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JAN-MAR 2013 ISSUE 16 MICA (P) 172/07/2012

A quarterly publication of National Heart Centre Singapore

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NHCS SHARES NEW PATIENT-CENTRIC PROCESSES AT TOPPING OUT CEREMONY

National Heart Centre Singapore (NHCS) marked the successful completion of the superstructure of its new building with the topping out ceremony on 21 March 2013, with Minister for Health, Mr Gan Kim Yong, as the guest-of-honour. The launch was kicked off with Mr Gan and senior leaders of SingHealth and NHCS imprinting their signatures on a piece of the roof structure – the purlin. The purlin beam will be displayed at the Sky Terrace located at level 8 of the new building and form an integrated part of the NHCS history.

NHCS also announced two new streamlined processes at the new building, following positive results from pilot projects. “The new building has given us a valuable opportunity to restructure our care delivery and putting the needs of patients first to enhance the patient care experience, quality, safety and efficiency,” said Associate Professor Koh Tian Hai, Medical Director, NHCS.



Mr Gan Kim Yong, Minister for Health (third from left), with the panel and Mr Hiroshi Takano, Managing Director and Head, International Division, Shimizu Corporation (far left), break open the sake barrels in a celebration signifying harmony and good health at the NHCS new building topping out ceremony on 21 March 2013 at the open field in front of the new building.



An artist's impression of the NHCS new building's institutional front.



The launch of the NHCS new building with the signing of the purlin beam which is a part of the building roof structure. From left, Assoc Prof Terrace Chua, Deputy Medical Director, National Heart Centre Singapore (NHCS); Prof Ivy Ng, GCEO, SingHealth; Dr Amy Khor, Minister of State, MOH; Mr Gan Kim Yong, Minister for Health; Mr Peter Seah, Chairman, SingHealth; and Assoc Prof Koh Tian Hai, Medical Director, NHCS.

Fewer queues, fewer bills

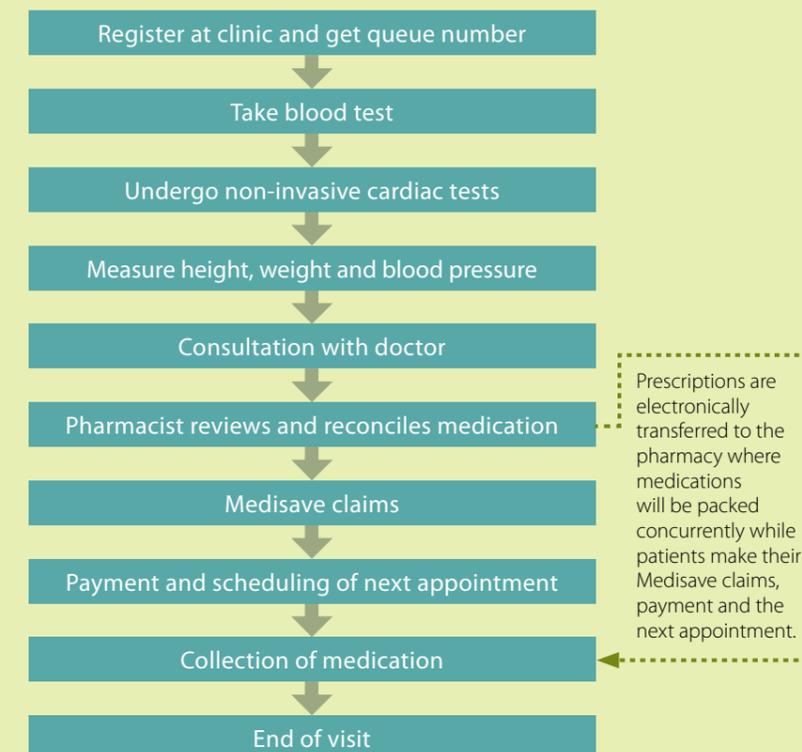
NHCS piloted a new queue and payment system known as the 1 Queue 1 Bill (1Q1B) system at Cardiac Clinic C located at its current Mistri Wing building. In the new system, patients need only register and make their payment once during their visit at NHCS – a faster and simpler process compared to the old system where they had to take at least four different queue numbers and foot three separate bills for their diagnostic tests, consultation with a specialist, and collection of medication.

“By simplifying the queue and payment process, we estimate a time savings of about 10 minutes for the patients,” said Mr Alson Goh, Chief Operating Officer, NHCS, “More importantly, it cuts down unnecessary movement, making their outpatient experience more pleasant.”

