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LEFT VENTRICULAR
ASSIST DEVICE (LVAD)

GIVING LIFE



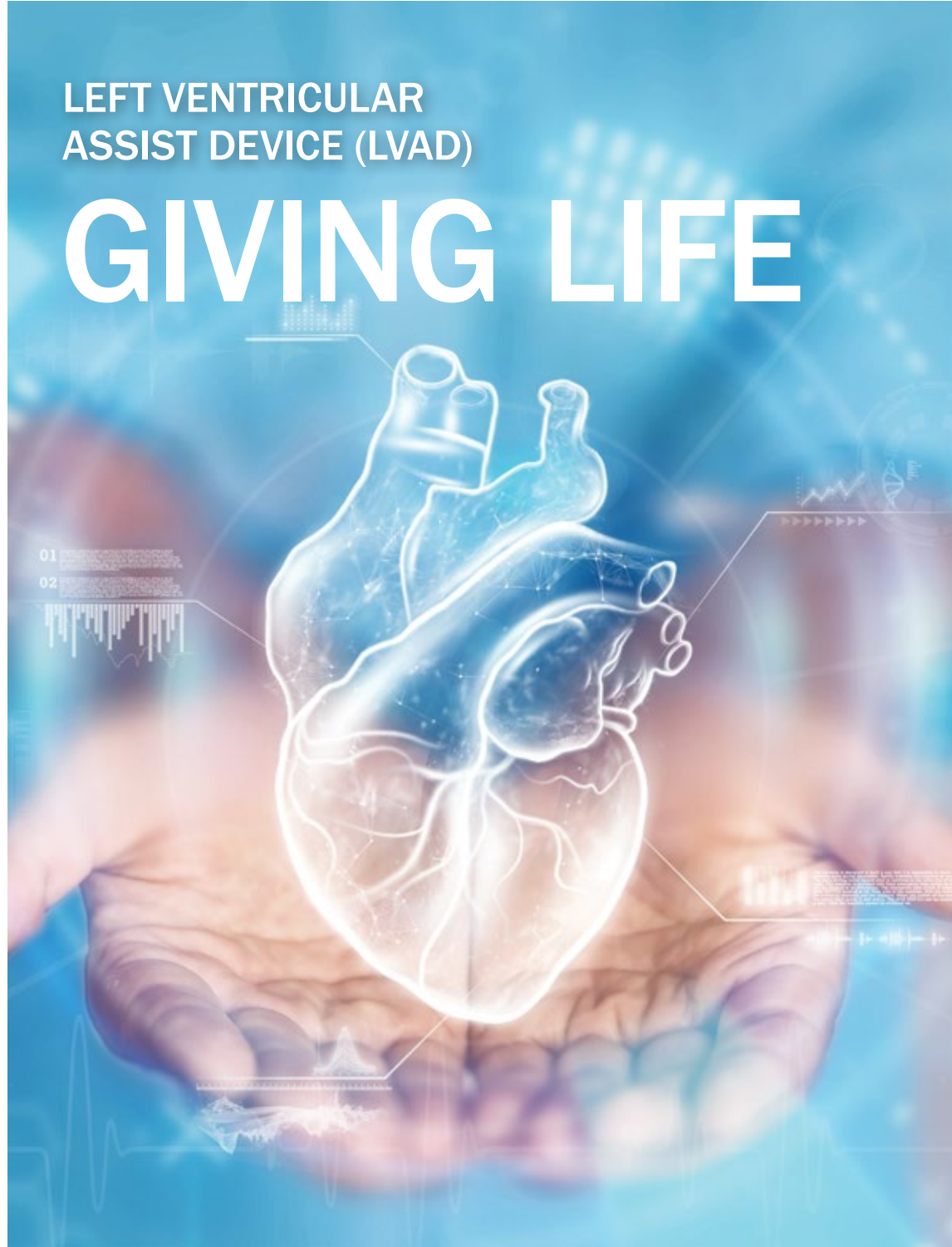
A REVOLUTIONARY
APPROACH: MINIMALLY
INVASIVE CARDIAC
SURGERY



BEYOND THE HEARTBEAT:
MITRAL VALVE DISEASE



AN INSIDER'S
GUIDE TO CHRONIC
THROMBOEMBOLIC
PULMONARY
HYPERTENSION (CTEPH)



