

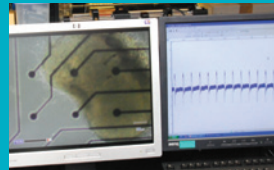


# Murmurs

JUL - SEP 2011 Issue 10 A quarterly publication of National Heart Centre Singapore MICA (P) 078/07/2011

## HIGHLIGHTS

- Transforming Skin Cells into Beating Heart Cells
- Fellowship in Cardiac Imaging
- JCI Affirms NHCS' Commitment to Safe and Quality Care



## New Procedure to Repair Leaky Valve



From left to right: The NHCS' multidisciplinary team behind Asia's first MitraClip procedure: Dr Yeo Khung Keong (holding the MitraClip device), A/Prof Chua Yeow Leng, A/Prof Koh Tian Hai, Medical Director, NHCS and A/Prof Ding Zee Pin, with the first MitraClip patient Mdm Margaret Lim (centre).

For a while, Mdm Margaret Lim didn't want to go out with friends nor have the energy to do simple household chores. She was always tired and breathless. The 68-year-old heart patient has a condition known as severe mitral regurgitation, in which the heart's mitral valve doesn't close tightly, allowing blood to flow backwards into the heart. Complicating matters were her poor lung function and previous heart surgery which made her unsuitable for heart valve surgery.

Her life took a turn for the better when the National Heart Centre Singapore (NHCS) introduced a new minimally invasive procedure using the MitraClip system in April 2011, the first in Asia. The new procedure is performed through a small incision in the groin approximately 1cm in length. A 4-mm-wide metallic clip is delivered through this incision to the heart where the leaky valve is clipped in the middle, reducing the amount of regurgitation.

The procedure involves a multi-disciplinary team comprising interventional cardiologists, echocardiologists, cardiothoracic surgeons, anaesthetists, nursing and paramedical staff.

### Viable Treatment for Patients at High Surgical Risk

"The key advantages of the MitraClip procedure are improved safety, shorter hospital stay and recovery time and less risk of complications. The introduction of this new percutaneous valve repair provides a viable treatment for severe mitral regurgitation patients who are at high surgical risk," said Dr Yeo Khung Keong, Consultant, Department of Cardiology, NHCS and the lead cardiologist for the MitraClip procedure.

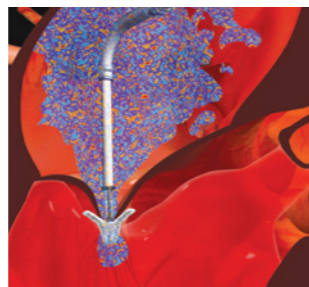
“Mitral regurgitation affects about 12 per cent of those aged 75 years old and above. As one in five Singaporeans will be 65 and older by 2030, this group of patients is set to rise. We estimate up to 50 patients a year may benefit from this new therapy.”

**Associate Professor Koh Tian Hai, Medical Director,  
National Heart Centre Singapore**

### Efficacy and Safety

The efficacy and safety of this new minimally invasive heart valve repair was studied in the EVEREST II clinical trial which compared the minimally invasive approach with the open surgery method in 279 patients. The findings showed that the minimally invasive approach was much safer with 33 per cent fewer major adverse events at 30 days. Both groups of patients experienced improvement in heart function and reduction in symptoms. In terms of clinical success rate, the minimally invasive group saw 55 per cent compared to 73 per cent for the surgery group at one year after treatment. At two years, the success rate was 52 per cent for the minimally invasive group compared to 66 per cent for the surgery group.

Left untreated, up to 30 per cent of these patients with severe regurgitation may die within six years. It may also lead to irregular heartbeat and worsening congestive heart failure. In those with pre-existing heart failure, up to 60 per cent may die in five years.



*Pre-MitraClip Procedure:  
The MitraClip device being positioned in the heart during the procedure. The blue colour represents the mitral regurgitation.*



*Post-MitraClip Procedure:  
After the procedure, the MitraClip device remains and moves with the heart, allowing blood to flow through each opening.*

Courtesy of Abbott Laboratories

Today, Mdm Lim leads a more active life. The retiree joins her friends for their activities such as going to the market and can do household chores such as washing and cooking.