The consolidation of the process into a single queue ticket and payment will benefit heart patients, especially the elderly, as they do not have to move around the outpatient area as much and there will not be any confusion arising from different queue numbers. About one third of NHCS’ patients are 65 years old and above. This new 1Q1B system, when rolled out at the new building, is expected to create a more seamless experience for many as the centre sees over 100,000 outpatients each year.

NHCS is also looking into enhancing the outpatient experience further with a smart journey planning system that will detect which service stations have the shortest queue and plan the patient’s journey accordingly to minimise waiting time. There will also be an electronic charge form that consolidates charges for all services rendered on the same day, in line with the new building’s paperless concept.

A typical heart patient’s journey through the simplified 1Q1B system at NHCS



Time and cost savings for low-risk heart surgery patients

The other streamlined process to debut at the NHCS new building is the redesigned Same Day Admissions (SDA) for low-risk heart surgery patients.

Previously, patients requiring simple cardiac surgery, such as coronary artery bypass graft and heart valve surgery, are required to be admitted a day before the surgery for a blood test and pre-operation orientation. The new SDA process does away with this and incorporates the blood test and orientation into the pre-admission testing visit patients have to make a week before their surgery. This new arrangement helps patients save a day of ward stay and charges, and allows them to have a better rest the night before the surgery. The reduced length of stay also frees up beds for patients who need to be hospitalised for more severe types of heart disease.

According to Assistant Professor Kenny Sin, Head and Senior Consultant, Department of Cardiothoracic Surgery, NHCS, “up to 400 patients undergoing elective open heart surgery could benefit from the improved SDA process each year.”

The pilot project for the revised workflow saw an almost four-fold increase of SDA patients from 10 cases a year since 2009 to more than 35 cases between September 2011 and June 2012. The co-location of various services like clinic consultations, pre-admission testing and surgery within the NHCS new building will bring greater convenience to heart surgery patients.

Built at a cost of S\$266 million, the NHCS new building is slated to be operational by March 2014.

HAEMODYNAMIC SUPPORT DEVICES FOR HIGH-RISK PCI



A record-breaking number of more than 2,000 healthcare professionals attended the AsiaPCR/SingLIVE 2013 conference held at the The Sands Expo and Convention Centre, Marina Bay Sands.

The AsiaPCR/SingLIVE 2013 conference jointly organised by National Heart Centre Singapore and EuroPCR from 23 to 26 January 2013 saw an attendance of over 2,000 participants from more than 60 countries. This record-breaking participation was fuelled by an extensive selection of sessions catered to the needs of a wide range of healthcare professionals in cardiology. The sessions included a practical percutaneous coronary intervention (PCI) pre-course targeted at interventional fellows in training or young interventionists, forums for nurses, medical technologists and radiographers on team-based approaches to common interventions performed in the cardiac catheterisation laboratory, live transmissions from renowned regional centres emphasising on technical approaches to commonly encountered challenges, and expert focus discussions on issues pertaining to coronary, structural heart and peripheral vascular interventions.



By Dr Ho Kay Woon
Consultant
Department of Cardiology
National Heart Centre Singapore

One of these focused interactive sessions in line with the main theme of high-risk PCI was entitled "Haemodynamically unstable patient undergoing PCI: ensuring a favourable outcome". The session was co-chaired by Assistant Professor Kenny Sin, Head and Senior Consultant, Department of Cardiothoracic Surgery, NHCS, and Dr Martyn Thomas, clinical director of cardiology services at Guy's and St Thomas' Hospitals, UK, who helmed the balloon pump-assisted coronary intervention study (BCIS-1). Associate Professor Lim Soo Teik, Head and Senior Consultant, Department of Cardiology, NHCS, Dr Anand Gnanaraj from Apollo Hospital, India, and I formed the expert discussion panel.

Case presentations

I started the session with a case presentation of a 37-year-old female patient who presented with acute anterolateral ST elevation myocardial infarction secondary to coronary dissection and occlusion of the left main, left anterior descending and circumflex arteries one week post-partum. This case presentation illustrated the complementary use of three different haemodynamic support devices: the intra-aortic balloon pump (IABP), extra-corporeal membrane oxygenation (ECMO) machine and left ventricular assist device (LVAD). This allowed the completion of complex PCI and left main bifurcation stenting, haemodynamic stabilisation post-PCI and destination therapy for advanced heart failure in a patient who presented in an unstable, high-risk condition.