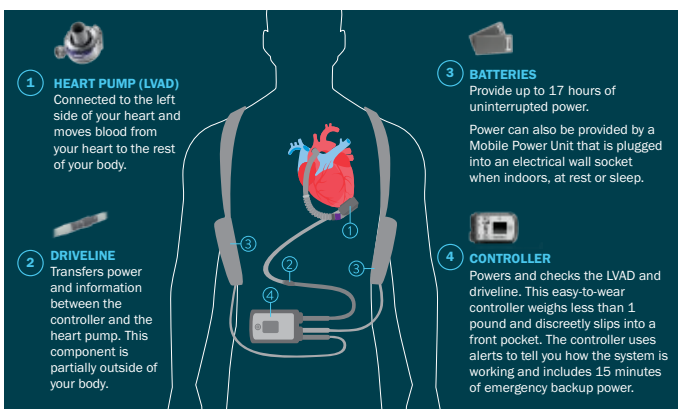
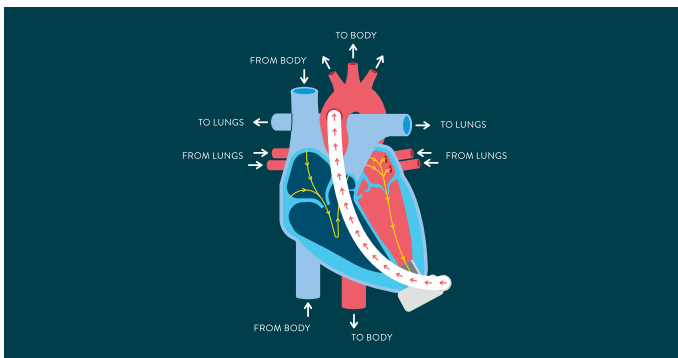
LEFT VENTRICULAR ASSIST DEVICE (LVAD)

GIVING LIFE

Heart Failure, also known as congestive heart failure, is a serious condition where the heart loses its ability to pump enough blood to the rest of the body, leaving the organs and tissues with insufficient oxygen and nutrients to function properly. The symptoms include shortness of breath even at rest, breathing difficulties, swollen ankles, legs or abdomen, tiredness, and so on. Once diagnosed, patients usually require lifetime medication and lifestyle modification, as well as procedures and/or surgeries.

When heart failure worsens

For most patients with heart failure, their condition tends to get worse over time. With severe heart failure where medications are no longer effective, patients might require frequent and multiple hospital admissions, due to deteriorating kidney and liver functions. These patients would experience persistent difficulties in breathing and have a very poor quality of life.



Images taken from Abbott's Understanding The Heartmate 3 LVAD System' Poster: The LVAD is an egg-sized mechanical pump that draws blood from the left ventricle and then pumps it into the aorta. An electrical driveline exits from the upper abdomen to obtain electrical power from a controller and two batteries. The pump must always be plugged into batteries or an electrical wall outlet, which means the patient must bring or wear the batteries at all times.

For such patients, a heart transplant would be the only option. However, a heart transplant does not happen immediately. Besides having to meet conditions such as age – only younger patients aged 60 years old and below are eligible, the number of donors in Singapore is limited too. When an available heart comes along, it also has to be assessed for suitability to the patient for a match to happen.

An artificial heart to keep on living

In 2008, an alternative treatment option was made available – the Left Ventricular Assist Device (LVAD) – a mechanical heart implant to take over the functions of the heart. The LVAD is known to be a bridge to transplant, or may also be a lifelong treatment known as destination therapy for those who cannot get a heart transplant. While waiting for a heart transplant, the LVAD helps to pump blood around the body.

Process of getting an LVAD

Patients need to undergo an open-heart surgery to have the LVAD implantation. After surgery, patients typically require to stay in the hospital for a few weeks, or longer if necessary. Before discharge, patients and their caregivers are required to learn how to use the device and care for the patient.

Living with LVAD

Immediately after getting an LVAD, patients will usually feel vast improvements in their heart failure symptoms – lesser breathlessness and swelling, and more energy¹. While it takes time to get used to having a device in the body, most patients adjust well within a few months and can return to school or work.

In the last decade since 2009, NHCS has implanted the LVAD in some 132 patients, with 92% and 68% survival rates at three months and five years, respectively. These patients have also been observed to be able to walk more than 400 metres on average for their 6-minute walk test, six months after their surgery, which was a huge improvement compared to pre-surgery.



Mr Timothy Quah, a patient of NHCS, proudly wears a custom-made vest containing his LVAD batteries.

Living with a device 24/7 also means that patients would need to have a constant power source, to be on long-term medications and to perform daily dressing to the device's driveline. However, there are ways to overcome some of these inconveniences in exchange for a better quality of life. Patients can carry the battery and controller in a pouch, sling bag or even fashionable vests! The LVAD is also a quiet machine and does not 'disturb' the patient as they go about their daily lives.

For avid travellers, extra batteries and charger must be carried along – though it may be slightly inconvenient, it can be managed with proper planning. Sexual activity is not an issue although female patients are advised to use contraceptives as pregnancy will be hazardous to their health condition.

Studies show that patients with LVAD usually live longer than those without. Nearly 90% of patients with LVAD are still alive after one year¹⁻⁴, whilst those without LVAD, especially those severely ill, usually do not survive as long¹.

