SINGAPORE Health

NOV
DEC
2018

THE FLAGSHIP PUBLICATION
OF THE SINGHEALTH DUKE-NUS
ACADEMIC MEDICAL CENTRE
MCI (P) 039/04/2018

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SAVING TIME SAVING HEARTS

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PHOTO: NHCS

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In a heart attack situation, speedy attention is vital if the surgeon is to reduce further damage to the patient's heart and save as much of the heart muscle as possible.

PHOTOS: ISTOCK

'Time is muscle' say heart doctors

When a heart attack occurs, the faster a patient gets life-saving surgery, the more of his heart muscle can be saved – something SingHealth cardiologists constantly strive to do. By Eveline Gan

"TIME IS MUSCLE" is a common saying among cardiologists. At the National Heart Centre Singapore (NHCS), this time has been cut down considerably over the years to the benefit of patients.

Known as the "door-to-balloon" time, it is the period from when a patient arrives at the emergency room to when he gets a procedure to open the "blocked heart artery". The balloon refers to the balloon that unblocks an artery so that blood can flow through.

NHCS has cut down its "after office hours" door-to-balloon time to 60 minutes. This is 30 minutes less than the 90 minutes recommended by the American Heart Association for "after office hours" cases. The US recommendation for cases seen during office hours is 60 minutes.

Associate Professor Philip Wong, Senior Consultant, Department of Cardiology, NHCS, said getting help quickly after a heart attack is vital.

"When a heart attack happens, the blocked artery interrupts blood flow, starving the region of the heart muscle where the attack happened of oxygen and nutrients. The heart tissue starts dying by the minute almost immediately.

"The faster the patient comes to the emergency department and have doctors open up his blocked arteries, the more heart muscle is saved. As cardiologists, we use the term 'time is muscle' to describe this."

The life-saving surgery, called primary percutaneous coronary intervention (PCI), helps reduce further damage to the heart, and is currently offered round-the-clock at NHCS. Even after office hours, special teams can be swiftly mobilised to be ready to treat patients immediately once the team is notified.

The operation involves inserting a special catheter with a balloon through the groin and pushing it to the blocked heart artery. There, the balloon is inflated to widen the blocked area and improve blood flow. A wire mesh tube, known as a stent, is then placed across the blockage to keep the artery open.

Most heart attacks at night

NHCS has been improving its door-to-balloon time since 2010 through a series of time-saving measures. It started with its night cases because statistics showed that the majority of heart attacks occurred after office hours.

> THE FASTER THE PATIENT COMES TO THE EMERGENCY DEPARTMENT AND HAVE DOCTORS OPEN UP HIS BLOCKED ARTERIES, THE MORE HEART MUSCLE IS SAVED.
>
> ASSOCIATE PROFESSOR PHILIP WONG, SENIOR CONSULTANT, DEPARTMENT OF CARDIOLOGY, NHCS

During the day, when NHCS staff are on duty, there is no problem getting patients from the Emergency Department to the NHCS Catheterisation Laboratory, where the life-saving operation can be done.

But after office hours, when the lab operates on an on-call basis, time-saving efforts mean that patients get to have that operation within 60 minutes.

NHCS treats about 300 heart attack patients annually. In 2016, nearly one in three deaths in Singapore was due to cardiovascular diseases, including heart attacks.

Once a heart attack is diagnosed, the machinery kicks into place.

The team is alerted and the patient is quickly transfered from the emergency department to the Catheterisation

> Continued on page 4

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"Time is muscle" say heart doctors

Laboratory where the lifesaving procedure will take place.

These time-saving efforts have meant that patients get faster treatment. A pilot study found that the measures shaved 20.5 minutes off the door-to-balloon time – from 80.5 to 60 minutes – and this has had a significant impact on patients' survival rate.

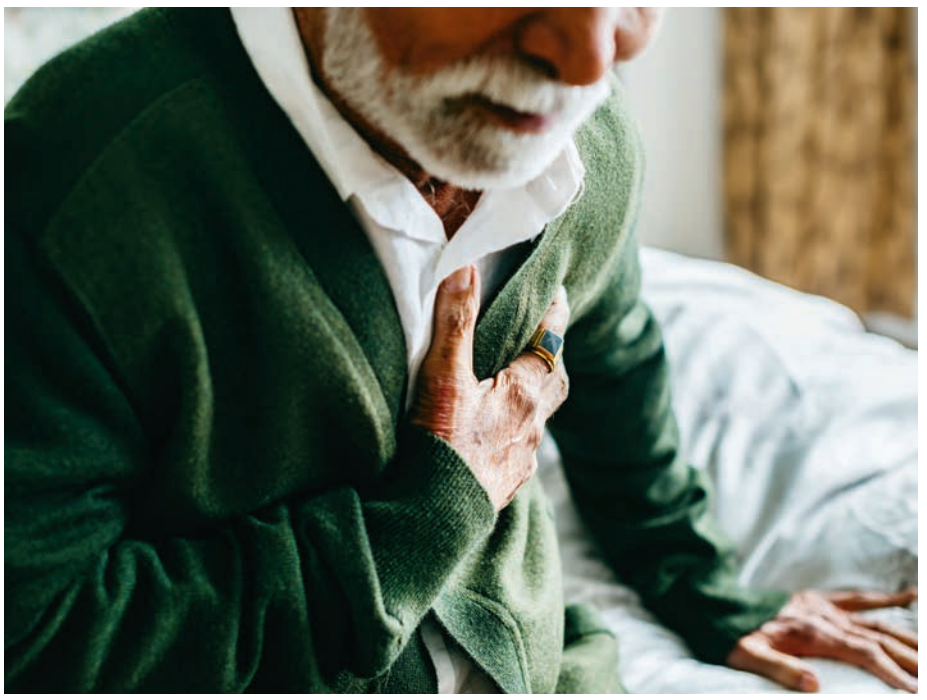
Some patients still delay

Despite this 24-hour service being available, Prof Wong said there are still some heart attack patients who arrive at the emergency department late. He said some people are caught unaware when they have a heart attack, which can occur without warning.

"Sometimes patients do not recognise the symptoms. They may think it's just some discomfort or a stomach upset, and delay going to the emergency department by seeing a general practitioner first," he said.

"There are also some elderly patients who may need someone to take them to the hospital, and this delays treatment. However, people are generally now more aware of heart attack symptoms and the need for prompt treatment."

Prof Wong said while primary PCI may be offered to patients up to 12 hours after a heart attack, those who receive treatment late are prone to getting heart failure, which is not easily reversible even with conventional medical treatment.



DESPITE THE 24-HOUR SERVICE, THERE ARE STILL SOME HEART ATTACK PATIENTS WHO ARRIVE AT THE EMERGENCY DEPARTMENT LATE.

ASSOCIATE PROFESSOR PHILIP WONG, SENIOR CONSULTANT, DEPARTMENT OF CARDIOLOGY, NHCS

Warning signs of a heart attack

- Severe central chest pain, usually described as a heavy or crushing sensation.
- The pain is usually prolonged, lasting more than 30 minutes, and not relieved with rest or usual medication for angina (chest pain caused by reduced blood flow to the heart muscle).
- One in four heart attack cases are "silent", with patients not noticing any obvious symptoms.

What to do in a heart attack

1. Recognise the warning signs of a heart attack.
2. Call 995.
3. Inform someone of the situation and have a person keep watch on the patient.
4. Get the patient to stop all activities, sit or lie down and wait for transport to the nearest hospital. The patient should not drive to the hospital.

Source: National Heart Centre Singapore

PHOTOS: ALVINN LIM

SGH Senior Speech Therapist Laura Chua (demonstrating diaphragmatic breathing on a colleague) first gets him to lie down, placing one hand on his chest and the other on the abdomen above the navel. He then slowly breathes in through the nose and out with the mouth open. The abdomen should rise while the chest and shoulders remain still. As the technique becomes more familiar, the person can do it while in a sitting or standing position.

Take deep breaths – and beat reflux

Some people with acid reflux and belching can benefit from a deep-breathing technique, study finds. By Veronica Koh

IF MEDICATIONS TO REDUCE GASTRIC fluid acidity or its secretion don't work for those with hard-to-treat acid reflux and belching symptoms, a form of deep breathing may be a viable optional treatment.

Known as diaphragmatic or belly breathing, the technique has been used by speech therapists to help people with speech and voice disorders. But a team from Singapore General Hospital (SGH) has found that the technique can also help those patients whose belching and gastro-esophageal reflux disease (GERD) symptoms don't respond to standard treatment.

"Patients' heartburn and regurgitation symptoms were reduced while their ability to control their belching, along with their belching severity, also improved," said Dr Andrew Ong, Associate Consultant, Department of Gastroenterology and Hepatology, SGH, and the first author of the study.

"We also showed that their quality of life improved at the end of treatment. These benefits were sustainable even four months after treatment was completed, and the majority of patients did not require medications to control their symptoms."

GERD is a digestive disorder that occurs when the ring of muscle between the oesophagus (the tube connecting the mouth and stomach) and stomach, known as the lower oesophageal sphincter, relaxes at inappropriate moments. This allows stomach acid to travel back up the oesophagus. Belching, said Dr Ong, is also common in people with GERD, although it may be the result or cause of their GERD symptoms.

Besides helping to reduce belching and regurgitation, diaphragmatic breathing can also ease stress and anxiety. "Since it is a form of relaxation therapy, the sensitivity of the nerves within the oesophagus may as a result be reduced, and so will the symptoms," said Dr Ong.

Besides heartburn and/or regurgitation, throat pain, a hoarse voice and chronic cough are other signs of GERD. However, these symptoms are only linked to GERD if they occur with heartburn and regurgitation, not in isolation.

Diaphragmatic breathing has become a standard treatment at SGH for patients with difficult-to-treat GERD and belching. SGH has published the benefits of the breathing treatment for this group of patients, and received queries from many international centres.

This condition is expected to affect more and more people, in part because of rising obesity, especially among younger Singaporeans. No current data is available on the percentage with this condition, but research 20 years ago noted a 10 per cent prevalence in Singapore, said Dr Ong.

"GERD contributes to about 20 per cent of our outpatient workload at SGH, and there are likely a lot more patients in primary healthcare," he added.

GERD is a long-term condition that can be helped by lifestyle changes such as losing weight if obese, medications such as antacids to reduce the acidity of gastric fluid, and proton pump inhibitors or PPI to lower the secretion and acidity of gastric fluids.

The *Diaphragmatic Breathing Reduces Belching and Proton Pump Inhibitor Refractory Gastroesophageal Reflux Symptoms* study was published in the peer-reviewed medical journal *Clinical Gastroenterology and Hepatology* late last year. In addition to Dr Ong, other members of the study team include Drs Christopher Khor Jen-Lock, Ravishankar Asokkumar, Vikneswaran Namasivayam and Wang Yu-Tien from the Department of Gastroenterology and Hepatology, and Ms Laura Chua Teng Teng from the Speech Therapy Department.