Assoc Prof Lim followed to give his expert opinion on the case management with a concise summary of the haemodynamic support devices available and evidence for their use. What ensued was a lively, interactive discussion between the panellists and the audience on management issues ranging from pharmacological management to interventional options and haemodynamic support using devices.

The second case presentation by Dr Gnanaraj was the successful use of the IABP in a patient with high-risk coronary anatomy who turned haemodynamically unstable while undergoing complex left main artery bifurcation PCI. This excellent case presentation was a platform for discussion on the identification of high-risk PCI patients, prophylactic versus bailout use of support devices and evidence for using haemodynamic support devices in these patients, with particular focus on the BCIS-1 trial. Dr Thomas shared his insight and experience on the BCIS-1 trial and revealed that long-term follow-up, up to five years, of trial patients showed mortality reductions in patients randomised to the use of IABP even though there were no significant reductions in major cardiac and cardiovascular events in the index hospitalisation.

The discussion concluded with a packed room of participants bringing back to their respective cardiovascular laboratories the knowledge and confidence of using support devices in high-risk PCI patients.

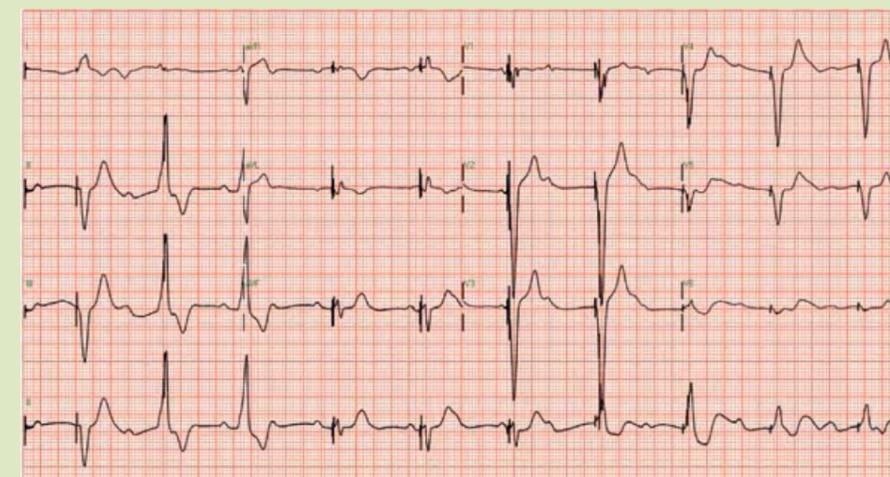


Assoc Prof Koh Tian Hai, Medical Director, NHCS, giving the opening address on the first day of AsiaPCR/SingLIVE 2013.

ANALYSE THIS

WHAT IS A POSSIBLE EXPLANATION FOR THE ECG ABNORMALITY SHOWN HERE?

Refer to page 10 for the answer.



HEART FAILURE: NEW MODALITIES OF TREATMENT

In the last 40 years, pharmacological therapy for chronic heart failure has rapidly expanded beyond diuretics and digoxin. Standard pharmacological therapy includes beta blockers and renin-angiotensin-aldosterone system antagonists. Even with existing contemporary pharmacological therapy, which has substantially improved outcomes, prognosis is fairly poor. The treatment of heart failure continues to evolve with the integration of results from landmark clinical trials into contemporary therapy.



Dr David Sim with a heart failure patient whose fluid overload was relieved with the help of the Aquapheresis therapy machine (centre).

Drug therapy

Guidelines have supported the use of aldosterone antagonists in systolic heart failure. The recommendations have been restricted to patients with moderate to severe heart failure [New York Heart Association (NYHA) class III/IV] and those with clinical heart failure after myocardial infarction based on findings from the RALES trial and EPHEMUS trial respectively. There remains a data gap for patients with mild heart failure (NYHA class II). This gap has now been addressed by findings from the EMPHASIS-HF trial. In this study, patients with NYHA class II heart failure with an ejection fraction of less than 35 per cent were randomised to eplerenone or placebo. There was a 37 per cent relative risk reduction for primary endpoint of cardiovascular death or hospitalisation for heart failure. Survival benefit was demonstrated with a relative risk reduction of 24 per cent for death from any cause.