What happens if a patient chooses not to get an LVAD or transplant?

Studies show that many patients with severe heart failure do not live past a year^{1,5}. However, opting not to have an LVAD means that the patients do not have to depend on a machine to live, and they can leave the hospital earlier to spend their remaining time at home. They may also need to receive palliative care or hospice service sooner than expected.

Palliative care

With or without an LVAD, palliative care offers medical care for those with serious illnesses and can help in relieving symptoms, pain and stress. It also provides emotional and spiritual support, enhancing the overall quality of life for patients and their caregivers.

Hospice

Hospice care is for patients near the end of their lives. The care is provided by doctors, nurses, and other health professionals, which includes medical, emotional, and spiritual support, and helps to provide comfort and peace for patients. It usually occurs at a patient's home, or can also occur in other places such as a nursing home.

Complications of LVAD

Like in any procedure and surgery, there are also risks in LVAD. Studies showed that patients with LVAD may encounter the following one year after surgery¹⁻³:

- 5 to 6 patients out of 10 are readmitted to the hospital
- 1 in 10 has a stroke
- 2 in 10 develop a device-related infection such as pump thrombosis or have a serious bleed requiring medical care
- 3 in 10 have ongoing heart failure

Other less serious complications include superficial driveline infection, feelings of depression and equipment malfunction.

How does LVAD affect caregivers?

In the first few months after surgery, the responsibilities of LVAD caregivers typically involve helping with the daily dressing of the driveline site, caring for batteries and equipment, managing medicines, assisting the patients with sponge bathing, meals, and accompanying for medical appointments and so on.

The caregiver may feel overwhelmed and stressed initially, although the level of care required usually lessens over time once the patient gains independence.

LVADs continue to be an excellent option for patients with advanced heart failure, with most experiencing dramatic improvements in their daily lives.

As medical technology advances, LVAD is contributing to longer survival rates. The average waiting time for a heart transplant in Singapore has increased from 153 days, before LVAD was available, to presently 1,172 days (slightly more than three years) for LVAD patients. The majority of these patients are likely to live with their LVAD for the rest of their lives.

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FOR THE PHYSICIANS

A REVOLUTIONARY APPROACH

MINIMALLY INVASIVE CARDIAC SURGERY

By Asst Prof Chua Kim Chai, Consultant, Department of Cardiothoracic Surgery

Minimally invasive cardiac surgery is a surgery where the surgeon performs the heart operation through a small incision on the side of the chest in between the ribs, as opposed to conventional open-heart surgery.

Traditionally, cardiac surgery is carried out through median sternotomy, which unavoidably subjects a patient to a lengthy two to three months full recovery post-cardiac surgery. For minimally invasive cardiac surgery (MICS), the exposure of cardiac surgical field is gained through a small 3-5cm thoracotomy instead. Just like cholecystectomy, in the current era, it is by default performed through minimally invasive technique rather than open surgery, MICS has also become the default approach for certain cardiac conditions in some high-volume overseas centres.

What are the types of MICS?

Nowadays, it is possible to perform selected coronary artery bypass graft and valvular surgeries using minimally invasive techniques.

The most common coronary artery bypass grafting procedure is the single graft bypass performed on left anterior descending (LAD) artery stenosis – minimally invasive direct coronary artery bypass (MIDCAB), usually on a beating heart. This can be part of a hybrid revascularisation strategy for multi-vessel disease as well.

In aortic valve replacement, the minimally invasive approach is done either through the partial upper sternotomy or right mini thoracotomy to access the diseased valve. In mitral valve repair/replacement, the surgery is performed through right mini thoracotomy, sometimes done with concomitant maze and/or tricuspid valve repair procedure. Not forgetting catheter-based procedures such as transcatheter aortic valve implant and mitral clip which are also part of MICS.

MICS vs open-heart surgery

Many studies¹⁻⁴ have shown that minimally invasive valve surgery has multiple established benefits compared to the conventional sternotomy approach. MICS reduces the need for blood transfusion and length of hospitalisation stay. It has faster recovery which could reduce medical costs and allows patients to have a better quality of life as well as a better experience from the cosmetic result.

For coronary surgery, LIMA-LAD has established superior long-term outcome that is unrivalled by percutaneous coronary intervention (PCI). However, with the current advancement of newer generations

In a MIDCAB procedure, the patient is positioned in a slight right decubitus position and put on single right lung ventilation to allow better visualisation in the left chest. A small 4-5cm incision is made on selected intercostal space to gain exposure to target vessels. A specialised retractor is then applied through the incision to elevate the left side of the chest to allow harvesting of the left internal mammary artery (LIMA). Then a suction device is used to stabilise the LAD artery on a beating heart, and anastomosis is performed thereafter.