> THEIR QUALITY OF LIFE IMPROVED... THESE BENEFITS WERE SUSTAINABLE EVEN FOUR MONTHS AFTER TREATMENT WAS COMPLETED, AND THE MAJORITY DID NOT REQUIRE MEDICATIONS TO CONTROL THEIR SYMPTOMS.
>
> DR ANDREW ONG, ASSOCIATE CONSULTANT, DEPARTMENT OF GASTROENTEROLOGY AND HEPATOLOGY, SGH

Dr Andrew Ong was the first author of the study into the benefits of diaphragmatic breathing for patients whose GERD symptoms did not respond to standard treatment.

New light on an existing therapy

Two landmark studies led by SingHealth researchers show interesting new findings on a liver cancer therapy that has been in use for more than a decade.

THE THERAPY – Y90-SIRT – refers to Selective Internal Radiation Therapy (SIRT) with yttrium-90 (or radio embolization), which is a way of controlling the growth of liver cancers too advanced to be removed by surgery at the time they were diagnosed.

The two studies were led by researchers from the National Cancer Centre Singapore (NCCS).

The first study was a 27-centre, randomised controlled study in 11 Asia-Pacific countries. Randomised controlled trials provide the highest form of clinical evidence in medicine, known as level 1 evidence, because it compares two treatments under highly controlled conditions.

The study confirmed that the therapy is efficacious and safe for patients with locally advanced liver cancer, while the second study uncovered additional mechanisms that explain why it works so well.

The findings from both studies provided the researchers with strong scientific data that confirmed and explained why the Y90-SIRT works.

> **THE SIDE EFFECTS OF Y90-SIRT WERE FEWER AND MILDER. IT IS A LESS TOXIC DRUG, AND OVER A SIX-MONTH PERIOD, THE PATIENT SURVIVAL RATE WAS MUCH HIGHER.**
>
> PROFESSOR PIERCE CHOW, SENIOR CONSULTANT, DIVISION OF SURGICAL ONCOLOGY, NCCS

The six-year randomised controlled study, which involved 360 patients, showed significant tumour regression and higher safety with Y90-SIRT compared to available oral cancer therapy.

"Tumour regression is important, as this potentially allows patients with locally advanced liver cancer to eventually be treated with liver resection or transplantation, which are curative modalities in early-stage liver cancers. Most liver cancer patients in Singapore are diagnosed with locally advanced cancers," said Professor Pierce Chow, Senior Consultant, Division of Surgical Oncology, NCCS, who initiated both studies.

The findings were published in leading cancer journal *Journal of Clinical Oncology* earlier this year.

While this clinical trial confirmed that the therapy leads to good response in patients and is safe, it is the second study that explains the molecular mechanisms behind the good outcomes.

"These findings represent new advancement in the knowledge and treatment of liver cancer. They have provided us with strong scientific data that confirms and explains why this therapy works," said Prof Chow. Singhealth currently has the most experience with this therapy in the Asia-Pacific after having treated almost 500 cases.

Therapy has fewer side effects

Y90-SIRT, which delivers radioactive micro beads directly into tumours through the blood vessels leading to tumours, causes fewer side effects than Sorafenib, an oral drug for liver cancer.

Prof Chow cited the case of a patient in his 70s with an 8cm tumour in his liver. Two weeks after the Y90-SIRT therapy, apart from a loss of appetite, he could carry on with his daily activities.

Six months later, his tumour had shrunk by half and he was downstaged to early-stage liver cancer. His cancer was subsequently resected and he remained well.

"The side effects of the standard oral cancer therapy drug include skin peeling, tiredness, diarrhoea and so forth. But the side effects of Y90-SIRT were fewer and milder. It is a less toxic drug, and over a six-month period, the patient survival rate was much higher," said Prof Chow.

While Y90-SIRT has been used for more than a decade, level 1 evidence was only available in 2017 through the NCCS-led SIRveNIB Asia-Pacific study and the European SARAH study, which was conducted at the same time with a study design based on the Asia-Pacific one. Both studies have since been published.

The second study results

The second study found that in addition to killing cancer cells through radiation, Y90-SIRT also boosts the body's immune system, which leads to long-lasting effects.

Results, published in leading scientific journal *Gut* this year, showed that Y90-SIRT enhanced the body's immune system to fight cancer.

Dr Valerie Chew, Junior Principal Investigator, SingHealth Translational Immunology Institute, and lead author of the study, said the Y90-SIRT therapy activates immune cells to attack cancer.

"We discovered that immune cells in the body that can fight cancer are enriched in patients who had the therapy," she said.

The discovery is important when seen in the context of immunotherapy, a treatment that harnesses the body's immune systems to recognise and attack cancer cells. But how well patients respond to immunotherapy can be limited by the number of immune cells they have. If the number of immune cells is low, even with immunotherapy, cancer treatment might not be effective.

Dr Chew said this suggests that the Y90-SIRT treatment, which induces an increase in immune cells in patients' bodies, may work very well in combination with immune-therapy.

"Y90-SIRT in combination with the existing immunotherapy may enhance the immune response in patients," she said.

Studies by Prof Pierce Chow and Dr Valerie Chew yielded data that shows Y90-SIRT is not only effective in treating patients with advanced liver cancer but also boosts the immune system.

PHOTOS: (MAIN) ISTOCK; ALVINN LIM

A game changer for blood cancer patients

New technique to grow stem cells for transplant promises faster recovery for blood cancer patients. By Rosnah Ahmad

WHEN A STEM CELL TRANSPLANT is needed to treat leukaemia or other blood cancers, a donor with a good genetic match must be found.

Blood-forming stem cells have to be taken from either the donor's bone marrow or peripheral blood for transplant. But the chance of finding a fully matched, unrelated donor is slim – and the next best hope is to turn to cord blood stem cells, which don't have to be a perfect match. Using stem cells from a newborn baby's placenta and umbilical cord has a major limitation as each cord blood unit contains only a small amount of stem cells. Two units of cord blood are usually needed for adult patients suffering from blood cancers.

Now, a new technique – Nicord® cord blood expansion – aims to overcome this limitation by taking a single unit of cord blood, and then culturing and growing the stem cells in the laboratory for transplant.

Describing cord blood expansion as "game-changing technology", Associate Professor William Hwang, Senior Consultant, Department of Haematology, Singapore General Hospital (SGH), and Medical Director, National Cancer Centre Singapore (NCCS), said: "By growing or expanding cord blood cells using this new technique, a single cord blood unit is enough to produce a sufficiently high cell dose that offers hope for a successful transplant in an adult.

"Basically, cord blood transplant is part of our attempts to meet the needs of those patients who cannot find a perfect match."

In preparation for a transplant, patients undergo a high dose of chemotherapy, which lowers their infection-fighting white blood cells to near zero. They then receive an infusion of the expanded stem cells. "It's like a garden with abnormal plants and weeds. Sometimes you need to clear everything in order to start afresh. That's what a transplant is all about," said Prof Hwang.

Until the transplanted cells are grafted, or start to grow, the patient is very prone to infections. An indicator of success of the transplant is the time required for the patient's white blood cell count to recover – that is, for engraftment of the transplanted cells.

According to Prof Hwang, a trial of the Nicord® technique found that engraftment took around 11 days versus the average 24 to 26 days with standard cord blood transplants.

New blood and immune system cells were able to grow and multiply quickly – meaning patients were less prone to infections. They were also discharged from hospital earlier as a result.

> **IT'S LIKE A GARDEN WITH ABNORMAL PLANTS AND WEEDS. SOMETIMES YOU NEED TO CLEAR EVERYTHING IN ORDER TO START AFRESH. THAT'S WHAT A TRANSPLANT IS ALL ABOUT.**
>
> PROF WILLIAM HWANG, SENIOR CONSULTANT, DEPARTMENT OF HAEMATOLOGY, SGH

Ms Judith Chew (with Prof Hwang), a business consultant in her early 50s, is the first patient in Asia to undergo a stem cell transplant using the Nicord® cord blood expansion technique. Following the surgery, Ms Chew, who was diagnosed with acute myeloid leukaemia, a blood cancer, spent just a month recovering at SGH.

PHOTO: ISTOCK

With the new technique, fewer than 10 per cent of patients died, Prof Hwang said, compared to the more than 30 per cent mortality rate for those undergoing a conventional cord blood transplant.

However, the long-term survival prospects of patients who undergo the technique are unclear as no data are yet available. The Nicord® technique is now undergoing a phase 3 multi-centre trial, which aims to recruit 120 patients, and is expected to be completed by December 2019.

With the Nicord® clinical trials showing the potential that such expansion techniques has in treating blood cancers, Prof Hwang is working with a multi-disciplinary team of researchers from NCCS, Duke-NUS Medical School and the National University of Singapore to develop a novel method for expanding the blood-forming stem cells in umbilical cord blood in Singapore. Nicord® is a product of Gamida Cell of the US.

At SGH, more than 80 stem cell transplants are performed yearly on average, with four of them being cord blood transplants.

Dr Norrie Brown (right), School Director of Quality Enhancement in the School of Health and Social Care, with nursing students.

The Nursing Practicum Lab at MDIS allows our students to practise key clinical assessment skills in a very realistic but safe setting, under the supervision of highly skilled and qualified faculty.

Simon Sikora, lecturer, Ediburgh Napier University

A FRAMEWORK TO EXCEL

Former clinical educator Simon Sikora highlights the importance of nurses deepening their knowledge and skills in the modern healthcare landscape.

When Simon Sikora first visited Singapore, he found it an eye-opening experience. A lecturer with Edinburgh Napier University (ENU), one of Scotland's largest institutions, he was struck by the quality of healthcare facilities here.

"You have many new public and private hospitals, and they are incredibly impressive, both in terms of facilities and the care that they provide," he says.

Having trained at the Edinburgh Royal Infirmary, he went into nursing after specialising in critical care relating to neurotrauma and cardiac care.

A former clinical educator, he has been the programme leader for the Bachelor of Science Nursing (Top-up) programme offered at MDIS for about five years now.

"Teaching and working with Singaporean students has been a thoroughly enjoyable experience. I have been lucky enough to speak with nurses when they are applying to the programme, and on their first day of class," he says.

"What I see is a group of professionals who are passionate about the care they provide, and very keen to learn more about the art and science of nursing."

In his opinion, studying at the degree level is important as it encourages students to develop an open, enquiring mind.

"The degree enables them to add greater depth to their knowledge and skills by challenging them to consider how and why they provide the care that they do," he reasons.

"We do this by exploring how contemporary evidence [from nursing and other relevant fields] can help them deliver higher standards of care to their patients and clients."

While he recognises that the modern healthcare sector is a dynamic and exciting field to be in, advances in medical knowledge and technology cause many challenges in terms of care, leadership, ethical dilemmas and clinical skill sets.

"[This degree] provides an excellent framework for nurses to develop the knowledge, attitude and skills to address these and excel."

One of the reasons for the success of the two-year programme, which is accredited by the Singapore Nursing Board, is its delivery method, with faculty teaching at the beginning and middle of each module in small lectures.

