stem Cell Therapy in Acute Myocardial Infarction: Friend or Foe? *Cardiovasc Res.*

De Silva DA, Yassin N, Toh AJ, Lim DJ, Wong WX, Woon FP, Chang HM. Timing of Arrival to a Tertiary Hospital after Acute Ischaemic Stroke - A Follow-up Survey 5 Years Later. *Ann Acad Med Singapore.*

Moe KT, Wong P. Current trends in diagnostic biomarkers of acute coronary syndrome. *Ann Acad Med Singapore.*

Kirk P, He T, Anderson LJ, Roughton M, Tanner MA, Lam WW, Au WY, Chu WC, Chan G, Galanello R, Matta G, Fogel M, Cohen AR, Tan RS, Chen K, Ng I, Lai A, Fucharoen S, Laothamata J, Chuncharunee S, Jongjirasiri S, Firmin DN, Smith GC, Pennell DJ. International reproducibility of single breathhold T2\* MR for cardiac and liver iron assessment among five thalassemia centers. *J Magn Reson Imaging.* 2010 Aug;32(2):315-9.

Shim WS, Tan G, Gu Y, Qian L, Li S, Chung YY, Lim SY, Sim E, Chuah SC, Wong P. Dose-dependent systolic contribution of differentiated stem cells in post-infarct ventricular function. *J Heart Lung Transplant.* 2010 Aug 3.

Chin CT, Roe MT, Fox KA, Prabhakaran D, Marshall DA, Petitjean H, Lokhnygina Y, Brown E, Armstrong PW, White HD, Ohman EM; TRILOGY ACS Steering Committee. Study design and rationale of a comparison of prasugrel and clopidogrel in medically managed patients with unstable angina/non-ST-segment elevation myocardial infarction: the TaRgeted platelet Inhibition to cLarify the Optimal strateGy to medically manage Acute Coronary Syndromes (TRILOGY ACS) trial. *Am Heart J.* 2010 Jul;160(1):16-22.e1.

Chao VT, Chiam PT, Tan SY. Transcatheter aortic valve implantation with preexisting mechanical mitral prosthesis - use of CT angiography. *J Invasive Cardiol.* 2010 Jul;22(7):339-40.

Liew R. Prediction of sudden arrhythmic death following acute myocardial infarction. *Heart.* 2010 Jul;96(14):1086-94.



## NHCS nurse wins Tan Chin Tuan Nursing Award



Her passion to learn and care for the patients saw Ms Rokiah Bte Sulaiman, Principal Enrolled Nurse, Ward 56, NHCS, as one of the top three winners for the 4th Tan Chin Tuan Nursing Award 2010.

The Award recognises enrolled nurses who are exemplary in their dedication to their patients; demonstrate excellence in their nursing careers; and make significant contributions to the nursing profession and the community. It is the highest accolade that can be bestowed on an enrolled nurse in Singapore.

Mr Lim Chuan Kah, Principal Enrolled Nurse, Ward 44, NHCS won the inaugural award in 2006.

*Ms Rokiah Bte Sulaiman receiving the 4th Tan Chin Tuan Nursing Award 2010 from Mr K Shanmugam, Minister for Home Affairs and Minister for Law at the award ceremony on 20 November 2010.*

## NHCS pays tribute to Dr B A Johan



After close to 50 years in medicine, Dr B A Johan, Senior Consultant, Department of Cardiology, National Heart Centre Singapore (NHCS) has decided to take a slower pace as a visiting consultant instead.

A trailblazer in the field of cardiovascular medicine in Singapore, Dr Johan was the Head of the Department of Cardiovascular Medicine, Tan Tock Seng Hospital in 1973 and was at the helm for 12 years. Starting the first cardiology department in Singapore with minimal resources was a challenge. With a fierce determination and support from other veterans, Dr Johan overcame all odds and helped lay a strong foundation. A strong advocate on preventive cardiology, he led the cardiovascular rehabilitation and preventive cardiology unit for close to 13 years. Dr Johan is a tireless and dedicated teacher to many of today's cardiologists. He takes great pains to personally teach and instruct the new medical officers on the finer points of conducting and interpreting exercise stress tests.

NHCS salutes Dr Johan for his instrumental role in shaping cardiology in Singapore.

## NHCS bags Singapore Health Award 2010 (Gold)



NHCS won the Gold Award for Singapore Health Award 2010!

The Singapore HEALTH (Helping Employees Achieve Life-Time Health) Award by the Health Promotion Board is a national recognition presented to organisations with commendable Workplace Health Promotion (WHP) programmes. Such programmes help to keep staff fit and healthy and boost productivity.

NHCS has been an award recipient of the Singapore Health Award since 2004.

# Castle of Dreams, Home of Hearts

More than 100 needy heart patients and their family members benefited from the innovative sandcastle-building event titled "Castle of Dreams, Home of Hearts", organised by NHCS medical social workers on 18 December 2010 at East Coast Park. Mr Nooran Bin Hussain, 41, a Medifund recipient, said, "I am very excited because we seldom have this kind of chance for family gathering. My favourite moment is being able to see everyone focused on the same work."

The brainchild behind this refreshing concept, Ms Joey Chang, Medical Social Worker, NHCS chanced upon the idea at a recent trip to East Coast Park. The magnificent scene of numerous beautiful sandcastles created by the families left an indelible impression on her. It prompted her to start the teambuilding exercise for needy heart patients to help instil hope, raise self-esteem and confidence in them.



## Construction for new heart centre to start

National Heart Centre Singapore (NHCS) called for the main construction tender for the new building on 22 November 2010. This marks an important milestone in the new building development.

The new heart centre will be located on Hospital Drive, opposite Block 4, Singapore General Hospital and is expected to be operational in 2013.



## Upcoming Events

### GP Heart Care Symposium – Acute Cardiac Care: Cardiogenic Shock Update

**Date** 19 February 2011 (Saturday)

**Venue** Furama Riverfront Hotel

### Public Forum – Understanding Heart Valve Disease

**Date** 26 February 2011 (Saturday)

**Time** 1 – 3 pm

**Venue** Grassroots Club, Main Auditorium (near Yio Chu Kang MRT Station)

For registration and event details, please check out [www.nhcs.com.sg](http://www.nhcs.com.sg).

For feedback on Murmurs, please direct to

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