In minimally invasive mitral valve surgery, cardiopulmonary bypass is arranged peripherally through femoral artery and vein, different from the traditional way which is established centrally through the ascending aorta and right atrium. The access of the heart is achieved through a 4-5cm thoracotomy incision usually on the right fourth intercostal space, aided with a thoracoscope for better visualisation of the surgical field. Specialised long instruments are used to achieve diastolic arrest of the heart and subsequent repair or replacement of the diseased mitral valve.

of coronary stents and their improved durability, the long-term benefits of vein or radial grafts are being challenged. Thus, the concept of hybrid revascularisation arises where the surgeon does LIMA-LAD, and the cardiologist does stenting of non-LAD lesions. This allows a patient to enjoy the advantages of both MIDCAB + PCI, and at the same time eliminates the disadvantages of both procedures⁵⁻⁶.

While there is no true disadvantage of MICS, additional pre-operation investigations [computed tomography (CT) of the chest, lung function test, vascular scan, etc] may be required. As the surgeon has to operate through a small incision, it is important to ensure that there are adequate information and careful planning prior so as achieve a higher success rate of MICS.



A comparison of visible scars done through open-heart surgery (left) and minimally invasive cardiac surgery (right).

Patient selection for MICS

Few conditions may preclude a patient from having MICS. These include extreme chest wall deformity (severe pectus excavatum), advanced pulmonary disease, poor right heart function or peripheral vascular disease. If a patient needs a complex surgery such as coronary work plus valve surgery, the MICS approach is not suitable. Thus, for isolated coronary or valve condition, any patient without the above contraindications who wish to avoid sternotomy may be offered the MICS approach after further evaluation by a specialist surgeon.

The benefits are usually more prominent in young adults who wish to return to their active daily life, and also in the very old group of patients whom sternotomy healing may expect to be prolonged or the cardiopulmonary function be affected post-sternotomy.

MICS offered in NHCS

- Bioprosthetic or mechanical aortic valve replacement
- Mitral valve repair or replacement, with or without concurrent tricuspid valve repair
- MIDCAB, either stand-alone or as a hybrid procedure
- Atrial myxoma removal
- Atrial septal defect closure
- Catheter-based procedure – transcatheter aortic valve implantation (TAVI) and Mitraclip

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CONTACT US



**National Heart
Centre Singapore**
SingHealth

GP PATIENT REFERRALS

Tel (65) 6704 2222

APPOINTMENTS

Tel (65) 6704 2000

Fax (65) 6222 9258

central.appt@nhcs.com.sg

GENERAL ENQUIRIES

Tel (65) 6704 8000

Fax (65) 6844 9030

nhcs@nhcs.com.sg

CARDIOTHORACIC SURGERY

NHCS' team of cardiac, thoracic and vascular surgeons specialises in treating high-risk patients. Cardiovascular surgery includes valve repair and replacement, coronary artery bypass graft surgery, aortic aneurysm repairs, peripheral vascular surgery, mechanical heart assist device implantation, and heart and lung transplantation. It also carries out minimally invasive general thoracic surgery for the diagnosis and treatment of a spectrum of chest and lung diseases. NHCS is the only institution in Singapore that carries out heart and lung transplantation.

OUR SPECIALISTS

Assoc Prof Kenny Sin Yoong Kong	Deputy Chief Executive Officer and Senior Consultant
Asst Prof Tan Teing Ee	Chief Medical Informatics Officer, Head and Senior Consultant Director, Heart Transplant & Mechanical Assist Device Programme
Asst Prof Ong Boon Hean	Deputy Head (Thoracic) and Senior Consultant Director, Lung Transplant Programme Director, Thoracic Surgery
Asst Prof Philip Pang Yi Kit	Deputy Head (Cardiac) and Senior Consultant
Assoc Prof Chua Yeow Leng	Senior Consultant
Assoc Prof Naik Madhava Janardhan	Senior Consultant
Asst Prof Lim See Lim	Senior Consultant Director, Operating Theatre
Asst Prof Nakao Masakazu	Senior Consultant
Asst Prof Tina Koh Puay Theng	Senior Consultant
Asst Prof Victor Chao Tar Toong	Senior Consultant Director, Vascular Laboratory
Asst Prof Alicia Chia Xue Fen	Consultant
Asst Prof Chua Kim Chai	Consultant
Asst Prof Chua Yang Chong	Consultant
Asst Prof Mathew Chakaramakill Jose	Consultant Director, Cardiothoracic Surgery Intensive Care Unit
Asst Prof Sivaraj Pillai Govindasamy	Consultant
Asst Prof Soo Ing Xiang	Consultant
Asst Prof Zameer Bin Abdul Aziz	Consultant
Dr Cynthia Chia Ming Li	Consultant
Dr Huang Mingjie	Associate Consultant
Dr Jason Leung Hongting	Associate Consultant
Dr Tham Yi Chuan	Associate Consultant
Dr Yap Kok Hooi	Associate Consultant
Dr Zhu Ling	Associate Consultant