"This allows students to get to know their teachers, and enables them to have access to these instructors at important times in the academic calendar," says Simon, who also marvels at the dedication of the nurse students he has come across.

Many of these students usually work full-time while they study in this programme, while, more often than not, also devoting time to look after their families.

It is useful, then, that the programme provides additional support, such as academic writing workshops and small group sessions, to support students through resubmissions.

Then there is the Nursing Practicum Lab at MDIS – a "fantastic resource", as Simon calls it, particularly for the Health Assessment in Nursing module. "It allows our students to practise key clinical assessment skills in a very realistic but safe setting, under the supervision of highly skilled and qualified faculty."

Speaking about the tie-up between MDIS and ENU, Simon highlights the great fit for both institutions to become partners, given ENU's proven track record for high-quality teaching and associated research.

"We have been delivering nurse education in Singapore for more than eight years, and so bring a great deal of local understanding and knowledge to the programme," he says.

"Since pairing up with MDIS, we believe that we have a well-equipped, reputable local partner that shares our passion and commitment to providing the very best teaching, facilities and support that a nursing student can have."

Never give up

At the 2018 Singapore Health Inspirational Patient & Caregiver Awards, these three were among others honoured for their courage and spirit of never giving up.

The kids kept her going

After fighting advanced lung cancer in 2014, mother-of-five Madam Jamilah Tan Adbullah, 49, is today back on track with her life. Back then, her youngest child was only two years old.

"The one thought that kept going through my head was: Who will take care of my kids if anything happens to me?" she recalled.

Her children were her biggest worry, but also her biggest motivation to get well. "I refused to succumb to the cancer," she said. "I want to see my children grow up, and I want to grow old with my husband."

This attitude has made her one of the recipients of this year's Singapore Health Inspirational Patient & Caregiver Awards – an annual award celebrating the bravery and resilience of people facing illness or supporting a loved one through it.

In her case, seven cycles of chemotherapy did nothing for her, and her doctors were not hopeful that she would live past a year. The turning point came when she was introduced to a clinical trial for a new lung cancer drug.

"I immediately agreed. I knew there was no guarantee that the new drug would cure me, but I was willing to give it a shot. I didn't want to give up without a fight."

> **THE ONE THOUGHT THAT KEPT GOING THROUGH MY HEAD WAS: WHO WILL TAKE CARE OF MY KIDS IF ANYTHING HAPPENS TO ME?**
>
> MADAM JAMILAH TAN ADBULLAH
> INSPIRATIONAL PATIENT AWARD

A heart for others

Another award winner with the same never-give-up spirit is Mr Kevin Wong. Six years ago, at just 22 and a polytechnic student, he was diagnosed with heart failure.

"The diagnosis was a shock because we had no family history of heart disease. I never thought such a thing could happen to me," he said.

As his condition worsened, he put his studies in Electrical and Electronic Engineering on hold, and

> **THE DIAGNOSIS WAS A SHOCK. WE HAD NO FAMILY HISTORY OF HEART DISEASE. I NEVER THOUGHT IT COULD HAPPEN TO ME.**
>
> MR KEVIN WONG
> INSPIRATIONAL PATIENT AWARD

received a HeartMate II – a left ventricular assist device (LVAD) that would stabilise his heart until a donor heart became available.

"It was frustrating having to carry the pump around everywhere. I felt really restricted as it weighed around 2kg and had to be kept dry at all times." Often tired because of his condition, he could no longer live the active life he had before falling ill. But he was determined not to give up.

His harrowing journey saw him undergo eight surgeries and long stays at the National Heart Centre Singapore. He was also diagnosed with a blot clot in his brain that affects his speech to this day. In 2016, he finally got a heart transplant, and it was a success.

Today, he works with a medical technology company that distributes the HeartMate device that helped save his life. In his spare time, as a member of the LVAD Patient Support Group, he helps counsel and support other heart failure patients.

Helping and hoping

Mrs Cecilia Kong and her husband, Fidelis, find volunteering with patient support groups a great way to encourage others who are on the same journey they have been on.

In 2015, Mr Kong, then 73, was found to have a large tumour in his liver. Throughout his journey

> **WE LIVE DAY TO DAY, FROM ONE REVIEW TO THE NEXT, ALBEIT WITH THE HOPE THAT ONE DAY, FIDELIS WOULD BE CANCER-FREE.**
>
> MRS CECILIA KONG
> INSPIRATIONAL CAREGIVER AWARD

fighting the cancer, his wife was his greatest supporter, cheerleader and confidante.

Because of the size of the tumour, immediate surgery was not possible. Fortunately, the tumour shrank after radiation therapy and was finally removed the following year.

But at Mr Kong's monthly follow-ups, small lesions began to show up. The Kongs were devastated. "We thought that with the surgery, the worst was over," said Mrs Kong.

The lesions were removed via a minimally invasive procedure, but Mr Kong had to go through the process again in February 2018.

For the Kongs, it is a daily battle. Said Mrs Kong: "We live day to day, from one review to the next, albeit with the hope that one day, Fidelis would be completely cancer-free."

Extracted from the *Singapore Health Inspiring Patients and Caregivers Awards 2018* booklet. For more on these three and other award winners, go to https://www.singhealth.com.sg/AboutSingHealth/CorporateOverview/AwardsAndAchievements/Inspirational-Patient-Caregiver-Award/Documents/IPCA_2018_Booklet.pdf.

1,000 lives changed... and counting

SGH performed its 1,000th life-changing deceased donor kidney transplant this year. By Annie Tan

FOR FIVE YEARS, Ms Lai Yoke Ling regularly spent hours hooked up to a peritoneal dialysis machine. Suffering from end-stage kidney failure, the 47-year-old struggled with chronic fatigue and the financial burden of treatment.

"Unlike a healthy kidney, dialysis doesn't work round the clock. I felt lethargic and that affected my work performance. Travelling overseas for work assignments became a challenge, as each day's worth of dialysis solution weighed 8kg. The catheter in my abdomen also restricted my choice of clothes and physical activities such as swimming," said Ms Lai, who runs a photography studio with her husband.

All that changed when she received a kidney transplanted from a deceased donor in January this year. She now enjoys newfound energy to run her business, and participate in physical activities such as running and swimming.

Ms Lai is the 1,000th patient to undergo a deceased donor kidney transplant at Singapore General Hospital (SGH). Being the first hospital in Southeast Asia to perform a deceased donor transplant in 1970, SGH has since made great strides in the field. Patients are living well beyond the five-year threshold: In 2010, five-year survival rates were 92 per cent for deceased donor transplant patients, and 99 per cent for living donor transplant patients.

Still, the number of kidney transplants remains low. A compatible kidney from a deceased donor is so hard to come by that Dr Terence Kee, Director, Renal Transplant Programme, and Senior Consultant, Department of Renal Medicine, SGH, likens it to winning the lottery. The average waiting time is eight to nine years. However, some patients end up waiting for 15 to 20 years.

Receiving a kidney from a living donor is a good alternative because of the good outcomes, including a greater chance of survival for the recipient. Many people, however, worry about complications during their surgery to donate a kidney and their health living with one kidney.

PHOTO: THE STRAITS TIMES/SPH

Ms Lai Yoke Ling (with Dr Terence Kee) experienced newfound energy in her work and social activities after her kidney transplant.

But the risk of complications is small: For instance, the chance of dying on the operating table is 0.03 per cent, while the chance of developing wound infections is less than 5 per cent. Underscoring the advances made in kidney transplantation, patients need to stay in hospital for an average of three to four days following transplant, and to be on painkillers for one to two weeks.

Kidney transplant involves a large multi-disciplinary team that includes specialists in kidney disease, urology and psychiatry. Other important members of the team are the transplant coordinator, social worker, physiotherapist and dietitian. The transplant coordinator, for instance, helps in evaluating and interviewing potential donors and recipients, in addition to coordinating the evaluations until the transplant is completed. The urologist, meanwhile, performs the surgery and is responsible for explaining the procedure, possible complications to the potential donor and recipient before the operation. He will also continue with post-surgical care until the donor is discharged.

To raise awareness of living donor kidney transplant, SGH has put together two guides – one for family members learning about kidney donation as an option for their loved ones, and the other for those who have decided to be a living donor.

Inside the new Sengkang hospitals

Medical services are now closer to home for those living in the northeast.

PHOTOS: FRENCHESCAR LIM

THE RECENT OPENING OF TWO hospitals in Sengkang – the 1,000-bed Sengkang General Hospital (SKH) and the 400-bed Sengkang Community Hospital – is good news for people living in Singapore's northeast.

Together, they offer a comprehensive range of services covering major healthcare disciplines, including specialist care, inpatient and rehabilitation services, and Accident & Emergency services.

SingHealth's national specialty centres will run clinics and offer specialist care at the SKH Medical Centre. They are the National Heart Centre Singapore, the Singapore National Eye Centre, the National Cancer Centre Singapore, the National Dental Centre Singapore, the National Neuroscience Institute and KKH Women's and Children's Hospital.

To provide seamless care and avoid duplication of treatment plans, the same primary doctor will oversee and coordinate care throughout hospitalisation, including follow-up visits after discharge.

▲ Easy to get to Both hospitals are linked to Cheng Lim LRT station, which is one stop away from Sengkang MRT station.

▲ The large kitchen

The 3,650sqm central kitchen serving both hospitals can dish up 1,500 meals per mealtime, and pack 800 sets of cutlery per hour.

Special trolleys store hot and cold items on the same tray, and meals are served in porcelain ware. Rice is 20 per cent brown and 80 per cent white, unless patients need to avoid wholegrains or are under therapeutic diet restrictions.

Halal meals and dishwashing are kept strictly separate from other food preparations. Semi-automated dishwashing means a tray on the conveyor belt can emerge washed and dried in five minutes. Food waste goes through pipes to the disposal grinder and not through the conventional open-and-close hatch of the food waste digester.

▶ Community space

Called the Community Heart, it is a bright and airy communal space where people can relax or take part in activities.

▼ The outdoor terrain training area

It simulates a real environment in the community, complete with uneven paths and slopes (with handrails), so that patients with mobility problems can get familiar with the terrain before they return home. They can even practise boarding and alighting on a mock-up bus.

▼ The Outpatient Rehabilitation Centre

This high-tech rehab centre offers services such as physiotherapy, occupational therapy, dietetics and speech therapy in one location.

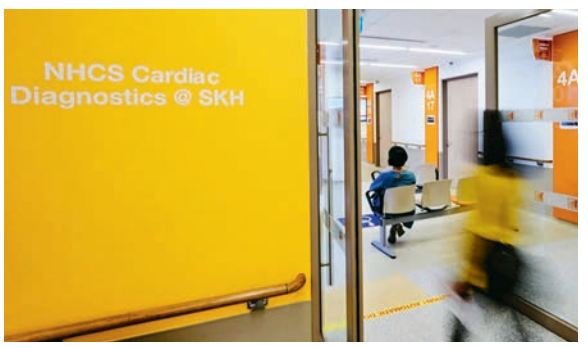
The **Walker View** treadmill assesses a patient's gait and running in real time, tracks improvements, and provides instant feedback. Its speed can be adjusted to suit different ages and conditions.