Raised resting heart rate is a risk factor for mortality and cardiovascular outcomes in epidemiological and observational studies. Heart rate reduction has been postulated to be a potential mechanism for the observed benefits with beta blockers.

Heart rate remains increased, however, in most patients treated with beta blockers, which constitutes a need for new therapeutic strategies for heart rate reduction.

Ivabradine is a specific inhibitor of the I_f current in the sinoatrial node and results in heart rate reduction with no other apparent direct cardiovascular effects.

In the SHIFT trial, investigators studied the effects of ivabradine in patients with symptomatic heart failure (NYHA class II-IV) and an ejection fraction of less than 35 per cent, were in sinus rhythm with a heart rate of 70 beats per minute or higher. There was an 18 per cent relative risk reduction for the primary end point of cardiovascular death or hospital admission for worsening heart failure.

Guidelines have been updated accordingly to recommend the use of eplerenone and ivabradine in the treatment of chronic heart failure.

Ultrafiltration

Current clinical strategies for the treatment of fluid overloaded patients are based on unproven but clinically convenient aggressive diuretic-based strategies. Over a prolonged period of use, there is a decline in the magnitude of natriuresis after administration of sequential doses – termed the Braking Phenomenon.

The need for invasive venous access and intensive nursing staffing has largely limited ultrafiltration to those patients who simultaneously have dialysis needs. With the introduction of the Aquapheresis ultrafiltration treatment at the National Heart Centre Singapore (NHCS) in 2011, diuretic-resistant patients now have another therapeutic option. The Aquapheresis machine is a portable, low flow ultrafiltration system that does not require the intensive care setting and nursing requirement for dialysis. Compared to diuretics, ultrafiltration is associated with a shorter stay in hospital, greater fluid and weight loss, and a lower rate of 90-day patient re-admission for fluid overload.

Ventricular Assist Device

Despite advances in optimal medical therapy, a substantial number of patients progress to advanced heart failure. The option of cardiac transplantation is limited by the availability of suitable donor hearts.

With the arrival of a new era of mechanical circulatory support, more patients who are refractory to optimal medical therapy can now significantly improve their quality of life and survival. Introduction of second and third generation continuous flow left ventricular assist devices (LVADs) at NHCS has revolutionised the treatment of advanced heart failure in Singapore. Previous usage of first generation pulsatile LVADs was limited due to the smaller body frame in our Asian population. Since 2009, NHCS has performed more than 30 continuous flow LVAD implantations.

The result has been encouraging with a 95 per cent survival rate at one year, which is superior to data from clinical trials and the international registry. Majority of the patients remained in NYHA class I after the implantation and are able to return to work and resume their usual activities.

Conclusion

Heart failure is a disease of epidemic proportion. The impact of this new epidemic poses a significant burden on patients and the society. Many novel therapeutic approaches have emerged and are continuing to evolve, promising exciting possibilities for the future. Healthcare providers caring for heart failure patients require a periodic review of all available treatment strategies in order to provide the best care for their patients.



By Dr David Sim
Consultant
Department of Cardiology
Co-Director
Heart Failure Programme
National Heart Centre Singapore

NHCS PERFORMS SINGAPORE'S FIRST IMPLANTATION OF NEW GENERATION HEART PUMP



Madam Helen Tan, Singapore's first patient to be implanted with the new third generation pump, with the team of doctors at National Heart Centre Singapore: (From left) Dr C Sivathasan, Co-Director, Heart and Lung Transplant Programme; Dr David Sim, Co-Director, Heart Failure Programme; and Assoc Prof Lim Chong Hee, lead surgeon and Director, Heart and Lung Transplant Programme.

Madam Helen Tan became the first patient in Singapore to be implanted with a new generation heart pump on 26 September 2012. The HeartWare ventricular assist device, or HVAD, is a third generation heart pump designed to give advanced heart failure patients like Madam Tan a better quality of life and functional capacity while waiting for a heart transplant.

"Before I had the pump implanted, I was always out of breath, tired, and so weak that I could hardly walk and go about with my daily life," recounted the 57-year-old retiree on her heart failure condition which became worse in 2012, "Sometimes, I even got breathless while talking to someone."

Madam Tan has since regained her heart function after the surgical team at National Heart Centre Singapore (NHCS), led by Associate Professor Lim Chong Hee, Senior Consultant, Department of Cardiothoracic Surgery and Director, Heart and Lung Transplant Programme, NHCS, performed a four-hour open heart surgery on her to implant the new heart assist device. She recovered well and was discharged less than three weeks after the surgery.