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

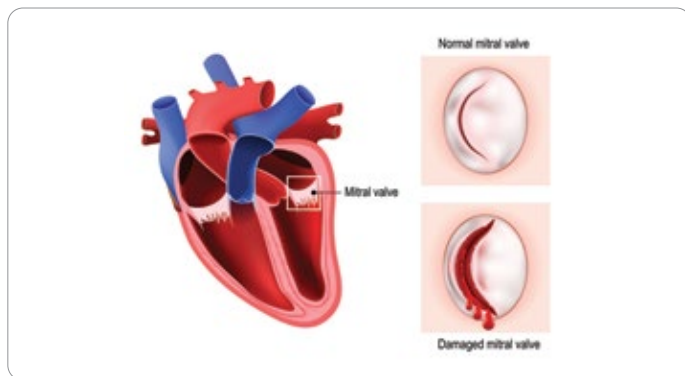
BEYOND THE HEARTBEAT

MITRAL VALVE DISEASE

By Dr Zhu Ling, Associate Consultant,
Department of Cardiothoracic Surgery

The mitral valve is a flap-like structure made of two leaflets - anterior leaflet and posterior leaflet, located between the left heart chambers. It functions like a one-way door for the blood to flow from the left atrium into the left ventricle, then further across the aortic valve into the aorta supplying down to the entire body.

Mitral valve disease occurs when the mitral valve does not function properly. Forms of the disease include regurgitation (leakage), when the mitral valve leaflets are not able to close tightly, causing blood to leak back from the left ventricle into the left atrium; and stenosis when the mitral valve leaflets thicken or become stiff and fuse together, narrowing the valve opening resulting in inadequate blood flow from the left atrium into the left ventricle.



Causes and Complications

Mitral valve disease has many causes. Some forms can be already present at birth (congenital heart defect), while more commonly seen forms are developed later in life or acquired. The most common cause of mitral valve stenosis is rheumatic heart disease, where an infection (rheumatic fever) causes the heart to become inflamed. Mitral valve regurgitation, on the other hand, can be caused by mitral valve prolapse (floppy valve), endocarditis (infection), heart attack, or autoimmune disease such as lupus disease.

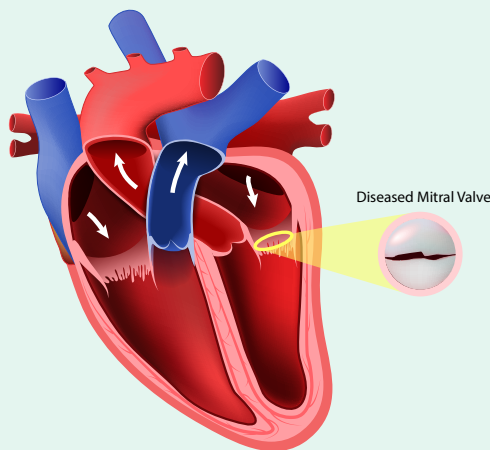
If left untreated, mitral valve disease can lead to serious, life-threatening complications such as heart failure, irregular and often rapid heart rate, blood clots and stroke.

Diagnosing Mitral Valve Disease

Some patients can be symptom-free for many years even with serious mitral valve problems. Otherwise, signs and symptoms of mitral valve disease include fatigue, decrease in effort tolerance, heart murmur, palpitation, irregular heartbeat, and shortness of breath even at rest.

When diagnosing mitral valve disease, a cardiologist will require a thorough medical history, detailed physical examination and if required, investigations may include:

- **Echocardiogram:** an ultrasound scan of the heart that provides details of the heart structures and function, is usually performed over the chest (known as a transthoracic echocardiogram). In certain cases, the ultrasound is done via a probe inserted into the food pipe (transoesophageal echocardiogram) to get a closer look at the heart, especially at the mitral valve (from the back of the heart).
- **Electrocardiogram (ECG):** detects enlarged chambers of the heart, heart disease and irregular heart rhythms.
- **Chest X-ray:** provides information for both the heart and lungs.
- **Cardiac magnetic resonance imaging (MRI):** produces extra information of the heart chamber and valve condition.
- **Exercise tests or stress tests:** help reveal how the heart responds to physical activity and whether valve disease symptoms occur during exercise. These tests often involve walking on a treadmill or riding a stationary bike.
- **Cardiac catheterisation:** checks on the heart vessel conditions via a procedure in which a thin, flexible tube is guided through a blood vessel to the heart. Coronary bypass surgery may sometimes be carried out at the same time with valve surgery if there is serious blockage of the heart vessel.