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### NHCS Interventional Cardiology Procedures

- Coronary angiography / cardiac catheterisation
- Percutaneous coronary intervention (PCI) – angioplasty, stent implantation and rotablator 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
- Rotational coronary atherectomy

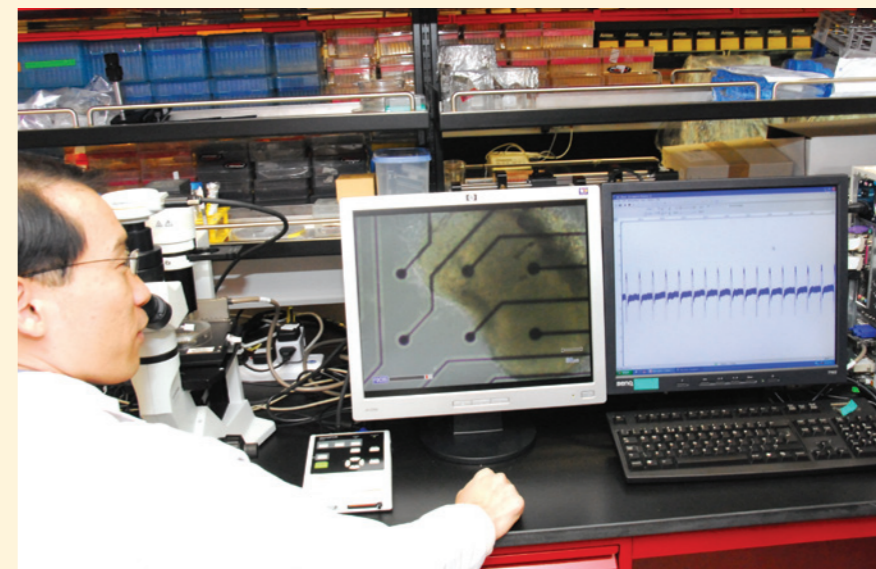
### Our Specialists (Interventional Cardiology)

- A/Prof Koh Tian Hai, Medical Director and Senior Consultant
- A/Prof Lim Soo Teik, Head and Senior Consultant, Director, Interventional Cardiology
- A/Prof Philip Wong, Senior Consultant
- Dr Aaron Wong, Senior Consultant
- Dr Paul Chiam, Consultant
- Dr Jack Tan, Consultant
- Dr Stanley Chia, Consultant
- Dr Rohit Khurana, Consultant
- Dr Yeo Khung Keong, Consultant
- Dr Chin Chee Tang, Consultant
- Dr Ho Kay Woon, Consultant (away for HMDP)

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## Transforming Skin Cells into Beating Heart Cells

Research at National Heart Centre Singapore (NHCS) has taken a big step forward. The centre is now able to create beating heart cells from skin, using a virus-free method to create human induced pluripotent stem (hiPS) cells. The research team takes skin cells from heart patients to generate hiPS cells and then transformed them into beating adult heart muscle cells outside the body. These beating cells are similar both genetically and physically to the properties of the heart cells from which they came from. NHCS is one of only a handful of basic research labs worldwide capable of this technique.



Dr Winston Shim, Senior Staff Research Scientist, Research and Development Unit, NHCS, showing the beating heart cells with corresponding ECG changes on the screen.

Associate Professor Philip Wong, Director, Research and Development Unit, NHCS says, “This technique is really a game changer for stem cell work and cell therapy for the heart. NHCS Research and Development Unit is currently one of only a few labs in the world with such capability and other labs worldwide are now asking us to help them produce these cells. Our research team is really excited about the clinical application and the potential for helping heart patients.”

### Potential Use in Heart Failure Therapy

With the heart muscle cells made with hiPS cells, they can be used to replace the damaged heart muscle of end-stage heart failure patients, to relieve the symptoms such as breathlessness and possibly delay the need for a heart transplant.

A key advantage of NHCS’ own virus-free hiPS cell method is that immunosuppressants to prevent rejection will not be needed as the source cells originate from the patient. The non-viral technique removes the risk of infection after a heart surgery, which may limit the clinical application of such stem cell therapy. Furthermore, hiPS cells, which are known to be as powerful as embryonic stem cells, can avoid ethical issues associated with the production of the latter. They also provide a renewable source of replacement cells and tissues.

### Allows Creation of Human Heart Cell Model

During simulation, the hiPS cells displayed predictable ECG changes. This allows for the creation of a human heart cell model to examine the progression of heart diseases. In addition, these hiPS cells could apply to pharmacogenetics to examine the impact of genetic variation on the response to medications. This will allow clinicians to tailor drug therapy at a dosage that is most appropriate for an individual patient, without the patient physically consuming any of the drugs. Such a method can be used to assess a patient’s risk factor for a number of conditions and tailor individual preventative treatments.