"Now that I have this heart pump, I can get back to my normal routine and help look after my grandchildren," said Madam Tan.

Smaller, lighter device

Weighing just 160g, the HVAD pump is about the size of a golf ball and pumps up to 10 litres of blood per minute. The new third generation heart pump is smaller and lighter than its predecessors, which makes it suitable for patients with a smaller build, such as Asian and female patients.

"The new HVAD pump's miniature size allows it to be implanted at the apex of the heart's left ventricle within the lining sac which envelops the heart, also known as the pericardium," said Assoc Prof Lim, "This removes the need for the creation of a pocket below the heart for placement of older devices."

Dr C Sivathasan, Co-Director, Heart and Lung Transplant Programme, NHCS, added that not having to create a pocket has shortened the implant surgery by an hour – from five to four hours.

The HVAD pump was first implanted in Austria in March 2006, and a major clinical trial conducted in the US showed that the device achieved improvements in the quality of life and functional heart capacity similar to those seen in heart transplant patients.

Madam Tan now wears equipment weighing about 2.5 kilogrammes to sustain her heart function: a controller and batteries supplying power to her heart pump through a driveline cable, which exits her body near the abdomen.

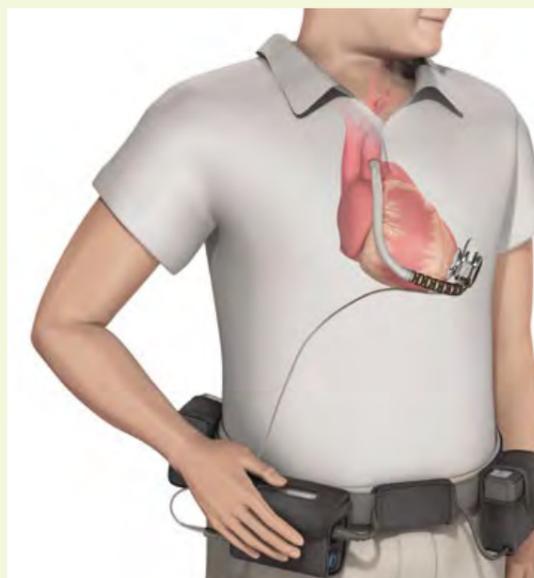
Heart failure in Singapore

Madam Tan has been living with heart failure since 2006. She was diagnosed with dilated cardiomyopathy which is a condition where her heart becomes weakened, enlarged and unable to pump sufficient blood to the rest of her body. Prior to implanting the heart assist device, her heart was functioning at below 30 per cent – a normal heart functions between 55 and 70 per cent.

Madam Tan is one of many patients in Singapore who suffers from heart failure, which also happens to be one of the most common cardiac conditions.

"Heart failure accounts for about 5,000 hospital admissions a year," said Dr David Sim, Consultant, Department of Cardiology, and Co-Director, Heart Failure Programme, NHCS, "We receive an average of 23 referrals a year at NHCS for heart transplant, and the lack of suitable donors is a key challenge. As a result, about one third of these cases require device implantation as a bridge-to-heart transplant."

NHCS performs an average of three heart transplantations a year – a low number due to a shortage in suitable donor hearts. Heart assist devices, such as the HVAD, are thus an important alternative for advanced heart failure patients to prolong and improve their quality of life while waiting for a suitable donor heart.



The HVAD pump fits within the lining sac around the heart, and is connected to a controller and batteries via a driveline cable which exits the patient's body near the abdomen.

Image courtesy of HeartWare International, Inc.



Made of titanium composite materials, the HVAD pump runs on a virtually frictionless system with no points of mechanical contact.

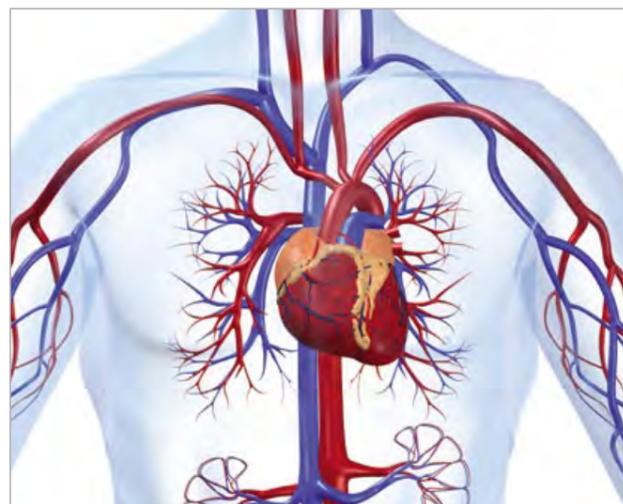
Image courtesy of HeartWare International, Inc.