The **G-EO System** is an advanced robotic walker that helps patients re-learn how to walk and even climb stairs after a stroke or spinal-related injury. Patients can walk 10 times more with the machine than in a traditional therapy session.

The **FITLIGHT Trainer** system is used to improve reaction time, agility and hand-eye coordination of those wanting to return to sports after an injury or surgery. The LED lights are used as targets for the user to deactivate.

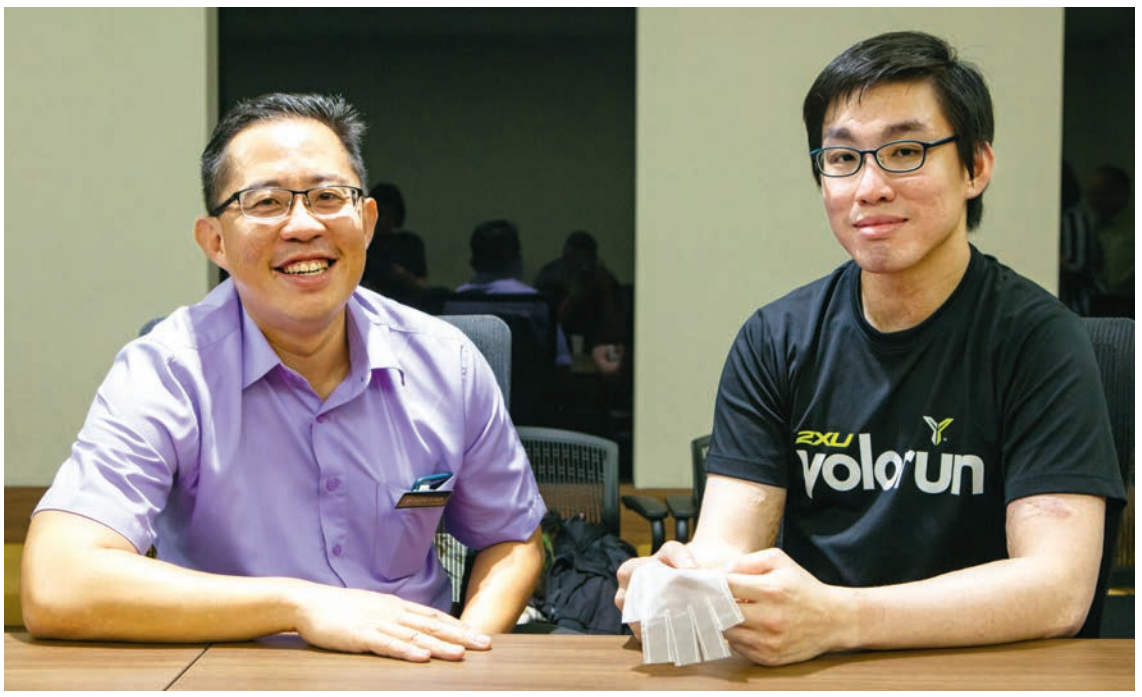
▼ Specialist care

The National Heart Centre Singapore is one of SingHealth's national medical institutions offering specialist care at clinics in the SKH Medical Centre.

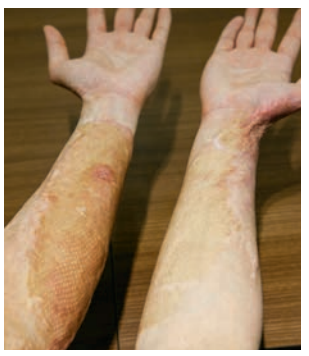


Ouch! Burns care undergoes overhaul

New care protocol includes use of new synthetic dressing and grafting method, leading to benefits like less pain, fewer infections and surgeries. By Sol E Solomon



PHOTOS: ALVINN LIM



Mr Lim Ming Tat (with Dr Chong Si Jack, far left), holding a biological dressing or skin substitute in the shape of a glove, was badly burnt in 2015, with injuries covering a substantial part of his body. He stayed some 40 days in hospital versus more than three months if he had been treated under the old methods. The skin on his arms (above) has healed but is mottled due to micrografting.

IMAGINE THE PAIN WHEN the plaster covering a wound is ripped off.

Now imagine the pain – and agony – when a large area of burnt skin is repeatedly cleaned, the dead skin cut off to prevent bacteria from growing and causing infection, and dressed.

Mindful of the pain and suffering that burns injuries cause, the Singapore General Hospital (SGH) Burns Centre introduced changes to the way such wounds are treated. The new set of protocols provide for prompt treatment, the use of a new synthetic dressing for less serious or extensive burns, and a new grafting technique for major or deep burns.

A study in 2016 comparing serious burns patients treated with the new burns care protocol between 2014 and 2016, and those in the year before, found that the former group stayed a shorter period in hospital (an average of 13 days versus 17), underwent fewer operations (1.96 versus 2.29), experienced fewer complications (the serious infection rate dropped 70 per cent) and fewer deaths (0.5 per cent versus 2.7 per cent).

"This means more patients returned home safer and faster," said Dr Chong Si Jack, Consultant, Department of Plastics, Reconstruction and Aesthetic Surgery, SGH.

Dr Chong, who was instrumental in making the changes, said that standardising the care for burns patients meant everyone involved had a clear idea of what to do and at what point of the patient's recovery.

"Burns patients often require care from a multi-disciplinary team, and could go through months, even years, of treatment and rehabilitation. Adopting a standard set of steps in treating burns patients allows us to tighten the processes and allocate resources more efficiently," he said. The medical team includes plastic surgeons; intensive care, renal and infectious disease doctors; as well as specialist nurses and therapists, dietitians, pharmacists and social workers.

> **ADOPTING A STANDARD SET OF STEPS IN TREATING BURNS PATIENTS ALLOWS US TO TIGHTEN THE PROCESSES AND ALLOCATE RESOURCES MORE EFFICIENTLY.**
>
> DR CHONG SI JACK, CONSULTANT, DEPARTMENT OF PLASTICS, RECONSTRUCTION AND AESTHETIC SURGERY, SGH

Burns patients who visit the A&E and are assessed to have second-degree burns – or burns that didn't penetrate beyond the outer skin or epidermis – are treated with a type of dressing known as artificial or substitute skin. Unlike conventional dressings, the substitute skin combines a layer of nylon interweaved with collagen. It sticks better, helps to lower the frequency of dressing changes and length of hospital stay, and offers better pain relief.

According to Dr Chong, burns wounds are dynamic and will worsen or deepen within two to three days if infected, so using a skin substitute to cover the wounds early is crucial.

Patients with deeper and more severe or third-degree burns (covering more than 40 per cent of the body) will have the burnt and dead tissue cut away before undergoing a skin graft.

Thin layers of the patient's own skin, supplemented by donated skin, have to be used to cover the burnt areas to promote skin recovery and regeneration. But in badly burnt patients, the amount of skin available for grafting can be very limited. Donated skin, meanwhile, is also limited and expensive. Donated skin has to be replaced frequently as it faces rejection after some weeks.

To overcome this, SGH adopted a new grafting technique where very small squares of the patient's own skin (3mm x 3mm) are placed onto 5cm x 5cm squares of donated skin. These micrografts are then used to cover burns wounds.

"Like little seeds placed neatly in a rice feed", the micrografts are able to stay on for around three weeks, allowing the tissues underneath to recover. The donated skin – unlikely to be a match with the patient's own skin – is rejected, but the tiny pieces of the patient's own skin remains.

"The micrografts allow donated skin to be maximised, and are an important resource, because when we have large, extensive areas of burnt skin of more than 40 per cent, we don't have much to use, so every little bit counts," said Dr Chong.

"The micrografts are life-saving but, unfortunately, they are not nice looking," said Dr Chong. The healed skin are discoloured and mottled.

Severity of burns

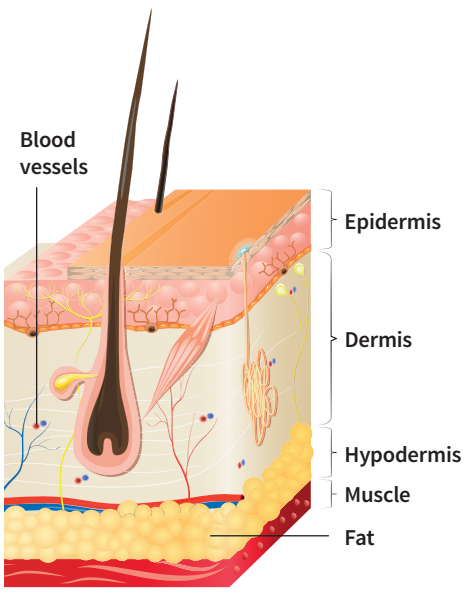
Superficial or 1st degree burn where the top layer of skin or epidermis is affected, and tissue below the skin (dermis) becomes become red and swollen.

Partial thickness or 2nd degree burn involves the epidermis and part of the dermis layer of skin. The burn site appears red, blistered, and may be swollen and painful.

Full thickness or 3rd degree burn where layers of skin, the epidermis and dermis, are destroyed, with the damage penetrating more deeply into underlying structures. Within hours, extensive blisters develop, and when ruptured, expose deeply damaged dermis. These burns have a dense white, waxy or even charred appearance. The sensory nerves in the dermis are destroyed in a full thickness burn, and so will not be able to sense a pin prick.

A burn the size of:

- an adult palm represents 1 per cent of the adult body surface area
- an upper limb represents 9 per cent of the body area
- a whole leg or back represents 18 per cent of the body area



DIABETES MELLITUS OR DIABETES

is a condition where the blood has a high sugar level. If not managed well, it can lead to blindness, nerve damage, kidney failure, heart disease, limb amputation and other complications.

TYPE 1 DIABETES

usually occurs in younger people below the age of 35, whose bodies are unable to produce insulin, a hormone that allows the body to use or store the glucose from food.

TYPE 2 DIABETES

results from insulin resistance – the body's cells and tissues do not respond to the insulin produced by the pancreas.

SIGNS AND SYMPTOMS

include feeling very thirsty, passing lots of urine, losing weight and being tired all the time. There may also be blurred vision and genital itching. Skin infections and wounds can take a long time to heal.

DON'T LET DIABETES WIN

World Diabetes Day on Nov 14 highlights the increasing health threat posed by the condition.

WHO IS MOST AT RISK?

Someone with a family history of diabetes, is overweight and over 40 years old.

EVERY 3 YEARS, SCHEDULE A SCREENING FOR DIABETES INTO YOUR HEALTHCARE

Pioneer Generation and Community Health Assist Scheme or CHAS cardholders, and eligible Singaporeans and Permanent Residents enjoy free or subsidised screening under the Health Promotion Board's Screen for Life programme.