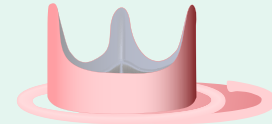


Valve Replacement

Mechanical Valve



Tissue Valve



Treatment – Intervention, Repair or Replacement

Mitral valve disease treatment depends on the symptoms, the severity of the condition, and the progress of the disease. Options may include monitoring the condition with regular follow-up visits, medications for the symptoms and medical interventions.

Percutaneous Intervention

Percutaneous intervention of the mitral valve is done in the cardiac catheterisation lab by the structural heart team. Commonly performed procedures include:

- Valvuloplasty for the narrowed mitral valve (mitral stenosis) - a catheter with a balloon on the tip is inserted through the groin vessel and threaded up to the mitral valve. The balloon is then inflated and the opening of the mitral valve is widened. The procedure can be performed even when the patient is symptom-free with a severely stenosed valve.
- MitraClip for a leaking mitral valve (mitral regurgitation) - a catheter with a clip on its end is guided to the mitral valve through the groin vessel. The clip is then anchored onto a torn or leaky mitral valve leaflet. This procedure serves as an option for patients with severe mitral regurgitation, particularly for those who are at high risk for mitral valve surgery.
- In some cases, a heart catheter procedure may also be done to insert a replacement valve into a biological tissue valve that is no longer working properly, known as a valve-in-valve procedure.

Mitral Valve Surgery

A diseased or damaged mitral valve eventually will need to be repaired or replaced, even if no symptoms are present. Surgery for mitral valve disease includes mitral valve repair and mitral valve replacement.

Mitral valve surgery is traditionally performed via median sternotomy, which is an incision through the middle of the chest bone. In selected cases, mitral valve surgery can be performed through a minimally invasive approach. The incision will be over at the side of the chest rather than through the middle chest bone.

Mitral Valve Repair

In mitral valve repair procedures, commonly used techniques include:

- Removing the excess tissue so the leaflets can close tightly (resection of part of the valve)
- Replacing the supporting structure (chords) of the mitral valve
- Patching the holes in the heart valve leaflets (patch repair)
- Splitting the valve leaflets that have fused (commissurotomy)
- Tightening or reinforcing the ring around the valve (annuloplasty)

Mitral Valve Replacement

In certain cases, when the mitral valve condition is not amenable to repair, the diseased mitral valve has to be replaced, that is, to change a new one. During mitral valve replacement, the original mitral valve tissue is removed, after which a new valve (using a mechanical valve or a tissue valve made from cow, pig or human heart tissue) will be implanted.

For a mechanical valve, the patient has to take a life-long strong blood thinner (warfarin) to prevent clots on the valve. They will need to take blood tests regularly to monitor the effect of the blood thinner and take precautions to prevent excessive bleeding. With good care, a mechanical valve can last a lifetime and does not usually wear out.

A tissue valve, on the other hand, does not need life-long warfarin, although the patient may require blood thinning for other conditions such as chronic atrial fibrillation (or irregular heartbeat). Tissue valve can break down over time, with wear and tear or calcium deposition. There may be a need for re-intervention after 10 to 15 years, in which case, another operation or percutaneous intervention may be needed.

Conclusion

Mitral valve disease is not an uncommon disease in Singapore. Patients with mitral valve disease need to work closely with their cardiologist and cardiac surgeons to manage their symptoms and prevent complications. With early diagnosis, proper treatment and management, and lifestyle changes, patients with mitral valve disease may still lead a normal life.

AN INSIDER'S GUIDE TO CHRONIC THROMBOEMBOLIC PULMONARY HYPERTENSION (CTEPH)

By Asst Prof Alicia Chia, Consultant, Department of Cardiothoracic Surgery

CTEPH is rare, hard to diagnose and can be fatal. But if discovered in time, it is probably the only type of pulmonary hypertension that is curable with surgery.

Toss out the words “Chronic Thromboembolic Pulmonary Hypertension (CTEPH)” and you are likely to get a collection of blank stares.

CTEPH is a condition caused by the long-term accumulation of clots in the blood vessels of the lung, called the pulmonary artery. In some people, their bodies are unable to naturally break down these clots. Over time, the clot gets incorporated into the wall of the blood vessels, causing them to scar and narrow. The resultant pulmonary hypertension or high blood pressure in the lungs places so much strain on the heart that it can be life-threatening.

Patients with untreated CTEPH encounter a higher risk of death. Once the mean pulmonary pressure reaches 50 mmHg, 90% of these patients do not survive beyond three years.¹

Nonetheless, the diagnosis of CTEPH can be difficult and is often missed due to numerous reasons:

1. Characteristic symptoms of CTEPH include shortness of breath on exertion or at rest and a progressive decrease in exercise tolerance, which can also be caused by several other health conditions. In the later course of the disease, exertional chest pain, haemoptysis (coughing up blood) and syncope (blackout) may occur due to massive pulmonary hypertension and right heart failure.
2. Majority of patients have no history of venous thrombosis (clots elsewhere in the body) or acute pulmonary embolism (PE).
3. There is still a general lack of awareness of this clinical entity and the option of successful therapy. Hence, many cases either remain undiagnosed or are not referred to specialised pulmonary hypertension/ CTEPH centres.