The research breakthrough is the combined efforts of research scientists and clinician scientists. The 15-member team, including three clinician scientists and five research scientists, has been working closely on the project since 2009. The project’s core theme is on regenerative medicine for the ageing population and is funded with a research grant of close to \$9 million for five years by the National Research Foundation.

# Fellowship in Cardiac Imaging

This issue, the Murmurs team speaks to Dr Ewe See Hooi, Associate Consultant, Department of Cardiology at National Heart Centre Singapore (NHCS) on her interesting fellowship at Leiden University Medical Center, The Netherlands from August 2009 – September 2011.



Dr Ewe See Hooi (front row, first on left) with other overseas fellows at a celebration at the Leiden University Medical Center.

## Why Leiden University Medical Center

The Leiden University Medical Center is one of the eight medical centres in the Netherlands. It offers a broad package of top-level clinical care, including organ transplants and cardiovascular interventions. As a university centre, it also has a rich research component, focusing on the translation from fundamental research to its use in patient care.

## The Enriching Experience

Over the course of my two-year fellowship, I learnt the applications of different techniques in the field of echocardiography (strain imaging, tissue Doppler imaging and 3-dimensional), cardiac computed tomography (structural heart diseases and coronary), magnetic resonance imaging (3D flow sequences for assessment of valvular diseases) and nuclear cardiology (perfusion and innervations). My mentor was Dr Jeroen J. Bax, a prominent figure in cardiac imaging. Through the extensive experience in the various imaging modalities, I learnt to appreciate the usefulness and limitations of different modalities / techniques and how they can serve to provide complementary information for clinical decision making.

I also acquired competence in cardiac imaging part of the percutaneous valve therapy, an emerging field of cardiology.

The training also gave me the opportunity to be involved in clinical research in various cardiac diseases using multimodality imaging, with a special interest / research topic on aortic valve disease and percutaneous valve therapy. I have authored/co-authored 21 papers.

## Memorable Experience

Typing reports in Dutch! I managed to pick up the commonly used Dutch medical terms to do my reports. In the Netherlands, cycling is a common mode of transportation. I cycle to work for about 20 minutes everyday.

I also managed to travel quite a bit in Europe during the holidays. Over the weekends, I joined the other overseas fellows for outings to the fascinating sand dunes, beaches, farms and factories.

## What's next

I'm focusing on multimodality imaging in better patient selection for percutaneous valve surgery and in the field of structural heart diseases.

I also plan to introduce research protocols for a better understanding of myocardial mechanics and early detection of myocardial dysfunction in patients with valvular diseases or cardiomyopathy.

Dr Ewe See Hooi is extremely jovial and affable. She is a foodie and loves catching up with family and friends during her spare time. The studious lady is also working on her PhD in cardiac imaging which she expects to complete in one to two years' time.



Dr Ewe See Hooi with her parents, having a wonderful time in Keukenhof Garden -- one of the most popular places to visit in The Netherlands, where you get to experience the ultimate spring blossom with an abundance of colours and fragrances.

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### ADVANCED NON-INVASIVE CARDIOVASCULAR IMAGING

- Multi-Slice Computed Tomography
  - CT Angiogram
  - Calcium Score

### NUCLEAR CARDIOLOGY

- Nuclear stress/rest perfusion scans
- Rest and exercise gated blood pool scans
- Rest-redistribution thallium imaging

### ECHOCARDIOGRAPHY (IMAGING AND HAEMODYNAMICS)

- Transthoracic-echocardiography studies
- Transoesophageal echocardiography
- Stress echocardiography – exercise
- Stress echocardiography – pharmacologic
- 3D echocardiography

### OUR SPECIALISTS (NON-INVASIVE IMAGING)

A/Prof Terrance Chua	Deputy Medical Director and Senior Consultant Director, Non-invasive Laboratory	Nuclear Cardiology
A/Prof Ding Zee Pin	Head and Senior Consultant Director, Echocardiography	Echocardiography
Dr Chuah Seng Chye	Senior Consultant	Echocardiography
Dr Lee Chung Yin	Senior Consultant	Echocardiography
Dr K Gunasegaran	Senior Consultant	Echocardiography
Dr Felix Keng	Senior Consultant	Nuclear Cardiology
A/Prof Tan Ru San	Senior Consultant and Director, Clinical Trials	Non-invasive Cardiac Imaging
Dr Tan Ju Le	Senior Consultant	Adult Congenital Heart Disease / Echocardiography
Dr Tan Swee Yaw	Consultant and Director, Cardiovascular Rehabilitation and Preventive Cardiology	Cardiac Rehabilitation and Preventive Cardiology / Cardiac Imaging
Dr See Chai Keat	Consultant	Echocardiography
Dr Tang Hak Chiaw	Consultant	Imaging / Cardiomyopathy
Dr Peter Ting	Consultant	Cardiac Rehabilitation and Preventive Cardiology / Echocardiography
Dr Ewe See Hooi	Associate Consultant	Cardiac Imaging