PREVENTION TIPS

- **Eat moderately:** Choose wholegrains, fruit and vegetable. Reduce sugar and saturated fat.
- **Be active:** Do at least 150 minutes of physical activity a week. Set achievable targets like standing while on the phone or use stairs. Through exercise, less insulin is needed to control blood sugar levels. Physical activity on a regular basis also increases insulin secretion.
- **Be smoke-free:** Smoking narrows blood vessels and reduces blood flow to many organs, which can lead to major complications.
- **Drink right:** Drinking water helps control blood sugar and insulin levels. Alcohol interferes with blood glucose control.

- **Stay calm:** Stress triggers some hormones that increase blood sugar.
- **Sleep tight:** Poor sleep raises the risk of diabetes.

440,000
Number of Singapore residents 18 years and above with diabetes in 2014.

1,000,000
Potential number of diabetics in Singapore by 2050.

422,000,000
Number of diabetics worldwide in 2014

ILLUSTRATIONS: ISTOCK

TEXT: SOL E SOLOMON

Source: www.singhealth.com.sg; www.who.int; www.healthhub.sg

Physio, burns patients forge warm links

Physiotherapist Er Wei Xiang gets to know his burns patients well as he sees them from day one through to discharge and after. By Thava Rani

PHOTO: ALVINN LIM

Mr Er Wei Xiang sometimes wraps stretchable dressing over burns during therapy to help reduce pain and prevent scars from forming.

HE LIKES TO INTERACT and engage with people, rather than work in a laboratory and dealing with inanimate things. And it is this thought that led Mr Er Wei Xiang to give up a place in bioengineering to study physiotherapy instead.

For the Singapore General Hospital (SGH) Senior Physiotherapist, eventually specialising in burns therapy also made sense as it means that he gets to care for his patients from the time they are admitted with injuries to when they start taking their first steps towards integration back into society.

In comparison, his colleagues who work in outpatient clinics don't usually see the same patient through the spectrum of recovery.

"Unlike other specialties, I'm their therapist even after discharge, when they come back for follow-ups. We become friends," said Mr Er.

Patients who are admitted to SGH for serious burns injuries often stay in hospital for relatively long periods. Their recovery, even after discharge, often also takes many months. Physiotherapy for these patients – who are almost always in agony even with painkillers – is a long and arduous affair. A physiotherapy session may take longer than scheduled if the pain gets to be too much and the patient needs to rest before resuming, he said.

"As their skin heals, it tends to tighten. If we don't help the patients to stretch, or position their limbs, or teach them relevant exercises, scars form, making it difficult for these patients to move the affected area," he added.

Mr Er also works regularly with plastic surgery patients like women who have had reconstruction following breast removal surgery. In these cases, muscles are taken from the back or stomach to cover the cancerous part of the breast taken out. "So we teach them how to use a jackknife or forward kneeling position to reduce the stretch over the stomach, and how to get out of bed despite the swelling and pain after their surgery," he said.

> NOT EVERYTHING IS SPOKEN. SOMETIMES IT'S A SMALL GRIMACE, THE CLENCHING OF FISTS, OR JUST THAT LITTLE TWITCH. THE FASTER YOU PICK UP SUCH NON-VERBAL CUES, THE FASTER YOU'RE ABLE TO BUILD RAPPORT WITH THE CLIENT.
>
> MR ER WEI XIANG, SENIOR PHYSIOTHERAPIST, SGH

Mr Er is careful with his patients in other ways. "It can get quite tricky, especially for patients with facial scarring [as a result of burns]. We have to be sensitive to their needs. For example, when we walk them around the ward, we avoid going near mirrors."

His ability to engage with people and pick up emotional cues is a big plus. The affable 32-year-old believes that gives him an edge in establishing a connection with his patients.

"Not everything is spoken. Sometimes it's a small grimace, the clenching of fists, or just that little twitch. The faster you pick up such non-verbal cues, the faster you're able to build rapport with the patient," he added.

Sometimes, despite all efforts, patients succumb to their injuries. While that understandably gets him down, knowing that he has done his utmost helps him cope. "I know I shouldn't brood for too long as it may affect the care of my other patients," he said.

Having a close-knit family helps too. Mr Er lives with his parents and younger brother, who works in a logistics company. His elder sister, a teacher, is married but visits the family home frequently for dinners.

When he was growing up, meals usually featured fish dishes – not because his surname in Mandarin sounds like the word for "fish", but because his dad works for a seafood supply company. "I didn't realise that not everyone eats fish at every meal until much later in life," he said, while confessing to having a soft spot for steamed white pomfret.

Food is the topic of conversation among his group of close friends too. "We love watching movies together and share a love of good food. Sussing out new food haunts is one of our favourite pastimes. We also plan our travel itineraries around where the best eats are!"

VUCA! He loves it

Dr Low Lian Leng wears many hats but he is now on a mission to make healthcare between SGH and the community more seamless. By Thava Rani

PHOTO: ANGELA GUO

In a well-connected healthcare system, hospitals work closely with community partners. Dr Low Lian Leng (above, second from right) discusses the care of residents in the Telok Blangah area with (from left) SGH nurses Dr Lim Su Fee and Ms Xu Yi, and Montfort Care Programme Manager Herman Lim.

HE THRIVES ON A VUCA environment. With his gentle demeanour, air of quiet confidence and steadfastness, the association with VUCA somehow comes as a surprise. VUCA stands for volatility, uncertainty, complex and ambiguity, the acronym first used by the US military to describe the extreme conditions in Afghanistan and Iraq.

But Dr Low Lian Leng relishes the challenges that are expected to come his way as he leads the push for an integrated care network between the Singapore General Hospital (SGH) Campus and community care services in the surrounding Outram area.

"The aim is to have a very well-connected health system, not just for the care part but also for a lot of health prevention activities that allow people to age well," said Dr Low, Director, SingHealth Office of Regional Health.

Under the government's regional health system (RHS), acute restructured hospitals form the nucleus of a network of care that includes polyclinics and general practitioners, as well as community care organisations like senior activity centres and social services centres.

"I still see many gaps, and care is still very fragmented, especially for those patients who are very elderly and those with complicated conditions. This is a personal challenge – to make the care more coordinated," he said.

Challenges are expected from working and building relationships with these groups – "this is where the real VUCA comes in" because of the many potential partners in the community, said Dr Low.

But, he added, it is "almost a privilege" to be given this role to create a more coordinated healthcare system, and to change how transitioning care between the hospital and community can be made smoother.

"Things are changing all the time, and this is very much a work in progress. Some of us enjoy the job because of this. I like such challenges," he said.

Much of his day-to-day work, however, is still focused on seeing patients. Dr Low, who is also Consultant, Department of Family Medicine and Continuing Care, SGH, sees patients both at SGH as well as at Bright Vision Hospital (BVH). Since 2010, SGH family medicine doctors have spent half their time at BVH to help support the team there.

"Knowing what patients go through is very important. Being on the ground gives me a good perspective of care beyond the acute hospital, and helps me understand some of the gaps and enhancements required for us to have a better RHS," said Dr Low.

It also helps to have someone with whom to bounce off ideas. For Dr Low, that role is filled by his wife, who is also a consultant in the same department. Some may not be entirely comfortable working with a spouse, but he sees it as a strength.

> **THE AIM IS TO HAVE A VERY WELL-CONNECTED HEALTH SYSTEM, NOT JUST FOR THE CARE PART BUT ALSO FOR A LOT OF HEALTH PREVENTION ACTIVITIES THAT ALLOW PEOPLE TO AGE WELL.**
>
> DR LOW LIAN LENG, DIRECTOR, SINGHEALTH OFFICE OF REGIONAL HEALTH

"We have developed a good understanding – and that's important, so that our conversations and lives are not overwhelmed," he added.

At the same time, he credits his wife for giving him the time and space to understand and develop his new RHS role. "I must thank my wife for giving me protected evening time," said Dr Low, who uses the opportunity to read up on population health and health systems for his RHS role. The ardent Manchester United fan, who supported England in the recent World Cup Finals, also runs two to three times a week to keep fit.

In turn, he reserves his Saturday evenings and Sundays for his wife and three young children. On Sundays, for instance, they get to know Singapore better by visiting places they haven't been to. They recently went to the zoo, as their younger children have not been there.

"I'm happiest when my family is happy. I think happiness must come from within. I feel most at ease and at peace when I know my family is doing well, happy and enjoying themselves. That gives me the peace of mind to then do other things," he said.

Soy-based foods for bone health

ILLUSTRATION & PHOTOS: ISTOCK

Women who have reached menopause should eat foods that are high in soy, such as bean sprouts, miso and edamame beans.

Such foods could strengthen the bones of women who are no longer fertile and guard against osteoporosis, according to researchers from the University of Missouri in Columbia in the United States.

Osteoporosis is a disease characterised by low bone mass and structural deterioration of bone tissue, leading to bone fragility and a higher risk of bone fractures.

Previous research suggests women can lose up to 20 per cent of their bone density in the years after menopause.

In their study, the researchers found that mice on soy-based diets had stronger tibia bones (found at the front of the lower part of the leg), which are also found in humans.

Lead author Professor Pamela Hinton said: "Our findings suggest that women don't even need to eat as much soy as found in typical Asian diets. But adding some tofu or other soy – for example, foods found in vegetarian diets – could help strengthen bones.

''We also believe that soy-based diets can improve metabolic function for postmenopausal women."

Source: Newsweek

Blue light can lead to blindness

Staring at the screen on your laptop or handphones for hours on end can make you go blind faster. This is because prolonged exposure to blue light that is emitted by these devices causes molecules in the eyes to become toxic, "killing" photoreceptors or light-sensitive cells in the retina.

These cells are not regenerated, even when the eyes are no longer subjected to blue light illumination.

A study by researchers from the University of Toledo in the United States shows that enough exposure to blue light – which has more energy compared with other colours – could cause permanent blindness.

Dr Ajith Karunarathne, an assistant professor at the university's Department of Chemistry and Biochemistry, said: "It's no secret that blue light harms our vision by damaging the eye's retina. Our experiments explain how this happens, and we hope this leads to therapies that slow macular degeneration, such as a new kind of eye drop."

To protect the eyes from blue light, wear sunglasses that can filter both UV and blue light. Also avoid browsing on mobile phones or tablets in the dark because this can dilate pupils and lead to even more harmful blue light entering the eyes, the researchers said.

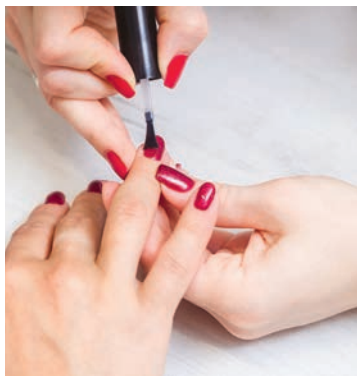
Source: The Guardian

Manicures can give you the itch

Chemicals found in gel, gel polish and acrylic nails can trigger an allergic reaction, causing a severe, itchy rash anywhere on the body.

Such a reaction often occurs when methacrylate chemicals are applied at home or by untrained staff at the salon, said the British Association of Dermatologists.