RESEARCH HIGHLIGHT

Int J Cardiol. 2013 Jan 18. pii: S0167-5273(12)01728-7. doi: 10.1016/j.ijcard.2012.12.084. [Epub ahead of print]

Myocardial contractile dysfunction associated with increased 3-month and 1-year mortality in hospitalized patients with heart failure and preserved ejection fraction.

Zhong L, Ng KK, Sim LL, Allen JC, Lau YH, Sim DK, Lee RK, Poh KK, Chua TS, Kwok BW, Tan RS.



ABSTRACT

BACKGROUND: There is a clinical need for a contractility index that reflects myocardial contractile dysfunction even when ejection fraction (EF) is preserved. We used novel relative load-independent global and regional contractility indices to compare left ventricular (LV) contractile function in three groups: heart failure (HF) with preserved ejection fraction (HFPEF), HF with reduced ejection fraction (HFREF) and normal subjects. Also, we determined the associations of these parameters with 3-month and 1-year mortality in HFPEF patients.

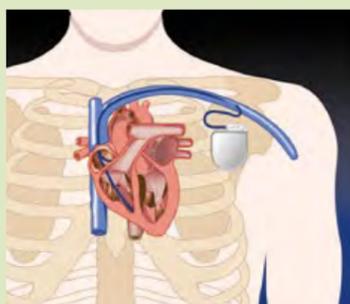
METHODS: 199 HFPEF patients [median age (IQR): 75 (67-80) years] and 327 HFREF patients [69 (59-76) years] were recruited following hospitalization for HF; 22 normal control subjects [65 (54-71) years] were recruited for comparison. All patients underwent standard two-dimensional Doppler and tissue Doppler echocardiography to characterize LV dimension, structure, global and regional contractile function.

RESULTS: The median (IQR) global LV contractility index, $d\sigma^*/dt(max)$ was $4.30s(-1)$ ($3.51-4.57s(-1)$) in normal subjects but reduced in HFPEF [2.57 ($2.08-3.64$)] and HFREF patients [1.77 ($1.34-2.30$)]. Similarly, median (IQR) regional LV contractility index was 99% (88-104%) in normal subjects and reduced in HFPEF [81% (66-96%)] and HFREF [56% (41-71%)] patients. Multi-variable logistic regression analysis on HFPEF identified $sc-mFS < 76\%$ as the most consistent predictor of both 3-month (OR=7.15, $p < 0.05$) and 1-year (OR=2.57, $p < 0.05$) mortality after adjusting for medical conditions and other echocardiographic measurements.

CONCLUSION: Patients with HFPEF exhibited decreased LV global and regional contractility. This population-based study demonstrated that depressed regional contractility index was associated with higher 3-month and 1-year mortality in HFPEF patients.

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

ANALYSE THAT Continued from page 5.



The patient is implanted with a VVI pacemaker. Occasionally, fusion beats can occur when a patient's intrinsic QRS coincidentally occurs about the same time as the delivered pacemaker impulse. This is normal because it takes time for the pacemaker to sense and deliver an impulse, and an intrinsic QRS can occur in that interval. The ECG on page 5 shows multiple episodes of fusion beats.

KEEPING HIS FINGER ON THE PULSE

In this issue, Murmurs speaks to Assistant Professor Ching Chi Keong, Senior Consultant, Department of Cardiology, and Director, Electrophysiology and Pacing, National Heart Centre Singapore. He completed his fellowship in cardiac electrophysiology and pacing in 2007 at Cleveland Clinic, Cleveland, Ohio, USA. Aside from his clinical responsibilities, he is also active in grooming the next generation of doctors with teaching appointments at Duke-NUS Graduate Medical School and Yong Loo Lin School of Medicine, National University of Singapore.



Why did you choose to sub-specialise in cardiac electrophysiology and pacing (EP)?