NHCS CTEPH Clinical Service

Started in 2016, NHCS CTEPH clinical service is the first in Singapore to offer comprehensive treatment options for patients with CTEPH including Pulmonary Thromboendarterectomy, Balloon

Pulmonary Angioplasty (BPA) and medical therapy. To date, more than 70 patients have been treated at NHCS. The service is managed by a multi-disciplinary team working hand-in-hand to provide a full spectrum of care comprising diagnostic investigations, customised treatment options and follow-up care for these patients.

The Razor's Edge – Pulmonary Thromboendarterectomy

Pulmonary Thromboendarterectomy (PTE), another tongue-twisting name, is a technically demanding yet highly successful operation known to remove life-threatening clots from the blood vessels in the lung.

PTE is the guideline-recommended treatment for operable CTEPH. Data from both the First International CTEPH Registry and the United Kingdom ASPIRE Registry showed a superior survival in patients who underwent PTE surgery compared to those who declined surgery (5-year survival of 83% versus 55%)²⁻³.



Clots removed from pulmonary artery during PTE

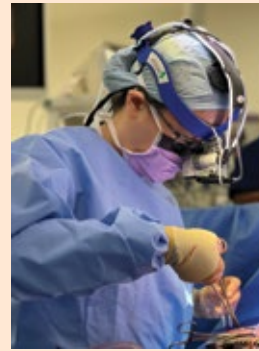
A PTE is a typically 7- to 8-hour procedure that requires the patient to be attached to a heart-lung bypass machine. The procedure begins with the surgeons opening the sternum (breastbone). During the operation, the body temperature is cooled to 20°C before the blood circulation is stopped and the heart-lung machine then completely drains the patient's body of blood. From this point on, the surgeons will need to be quick and accurate at removing the clots, as they have to work within a 20-minute interval before blood circulation is restored to the body. These measures are necessary to protect the brain and other vital organs from damage. A surgeon would then use a sharp blade to delicately scrape away the clots embedded in the wall of the pulmonary artery. The process is highly intensive and requires precision skills to perform well. The most important thing is to identify where the clot begins and ends and make sure not to remove too little, or too much. Success or failure balances on the razor's edge.

Balloon Pulmonary Angioplasty and Medical Therapy

Balloon Pulmonary Angioplasty (BPA) has become an established treatment for selected patients with inoperable CTEPH or where the clots are in the smaller blood vessels for which surgeons may not be able to reach directly. BPA uses a catheter with a balloon device to push the clots against the side of the blood vessels to restore blood flow.

Patients who are unsuitable for PTE and BPA will be offered medical therapy to lower the pressures in the lung.

Stint at World-Renown Institution



Asst Prof Chia embarked on her one-year fellowship in PTE surgery at the Royal Papworth Hospital, Cambridge (United Kingdom), in September 2021.

PTE was first performed at the Royal Papworth Hospital, Cambridge (United Kingdom) in 1997 and it has been commissioned to provide a national PTE service for the United Kingdom since 2000. Each year, approximately 200 patients from across the United Kingdom and Ireland undergo PTE surgery at the hospital. The intervention is now part of the routine workload at the hospital, and an effective multi-disciplinary team manages the patients throughout their stay.

Asst Prof Chia had the privilege of participating in approximately 170 PTE surgeries under the mentorship of all four PTE surgeons in the hospital (Dr David Jenkins, Dr Choo Ng, Dr Steven Tsui and Dr John Taghavi). The experience gained from the fellowship has broadened her horizons and honed her skills in complex PTE surgery to bring about improved care management of patients with CTEPH.

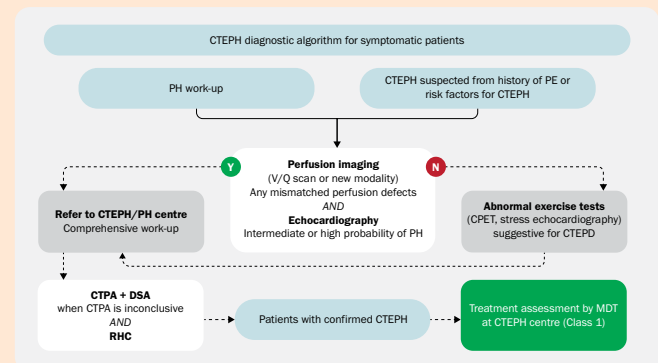


FOR THE PHYSICIANS

The primary problem remains that this is an under-recognised condition. Despite the advent of therapies and effective interventions for CTEPH, the time of symptom onset to the diagnosis of CTEPH remains at more than two years, with most patients presenting with advanced stage of the disease.