Allergy tests for the chemicals on 5,000 patients in the UK and Ireland in 2017 found that most of those affected, including nail beauticians, developed allergy through using nail enhancements, nail or eyelash glue.



Allergic reactions can occur when the chemicals come into contact with any part of the skin, causing a rash that goes beyond the fingertips, including the eyelids, face, neck and genital region. Nails can also loosen, and in rare cases, breathing problems can occur.

Dr David Orton from the association said: "The truth is there will be many women out there with these allergies who remain undiagnosed, because they may not link their symptoms to their nails, especially if the symptoms occur elsewhere on the body."

Dermatologists cautioned consumers to be wary of gel and gel polish home kits, and called for more training for those working in salons.

Source: BBC

Never too young to use sunscreen

Children who use sunscreen regularly could reduce their risk of getting melanoma – the deadliest form of skin cancer – in young adulthood.

A study of 2,000 people in Australia found that those aged 18 to 40 years who were regular users of sunscreen in their childhood reduced their risk of developing melanoma by 40 per cent, compared to those who rarely used sunscreen.

"Lifetime use of sunscreen was associated with a 35 per cent reduced risk of melanoma," said Dr Caroline Watts, the study's author.

The study found that those who used sunscreen regularly enjoyed the greatest benefit. Regular users are defined as those who apply sunscreen always or almost always when they are, or plan to be, in the sun.

Despite the proven benefits, experts said many people still choose not to use sunscreen.

"There's misinformation… it's not safe, it's not organic, I need my vitamin D, it causes cancer, it is polluting our water system," said Dr Adam Friedman, a professor of dermatology.

"Here's the reality: UV radiation causes skin cancer. Sunscreens have years of evidence proving they can prevent skin cancer."

Source: Healthline

EVENT CALENDAR

Blood Donation Drive 2018

DATE/TIME: Nov 15, Thur, 10am-4pm
VENUE: KKH Auditorium
FEE: All are welcome
REGISTRATION: Visit www.hsa.gov.sg/donor_criteria and www.hsa.gov.sg/travel_deferral
NOTE: Bring identification. For more details, call 6394-1863

Breezing through Menopause

DATE/TIME: Nov 17, Sat, 2pm-4.30pm
VENUE: KKH Auditorium
FEE: $10 per person, $15 per couple
REGISTRATION: Call 6394-1268 or log on to www.kkh.com.sg/healthseries. Registration closes 15 Nov
NOTE: Forum is in English and includes a workshop.

Learn to manage and overcome the common physical challenges and symptoms of menopause from healthcare experts. Forum topics include Osteoporosis and You; Pelvic Floor Exercises; and Maintaining Your Skin in the Golden Years.

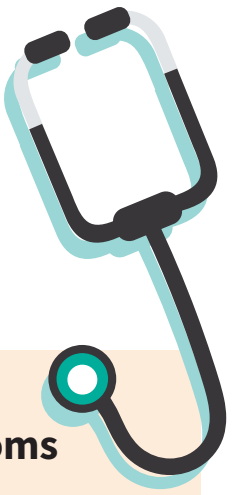
Toddler Feeding Workshop

DATE/TIME: Nov 24, Sat, 10am-12pm
VENUE: KK Women's and Children's Hospital, Patient Education Centre Room 1
FEE: $10 for KKJC members; $15 for non-KKJC members
REGISTRATION: Call 6394-1268 or log on to www.kkh.com.sg/events

Good eating habits are best cultivated from an early age, and attendees will hear KKH's dedicated dietitians share strategies for stress-free mealtimes.

The flu isn't a serious illness (and other myths)

The fact is it can be deadly, and the best way to protect against the virus is a flu vaccination, as well as practising good hygiene.



EVEN THOUGH IT USUALLY clears up within a week or so for most people, an influenza infection is a highly contagious and potentially serious illness.

The World Health Organization or WHO estimates that influenza causes as many as half a million deaths worldwide every year. The 1918 influenza pandemic, the worst so far, resulted in about 50 million deaths. Nobody knows when the next big influenza will hit us.

Influenza can lead to serious complications like pneumonia, and ear and sinus infections. Vulnerable groups such as those suffering from chronic medical conditions, the elderly, pregnant women and young children have a greater chance of developing complications.

There are two seasonal peaks for influenza every year, from May to July and October to January. Before each seasonal peak, WHO will give a projection of the dominant influenza virus strains from epidemiological surveillance data. This will allow vaccines against influenza to be manufactured. If the circulating influenza virus strains are very similar for both peaks in a year, then one influenza vaccination may be enough.

However, if the virus strains are very different, up to two vaccinations per year may be necessary as the vaccines will be different in composition.

For the vulnerable groups and even healthy individuals, an influenza vaccination reduces the risk of developing influenza-related complications. Even if complications arise, prior vaccination for that seasonal peak can reduce the severity of these complications.

Despite the benefits of getting vaccinated against influenza, the take-up rate remains relatively low, in part because of various misconceptions – like the notion that the flu isn't serious.

MYTH: I'll get influenza from the flu vaccine.
FACT: The influenza vaccine contains inactivated virus – and dead viruses will not cause infection. They stimulate your immune system to make antibodies that protect you from the influenza viruses that you have been vaccinated against. Some people may have fever after a vaccination, but this usually resolves after a few days.

MYTH: I am allergic to eggs, so the flu vaccine is out for me as it contains egg.
FACT: Most influenza vaccines contain a small amount of egg proteins because the viruses used to make the vaccines have been incubated in eggs. But severe reactions in people with egg allergies are rare: Only one in a million gets a life-threatening allergic reaction.

MYTH: A single jab will protect me for life.
FACT: The flu virus mutates very quickly, so each season's dominant circulating viruses may be different from the previous – meaning the vaccination received last year won't protect you from this year's influenza virus. So you need to be vaccinated at least once every year.

MYTH: As long as I wash my hands frequently, I won't get the flu.
FACT: Washing your hands often can help reduce the chance of getting the flu, but it won't prevent you from catching the virus. The flu virus can live for up to a day on hard surfaces, and frequent hand-washing may not be enough to avoid picking up the virus from contaminated everyday items. You can also carry the virus without realising it. As many as three out of 10 people carrying the virus have no symptoms of influenza. This means you could be spreading the bug to others without knowing it.

ILLUSTRATIONS: ISTOCK

Recognise the symptoms

- Fever
- Headache
- Chills
- Cough
- Nose congestion
- Sore throat
- Muscle ache
- Fatigue and weakness
- Sometimes gastrointestinal symptoms like nausea, vomiting or diarrhoea

MYTH: I might harm my foetus if I have a vaccination when I'm pregnant. So I shouldn't get vaccinated during this time.
FACT: You can and should receive the influenza vaccination if you are pregnant. Not only is it safe for pregnant women to get the vaccine, it is essential. This is because pregnant women have a greater chance of developing complications from influenza.

MYTH: Whether I get vaccinated or not makes little difference to the wider population. It's only me – one person.
FACT: When more people are vaccinated, the chance of the influenza virus being spread is reduced. This protects those who cannot be vaccinated and don't have immunity, such as babies younger than six months.

MYTH: I might develop Guillain-Barre Syndrome from the flu vaccine.
FACT: You are more likely to develop Guillain-Barre Syndrome from influenza than the vaccine. Only one or two in a million who are vaccinated develop this rare neurological disorder. The disorder is 17 to 70 times more common following influenza than it is after vaccination.

Achoo!

When someone with flu sneezes or coughs, he releases thousands of infectious droplets into the air. If he sneezes into a tissue, but doesn't wash his hands, the next thing he touches – door knob, phone – will be contaminated with the virus. The next person who touches the door knob can catch the virus if he then touches his nose or mouth. The flu virus lives up to a day on hard surfaces.

From the stars?

The word influenza comes from the Italian for influence or *influenza*. The disease often emerged suddenly, becoming widespread quickly. As a result, people in the past thought that the disease was caused or influenced by the planets, stars and the moon.

Inflammatory bowel disease on the rise

If left untreated, inflammatory bowel disease can lead to an increased risk of colon cancer. By Lediati Tan

PHOTO: ALVINN LIM

Undergraduate Waise Koh, 23 (left, with Dr Shim Hang Hock), lost more than 10kg after experiencing severe diarrhoea and bloody stools. He was eventually confirmed to be suffering from inflammatory bowel disease. IBD is hard to diagnose as its symptoms can be subtle and are often mistaken for irritable bowel syndrome, a common disorder that affects the digestive system.

INFLAMMATORY BOWEL DISEASE (IBD) is becoming more widespread in Singapore. And while the disease shares some symptoms like diarrhoea, stomach cramps and abdominal pain with the more common irritable bowel syndrome (IBS), IBD is a far more worrying condition.

Over time, IBD can lead to complications such as bowel obstruction, ulcers and perforations in the intestines. Also unlike IBS, which is a benign condition, IBD increases the risk of surgery and cancer.

At Singapore General Hospital (SGH), which sees one of the largest number of IBD cases, the number of people visiting its Centre for Digestive and Liver Diseases for IBD has doubled over the last decade.

According to Dr Shim Hang Hock, Consultant, Department of Gastroenterology and Hepatology, SGH, the Centre saw nearly 600 cases of the disease in 2017, versus 272 in 2007.

"Inflammatory bowel disease is not a very common disease, but we are seeing an emerging trend in Asia, including Singapore," said Dr Shim, who is also Director, Inflammatory Bowel Disease Centre.

"This is a very aggressive disease. It can increase the risk of cancer and surgery, and there is significant economic and psychological burden [on patients]. But if you can get the disease under control with medication, most people actually do well and live a normal life."

The disease can strike at any age, although most sufferers are diagnosed between the ages of 20 and 40 years. It also affects men and women equally.

It's not known what causes IBD but doctors believe that the interaction of various factors – including genes, micro bacteria in the gut, diet and environmental factors – might trigger an inappropriate immune response that causes inflammation and sores in the digestive tract.

The two main types of IBD are Crohn's disease (where inflammation can affect any part of the digestive tract, from the mouth to the large intestine) and ulcerative colitis (which only affects the large intestine).

The symptoms for IBD are varied and may range from mild to severe, depending on where it occurs and how bad the inflammation is. The most common signs of the disease include abdominal pain, persistent diarrhoea, blood in the stool and weight loss.

The disease can also come and go, fluctuating between periods where symptoms are severe and spells of remission. This is not unlike IBS, which is also more likely to afflict IBD patients.

Because of the similarities between IBD and IBS, blood tests, imaging and endoscopic procedures are necessary to rule out the latter or other possible causes to properly diagnose the disease. In addition to going through the patient's history, blood tests, and imaging and endoscopic procedures are done to confirm the disease.

IBD cannot be cured, but it can be effectively treated and controlled with medication for most patients.

Drugs like aminosalicylic acids are used to reduce inflammation, while immunosuppressants such as steroids help suppress the activity of the immune system.

For those who do not respond to such medications, other options may include biologics, a new antibody-based treatment given by injection that stops certain proteins in the body from causing inflammation.