Cardiology, in itself, is an exciting field of study in medicine. People have shared with me that EP is perceived to have a steep learning curve with many abstract concepts to grasp. I think they are quite close to the truth, as EP is indeed an intellectually stimulating sub-specialty. I decided on EP as I enjoy the challenge inherent in the sub-specialty, offered by the reading of complex ECGs and performing EP interventional procedures well with precision and accuracy.

How would you describe the work of an electrophysiologist?

A cardiac electrophysiologist can be likened to an electrician of the heart, who places his finger, literally, on the pulse of patients. Within the walls of the heart and its many structures is an electrical system designed to ensure that the heart beats in a coordinated manner. It is the cardiac electrophysiologist's job to assess how well the system is working and to fix any problems through appropriate treatments.

Can you share with us one key development in EP?

One of the most important devices developed in the field of EP is perhaps the implantable cardioverter defibrillator (ICD). It is implanted in patients who run a risk of sudden cardiac death (SCD), a risk which increases in patients who have survived heart attacks. There is, unfortunately, no cure for SCD at the moment, but it can be prevented with an ICD. Patients implanted with an ICD are able to go about their daily routine in peace, as the device will deliver an electrical shock to the heart to reset its rhythm each time an abnormal and potentially fatal heart rhythm is detected, thereby saving their lives.

Any advice for budding cardiologists?

I believe that it is a basic duty of doctors to teach and impart their knowledge and skills so that more patients can benefit from better treatment and care. Having said that, it is important for doctors to have an inquisitive mind, learn actively, be diligent and embrace hard work. A positive attitude will help them go a long way in becoming better doctors.



Asst Prof Ching showing the use of computer-aided magnetic guidance to guide catheters more precisely and accurately within the complex heart anatomy.

NHCS WINS 240 INDIVIDUAL AWARDS AT SHQSA 2013

The Singapore Health Quality Service Award (SHQSA) ceremony held on 16 January 2013 saw National Heart Centre Singapore (NHCS) staff receive 240 individual awards and a Best Team Merit Award in Clinical Practice Improvement. The annual award ceremony was initiated in 2011 by SingHealth to honour and appreciate healthcare professionals committed to delivering quality care and excellent service across the nation.



Mr Chia Li Sen (left), Patient Care Assistant, Ward 56, NHCS, emerged as the winner of the Superstar Award in the Ancillary category. His passion for patient care became evident through his actions. Mr Chia taught his colleagues to speak Hokkien so that they could better communicate with elderly patients. He also worked with a team and came up with an innovative, easy and painless way for patients to don compression stockings after surgery.

"It does not have to be something extraordinary," said Mr Chia, "Just understand the patient's needs and do your best to make him feel more comfortable."

The Superstar Award is given to the top winner for each of the categories: Clinician, Nursing, Allied Health, Ancillary and Administration. This is the second consecutive year that NHCS has succeeded in clinching the award. Mr Lim Chuan Kah, Principal Enrolled Nurse, Ward 44, NHCS, won the Superstar Award for the Ancillary category last year.



The NHCS team at the Singapore Health Quality Service Award ceremony this year.

In The Pink of Health



Promoting the importance of preventive care, the NHCS Healthy Lifestyle Committee organised a subsidised health screening for the staff from 25 to 28 March 2013. An overwhelming 425 staff took part in the screening exercise to check on their

body mass index, blood pressure and blood glucose and cholesterol levels. In addition, various health promotion activities such as health talks, sports events and fruits bazaars are also scheduled throughout the year to help the staff lead healthy and vibrant lives. NHCS' efforts in promoting workplace health won the Singapore HEALTH Award 2012 (Gold) last year.



Formation of Cardiovascular ACP

NHCS has formed the Cardiovascular Academic Clinical Program (ACP) in December 2012, with the aim to improve patient care and outcomes through Academic Medicine, in partnership with Duke-NUS Graduate Medical School.

The Cardiovascular ACP is built upon on three strategic thrusts - maintain the lead in innovative cardiac care, raise training and education to the next level, and strengthen and achieve targeted breakthroughs in research.

Sharing the importance of Academic Medicine, Associate Professor Koh Tian Hai, Medical Director, NHCS, said, "Teaching the next generation is important to ensure continued high standards of care. Our high volumes in clinical service support greater innovation research, allowing access to new drugs and technology. This gives the doctors the opportunity to stay abreast of the latest medical developments which is critical in delivering the best care for our patients and serves as a magnet for talent attraction and retention."

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