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## Research Publications Jul – Sep 2011

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## NHCS Research Scientist Receives Distinguished Award



Dr Moe Kyaw Thu, Senior Staff Research Scientist, Research and Development Unit, NHCS was awarded the Fellow of the American Heart Association (FAHA) on 25 October 2011. This is a prestigious award that recognises one's scientific and professional accomplishments and volunteer leadership and service. The American Heart Association is one of the world's most eminent organisations of cardiovascular and stroke professionals.

## Appointments with the Duke-NUS Graduate Medical School



### PROFESSOR HWANG NIAN CHIH

Head and Senior Consultant, Department of Cardiothoracic Anaesthesia appointed as Professor



### ASSOCIATE PROFESSOR DING ZEE PIN

Senior Consultant, Department of Cardiology appointed as Associate Professor



### DR LIM YEONG PHANG

Senior Consultant, Department of Cardiothoracic Surgery appointed as Adjunct Assistant Professor

## NHCS Launches Inaugural Outstanding Teacher Award

Seven outstanding teachers were awarded the inaugural NHCS Outstanding Teacher Award 2011 at the centre's service quality award ceremony on 29 September 2011. The award recognises individuals who had made an effort to educate, inspire and mentor healthcare professionals.

### DOCTOR CATEGORY

- **A/Prof Chua Yeow Leng**, Senior Consultant, Department of Cardiothoracic Surgery
- **A/Prof Ding Zee Pin**, Senior Consultant, Department of Cardiology
- **A/Prof Lim Soo Teik**, Head & Senior Consultant, Department of Cardiology

### NURSE CATEGORY

- **Foo Lee Lian**, Nurse Clinician, Ward 44
- **Rosalind Sim**, Senior Nurse Manager, Ward 44
- **Tong Seng Huay**, Clinical Instructor, Nursing Development Unit

### ALLIED HEALTH CATEGORY

- **Shirley Ng**, Senior Executive Medical Technologist, Vascular Laboratory



Proud winners of the NHCS Outstanding Teacher Award, Tong Seng Huey (front row, left) and A/Prof Lim Soo Teik (front row, right) with A/Prof Koh Tian Hai, Medical Director, NHCS and A/Prof Lim Swee Hia, Director, Nursing, NHCS (front row, centre). Standing (left to right): Shirley Ng, Foo Lee Lian and Rosalind Sim. Missing in the photo: A/Prof Ding Zee Pin and A/Prof Chua Yeow Leng.

## Promotions



**DR GUO WEI QIANG KENNETH**  
Associate Consultant,  
Department of Cardiology



**DR KOH SU-MEI ANGELA**  
Associate Consultant,  
Department of Cardiology

# JCI Affirms NHCS' Commitment to Safe and Quality Care



Staff explaining the work processes to JCI surveyor, Dr Nathan Erteschik during the JCI re-accreditation audit.

National Heart Centre Singapore's commitment to quality care and patient safety has once again received the stamp of approval from the Joint Commission International (JCI), a leader in international healthcare accreditation and quality improvement.

Between 18 and 20 July 2011, the JCI surveyors scrutinised the centre's processes, quality measures and patient care and were impressed with what they saw. Kudos to the rigorous preparations led by Dr Jack Tan, Chairman, NHCS JCI Steering Committee and A/Prof Lim Swee Hia, Director of Nursing, NHCS and all staff who have worked hard in bringing the JCI re-accreditation journey to a very successful conclusion.

NHCS was the first heart hospital in Asia to be accredited by JCI on 27 October 2005 and was successfully re-accredited on 24 July 2008.



Staff imparting heart health tips to the public at Heart Fair 2011.

## NHCS Supports World Heart Day 2011

Supporting National Heart Week / World Heart Day 2011, National Heart Centre Singapore (NHCS) participated in the Heart Fair 2011 from 24 to 25 September at Toa Payoh HDB Hub. Through interesting quizzes and informative brochures, NHCS shared with the public on the importance of heart health and encouraged them to adopt a healthy lifestyle to reduce their risk of heart disease.

## Upcoming Events

### 3rd AsiaPCR/SingLIVE

**Date** 12 - 14 Jan 2012

**Venue** Suntec Singapore

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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