In serious cases, patients may have to undergo surgery to remove damaged portions of their digestive tract. However, medical advancements in the last 20 years have helped slow the progression of the disease, making surgery less common in recent years.

Is it irritable bowel disease?

	Inflammatory bowel disease (IBD)	Irritable bowel syndrome (IBS)
Signs and symptoms	• Abdominal pain and cramping • Diarrhoea • Blood in stools • Fever and fatigue • Reduced appetite • Weight loss • Inflammation in digestive tract • Ulcers in digestive tract	• Abdominal pain and cramping • Diarrhoea • Constipation • Mucus in stool • Bloating and gas • No inflammation in digestive tract • No damage to digestive tract
Cause	Unknown	Unknown
Prevalence	Affects around 1 in 10,000 Singaporeans	Estimated to affect 20 per cent of the population worldwide
Treatment	• Medications commonly used include anti-inflammatory drugs, immunosuppressants, antibiotics and antibody-based treatments known as biologics	• Lifestyle changes such as balanced diet, regular exercise and reducing stress • Medications such as laxatives or antidiarrhoeal drugs to relieve specific problems
Complications	• Greater chance of getting colon cancer • Ulcers in digestive tract • Increased risk of surgery • Malnutrition • Anaemia	Impaired quality of life

Better treatments for better control

With newer treatments, multiple sclerosis, a potentially debilitating disease, can be controlled. By Suki Lor

PHOTO: ISTOCK

Multiple sclerosis occurs when the immune system mistakenly attacks different areas of a person's brain or spinal cord, and causes crippling outcomes such as blindness and physical disability.

MULTIPLE SCLEROSIS IS a chronic illness, another disorder of the nervous system that occurs when the immune system mistakenly attacks different areas of the brain or spinal cord, specifically the fatty material encasing nerves known as myelin.

Sadly, these attacks can lead to a range of crippling outcomes, including blindness and physical disability. What causes the disease currently remains a mystery.

In Singapore, multiple sclerosis is much more rarely encountered compared to the West, said Associate Professor Kevin Tan, Senior Consultant, National Neuroscience Institute (NNI). He estimates that about 200 people here are affected.

Some theories for why the disease is more common in temperate countries include genetic factors and potential environmental infections. "A well-described phenomenon is the further away you are from the equator, the higher the rate of multiple sclerosis," he said.

Symptoms can appear suddenly

Depending on which part of the nervous system is attacked, symptoms can range from weakness, numbness, unsteadiness, inability to control bladder or bowel functions, and vision problems, said Prof Tan.

During an attack, symptoms can develop over days or weeks. They tend to vary from person to person, and between attacks in the same person. The disabilities may appear similar to those of ageing, although most patients are far from elderly. The first symptoms commonly emerge between ages 15 and 50, and proportionately more women than men get the illness, he said.

As symptoms occur acutely, people with multiple sclerosis may end up going to the emergency department. Attacks may vary in severity and how quickly the symptoms progress. Attacks should not be ignored, as they can be treated and symptoms reversed. Unfortunately, with some severe attacks, patients may end up bedridden or wheelchair-bound.

> IF PATIENTS RESPOND WELL TO TREATMENT, POTENTIALLY THEY WILL BE ABLE TO LEAD NORMAL LIVES. SOME DO SO WELL THAT OTHER PEOPLE WON'T EVEN SUSPECT THEY HAVE THE DISEASE.
>
> ASSOCIATE PROFESSOR KEVIN TAN, SENIOR CONSULTANT, NNI

Prof Tan said doctors still do not understand how the disease develops. "But we know what happens when it is active – the immune system attacks the nerves. How it becomes active is still being worked out."

Stressful situations may sometimes trigger an attack, but that does not mean it is a cause of the disease, he said. "You must have had the condition to begin with. The current thinking is that these people have some genetic predisposition to developing multiple sclerosis, but something in the environment still needs to trigger the immune system and cause it to go out of control."

Diagnosis can be tricky

Because there are other medical conditions that have similar symptoms as that of multiple sclerosis, doctors will need to exclude these conditions before making a diagnosis.

"This is not based on a single test, but rather on the combination of symptoms that are typical [such as losing vision, unsteadiness and loss of bladder or bowel function], detection of nervous system dysfunction through physical examination, and areas of damage on MRI [magnetic resonance imaging] scan," said Prof Tan.

Areas commonly affected include:

- The optic nerve (which controls vision).
- The brainstem (the area at the back of the brain that controls vital functions).
- The cerebellum (which controls balance and coordination).
- The spinal cord. Disorders of the spinal cord can cause weakness, numbness, as well as bladder and bowel control problems.

Another test useful for diagnosis is a lumbar puncture, which can show the presence of the immune system activation in the brain. This is a procedure where a needle is used to draw cerebrospinal fluid from the lower back.

Treat early to stop progression

With new and better disease-modifying treatments developed over the years, multiple sclerosis can now be more effectively controlled. Treatments should not be delayed because early control of the condition can lead to better outcomes in the long term.

The moment the disease is diagnosed, doctors will discuss treatment options with patients. "If patients respond well to treatment, potentially they will be able to lead normal lives. Some do so well that other people won't even suspect they have the disease."

Prof Tan said although lifestyle changes such as regular exercise, a healthy diet and a positive state of mind are important and beneficial for patients, they cannot replace disease-modifying treatments.

"These treatments control the disease through different mechanisms and effects on the immune system, leading to prevention of further attacks."

However, some of the more aggressive treatments can suppress the immune system and put patients at higher risk of infections.

"Other treatments modulate rather than suppress the immune system, changing it from one that is active to one that is less likely to attack itself."

Other treatments may be required for symptom relief of those related to bladder dysfunction, numbness or muscle stiffness.

Treatment of multiple sclerosis is complex because the disease affects patients in many ways. There is no single treatment to treat everything. "Multiple strategies are needed to address different aspects of the disease," said Prof Tan.

Prof Kevin Tan said that attacks should not be ignored, as someone with multiple sclerosis can still be treated and his symptoms reversed.

The last option

There is a low consent rate for donor lungs, but a lung transplant is the only recourse for patients with end-stage lung disease.

By Sandhya Mahadevan

ILLUSTRATION: ISTOCK

IT BEGINS WITH SHORTNESS OF breath, wheezing or chronic cough – easy enough to shrug off as isolated symptoms, signalling a general lack of fitness.

By the time the patient is breathless, even at rest, it is a sign that his lungs are no longer able to perform the normal function of taking oxygen, and expelling carbon dioxide and other waste gases.

When a patient's lungs fail to respond to conventional treatment and he is diagnosed with end-stage lung disease (with an estimated life expectancy of less than 18 months), the only option left to consider is a lung transplant.

A lung transplant would mean replacing his diseased lungs with lungs from a recently deceased brain-dead donor.

The process is not as straightforward as it sounds. Compared to other organs, such a transplant involves a much longer waiting time compared to other organs. On average, it can take a little over one year to find a suitable lung donor, said Dr Ong Boon Hean, Consultant, Department of Cardiothoracic Surgery, the National Heart Centre Singapore (NHCS).

Consent needed

One of the main reasons for this long wait is a low consent rate.

Lung donation, unlike other organs such as heart, kidneys and liver, is not covered by the Human Organ Transplant Act. This means that lungs cannot be taken for transplantation without prior consent from the donor before death, or consent from the donor's relatives after death.

Currently, NHCS is the only centre in Singapore that performs lung transplants. Its Lung Transplant Programme, of which Dr Ong is the Acting Director, has performed 14 successful lung transplants since its inception in 2000.

Based on current outcomes at NHCS, half the patients who undergo a lung transplant are expected to live at least five years after a successful transplant. This is comparable to numbers reported internationally, which stand at a 50 per cent survival rate of beyond five years.

"These figures have improved over the years, and the outlook is expected to improve further with advances in lung transplantation," said Dr Ong.

Rare living donor cases

In very rare cases, lung transplantation using part of the lung from two separate living donors may be performed. "It was developed in the United States to address the shortage of organs from deceased donors, and has now been used in several countries, such as the United Kingdom, Japan and China," said Dr Ong.

However, this procedure is usually limited to children or small-sized adults. It is also more manpower-intensive because it requires three surgical teams to work simultaneously, as compared to two teams required for transplantation from a deceased donor. The added risk for the two donors is another factor to be considered.

This procedure is not currently done in Singapore, but according to Dr Ong, it may be considered in the future, if other efforts to increase the donor organ shortage in Singapore are unsuccessful.

This article was extracted from *Murmurs*, a publication of the National Heart Centre Singapore (NHCS), and supplemented with additional information from Dr Ong Boon Hean, Consultant, Department of Cardiothoracic Surgery, NHCS.

Dr Ong Boon Hean believes the survival rate of lung transplant patients will improve in tandem with advances in lung transplant surgery.

Who is a suitable recipient?

A potential recipient would be a patient with irreversible end-stage lung disease. This includes patients with emphysema or interstitial lung disease, with large areas of lungs that are diseased. These are people who are oxygen-dependent and not responding to conventional treatment.

The patient has to be less than 65 years old and not suffering from other debilitating medical conditions or organ dysfunction. Heavy smokers and those with a previous history of cancer will be assessed on a case by case basis before consideration.

What is involved?

Once referred to the Lung Transplant Programme at NHCS, a multidisciplinary team will evaluate the patient. The team comprises pulmonologists, thoracic surgeons, clinical coordinators, psychiatrists, dieticians, physiotherapists and medical social workers.

A comprehensive range of tests – blood, x-ray and other tests – are done on a potential recipient to evaluate the condition of his heart, lungs, kidneys and liver. If he meets the criteria to be a potential recipient, he will be put on a waiting list until a donor lung becomes available.

During the waiting period, the patient's health is monitored on a regular basis, to ensure that he maintains a healthy diet, does regular exercise, and does not smoke or drink alcohol.

"Transplants can take place as soon as donor lungs that become available have been assessed as suitable, and are a match based on blood type and size, for a patient on the waiting list," said Dr Ong.

The patient is also expected to participate in a pulmonary rehabilitation programme to improve his health and fitness level before and after the transplant.

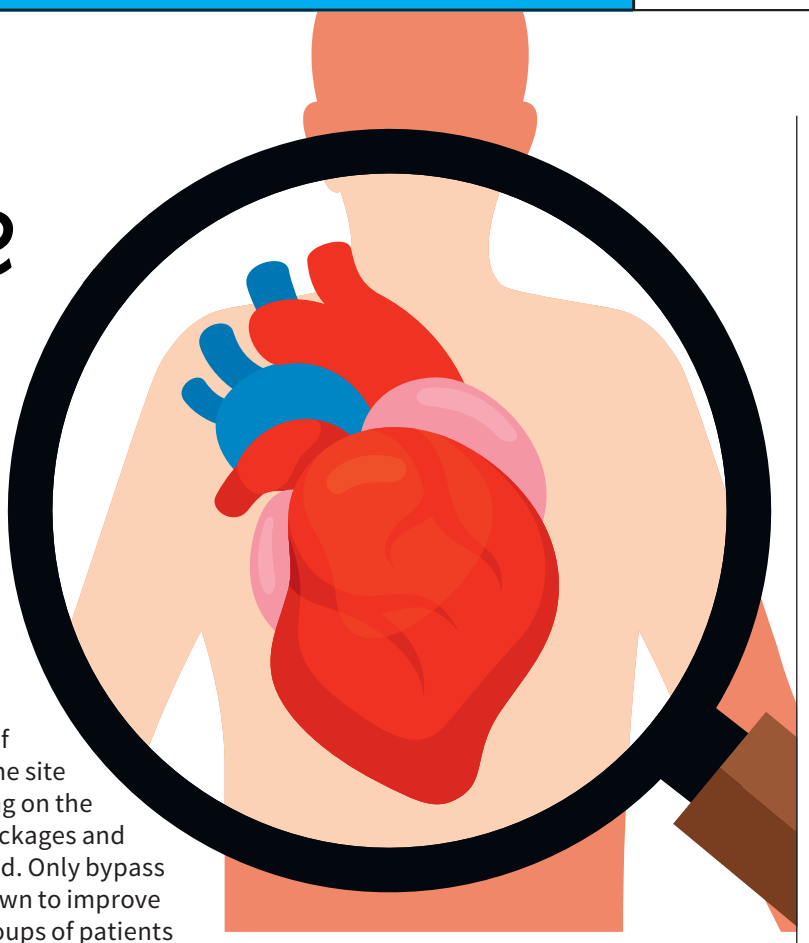
Recovery and maintenance

A typical recovery period for a lung transplant is around two to three months following a hospital stay of two to four weeks.

The patient is required to make regular visits to the Lung Transplant Clinic for follow-up appointments, and will be put on a prescription of immunosuppressant medication for life to prevent the possibility of organ rejection.

HEALTH XCHANGE

Is heart disease curable?



Is there a cure for coronary artery disease? Is bypass surgery the solution?
Coronary artery disease is a chronic condition. Once it starts, it will progress indefinitely and worsen with age. Treatment options include medication to control the symptoms and risk factors, such as diabetes, high blood pressure, high cholesterol and smoking.

When the blockage becomes critical and medication fails to control the symptoms, stenting (percutaneous coronary intervention) or bypass surgery can relieve the symptoms by unblocking or bypassing the blockage respectively. However, the effect is usually temporary, and re-narrowing of the artery at the same area or at different sites may recur with time.

The effects of bypass surgery last longer, usually around eight to 10 years or more, but the initial operation carries a higher risk. It is less invasive to perform a percutaneous coronary intervention, but the effect is shorter, with a 5 to 8 per cent risk of recurrence at the same site in one year, depending on the complexity of the blockages and the types of stent used. Only bypass surgery has been shown to improve survival in certain groups of patients with stable coronary artery disease as compared to medical treatment.

The type of operation that is suitable for a patient is determined by the number of arteries blocked and the complexity of the narrowing, or if the patient has diabetes.

Associate Professor Aaron Wong, Head and Senior Consultant, Department of Cardiology, National Heart Centre Singapore

Depression or unhappiness: What's the difference?

How would I know that I have fallen into depression, and that it is not a temporary state of unhappiness?
It can indeed be difficult to tell these apart. And often, reading a list of criteria makes us tend to check on all the items and claim we must be having the condition stated. As a rule, the key symptoms of depression are either low mood or feeling depressed, or loss of interest or pleasure.

Other symptoms of depression include poor sleep (especially early morning awakening); loss of appetite or weight, or increased weight and overeating; loss of concentration or forgetfulness; loss of energy, and feeling agitated or restless; slowing down or feeling lethargic; negative thinking, self-blame and excessive guilt; feelings of hopelessness and suicidal thoughts.

These symptoms must be present persistently for a period of two weeks or longer, and cause significant distress or impact on the functioning level of the person.

If you are asking this question, it suggests to me that perhaps your state is a little unclear, and possibly your symptoms may come and go, as they do for many patients. I suggest you consult your family doctor or a psychiatrist, as a proper assessment can be beneficial. Sometimes, untreated depression can lead to lasting problems in our personal life.

Dr Helen Chen, Head and Senior Consultant, Department of Psychological Medicine, KK Women's and Children's Hospital

ILLUSTRATIONS & PHOTO: ISTOCK

When should he use an inhaler?

My colleague, who coughs frequently in the office, doesn't want to use his asthma inhaler because he thinks that he should only use it when he has an attack. Is this true?
If he suffers asthma symptoms like coughing and wheezing frequently, he should use his asthma controller medications regularly even when he is well. This is to reduce the inflammation in the airways and lower the risk of symptoms and attacks recurring.

Reliever inhalers help to open up the airways when asthma symptoms develop. However, unlike controllers, they are not the main treatment for asthma as they do not treat the inflammation in the lungs. That is why they should not be taken in isolation or excessively when symptoms are frequent.

Excessive use of relievers can lead to side effects such as palpitations and hand tremors. Their effectiveness can also be reduced, which in turn leads to poor asthma control.

Asthma is a chronic inflammatory disease of the lung airways. People with the condition feel well between asthma attacks, so they may not feel the need to use their controller medications regularly.

But the cornerstone of asthma treatment is the regular use of controller inhalers, regardless of severity. In severe asthma, the dose of controller medications will be higher and additional treatment options may be required.

Dr Adrian Chan, Consultant, Department of Respiratory and Critical Care Medicine, Singapore General Hospital

CONTEST

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QUESTIONS

- **How many beds in total do Sengkang General Hospital and Sengkang Community Hospital collectively offer?**
- **For every 10,000 Singaporeans, how many are likely to have inflammatory bowel disease?**

Send your answers with details of your name, age, gender, address and telephone number to:
Email editor@sgh.com.sg (or)
Post The Editor, *Singapore Health*, Singapore General Hospital, Communications Department, #13-01 Surbana One, Blk 168, Jalan Bukit Merah, Singapore 15016.

Deadline Nov 30, 2018

Winners will be notified by phone or email. Please remember to send in all the details indicated above. Incomplete or multiple entries will not be considered.

WINNERS OF CONTEST 53

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3. Leong Yee Luen 4. Rosa Lim Sai Choo
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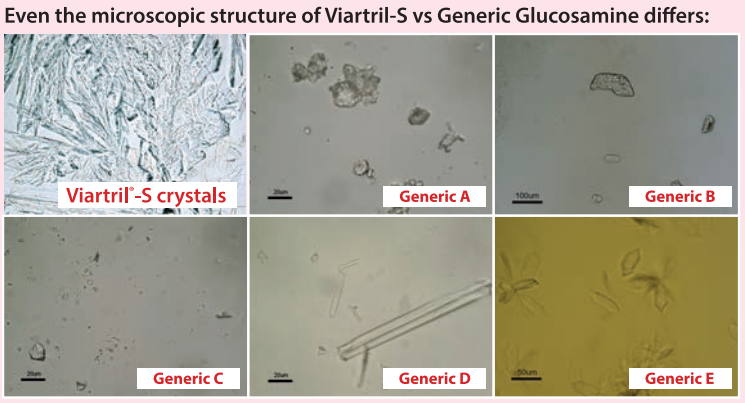

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Quoted from a European guideline:
"The European Society for Clinical and Economic Aspects of Osteoporosis and Osteoarthritis (ESCEO) advocates *the differentiation of prescription patented crystalline glucosamine sulphate from other glucosamine preparations*"

O. Bruyere et al, Seminars in Arthritis and Rheumatism 2014

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1) The role of diet and exercise and of glucosamine sulfate in the prevention of knee osteoarthritis: Further results from the PRevention of knee Osteoarthritis in Overweight Females (PROOF) study. **Seminars in Arthritis and Rheumatism, 2016.**
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2) An algorithm recommendation for the management of knee osteoarthritis in Europe and internationally: a report from a task force of the European Society for Clinical and Economic Aspects of Osteoporosis and Osteoarthritis (ESCEO). **Seminars in Arthritis and Rheumatism, 2014.**
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3) Glucosamine therapy for treating osteoarthritis. **Cochrane Database, 2009.**
- Brand Used: Viartril-S

4) Total joint replacement after glucosamine sulphate treatment in knee osteoarthritis: results of a mean 8-year observation of patients from two previous 3-year, randomised, placebo-controlled trials. **Osteoarthritis and Cartilage, 2008.**
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5) Glucosamine sulfate in the treatment of knee osteoarthritis symptoms: a randomized, double-blind, placebo-controlled study using acetaminophen as a side comparator. **Arthritis & Rheumatology, 2007.**
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6) Glucosamine sulfate use and delay of progression of knee osteoarthritis: a 3-year, randomized, placebo-controlled, double-blind study. **Archives of Internal Medicine, 2002.**
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7) Long-term effects of glucosamine sulphate on osteoarthritis progression: a randomised, placebo-controlled clinical trial. **The Lancet, 2001.**
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Please consult your health professional for more clinical papers.

The Netherlands study* reported in CNA, analysed only 5 out of 21 eligible studies. The 5 studies which found glucosamine to be INEFFECTIVE are:

*Ref : http://dx.doi.org/10.1136/annrheumdis-2017-211149

1) Glucosamine and chondroitin for knee osteoarthritis: a double-blind randomised placebo-controlled clinical trial evaluating single and combination regimens. **Annals of the Rheumatic Diseases, 2015.**
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2) Clinical efficacy and safety of glucosamine, chondroitin sulphate, their combination, celecoxib or placebo taken to treat osteoarthritis of the knee: 2-year results from GAIT. **Annals of the Rheumatic Diseases, 2010.**
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3) Effect of glucosamine sulfate on hip osteoarthritis: a randomized trial. **Annals of Internal Medicine, 2008.**
- Brand Used: Generic Glucosamine

4) Glucosamine, chondroitin sulfate, and the two in combination for painful knee osteoarthritis. **The New England Journal of Medicine, 2006.**
- Brand Used: Generic Glucosamine

5) Effectiveness of glucosamine for symptoms of knee osteoarthritis: results from an internet-based randomized double-blind controlled trial. **The American Journal of Medicine, 2004.**
- Brand Used: Generic Glucosamine

A recent response to the Netherlands review quoted+:

"Glucosamine products other than prescription* crystalline glucosamine sulfate are not effective in hip or knee OA pain and function."

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+ *Different glucosamine sulfate products generate different outcomes on osteoarthritis symptoms. Annals of the Rheumatic Diseases, 6 Sept 2017.*

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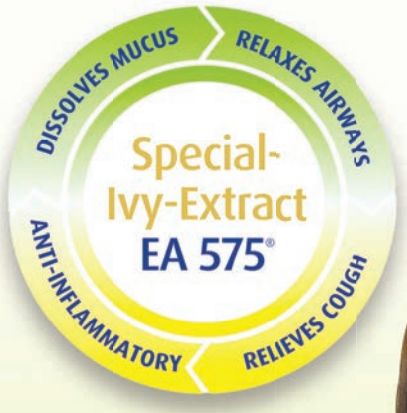

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