The latest European Society of Cardiology and European Respiratory Society (ESC/ERS) Guidelines, published in August 2022, proposed a new algorithm aiming at earlier detection of this condition in the community⁴.

1. In patients with persistent or new-onset dyspnoea or exercise limitation following pulmonary embolism (PE), further diagnostic evaluation to assess for CTEPH/ chronic thromboembolic pulmonary disease is recommended. [Class I recommendation]
 2. For symptomatic patients with mismatched perfusion lung defects beyond three months of anticoagulation for acute PE, referral to a pulmonary hypertension/ CTEPH centre is recommended after considering the results of echocardiography, BNP/ NT pro-BNP and/or cardiopulmonary exercise testing (CPET). [Class I recommendation]
- Risk factors for CTEPH include a history of PE, inherited hypercoagulable states (lupus anticoagulant, antiphospholipid



European Society of Cardiology and European Respiratory Society (ESC/ERS) 2022 Guidelines

- antibodies, anti-thrombin III/ protein C/ protein S deficiency), permanent intravascular devices, inflammatory bowel diseases, essential thrombocythaemia, splenectomy, high-dose thyroid hormone replacement.
- New modality includes alternative perfusion imaging techniques such as iodine subtraction mapping and dual-energy CT.
- DSA = Digital subtraction angiography; CPET = Cardiopulmonary Exercise Test; RHC = Right Heart Catheterisation; MDT = Multidisciplinary Team

In conclusion, an increase in awareness of this condition and the possibility of an effective treatment would hopefully avail more patients of the opportunity for relief from this debilitating and ultimately fatal disease.

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PREPARING FOR THE UNKNOWN

ADVANCE CARE PLANNING

Advance care planning (ACP) is a process that involves thinking and discussing your values, goals and preference for medical care, and making decisions about the type of care you would want in the event that you are unable to make those decisions for yourself.

ACP involves discussions with family, friends, and healthcare providers, and may involve the creation of legal documents, such as a living will (Advance Medical Directive) or lasting power of attorney. Discussing end-of-life issues with your loved ones can often be an uncomfortable topic. However, starting these conversations can help ensure you receive the type of medical care you want, even when you are unable to communicate your wishes. This can be especially important for individuals who have a chronic condition or who are nearing the end of their life.

Through ACP, you can take control of your own healthcare decisions and indicate your wishes. Healthcare providers can also provide care that aligns with those wishes, and reduce the burden on family members who may be having difficulty making medical decisions on your behalf.

Despite the benefits of ACP, there are still misconceptions that can prevent some from engaging in the process. Let us address some of the common misconceptions and the facts that debunk them.

Is ACP only for older adults, people with critical illness or who are dying?

ACP is for everyone and is not just about end-of-life care. Accidents and sudden illnesses can happen at any time, and having a plan in place can ensure that a person's wishes are honoured. ACP includes decisions about medical treatment preference, pain management, comfort care, and any other aspects of care that can improve quality of life.

Does ACP mean giving up control of medical decisions?

On the contrary, ACP gives you more control over your medical care. By expressing your wishes in advance, you can ensure that your loved ones and healthcare providers know what you want, even when you are unable to communicate your wishes later on.

Is there a need for ACP if you have done your Lasting Power of Attorney (LPA) or Advance Medical Directive (AMD)?

A LPA is a legal document that officially appoints someone to make decisions and act on your behalf when you lose mental capacity one day. On the other hand, an AMD is a legal advance directive stating your preference for life-sustaining treatment.

While both LPA and AMD are legally binding documents that state specific instructions, ACP is a broader process that can provide additional guidance and clarity. It includes ongoing communications with loved ones and healthcare providers and helps ensure that your wishes are fully understood and respected, and avoid unnecessary medical interventions.



Is ACP a one-time event?

ACP is an ongoing process that should be revisited regularly to ensure your wishes are up-to-date and reflective of your current values and goals. ACP conversations can also involve updating legal documents and sharing new information with loved ones and healthcare providers. Generally, ACP is a reflection of your perspectives and preferences towards life. As your life changes, so may your life goals and decisions. You may continuously make changes to your ACP as long as you have the mental capacity to do so.

Never too late to start planning – the earlier, the better

Nobody knows when a medical emergency can happen. Starting early allows you to make informed decisions about your healthcare while you are still able to do so. The earlier you plan for your advance care, the more time you have to think about and communicate your wishes to your loved ones and healthcare providers. Early planning can also alleviate stress and uncertainty for your loved ones, and even prepare them emotionally, especially for the end-of-life process. Anyone can start ACP with three simple steps:

1. Reflect on what you want – think about what matters to you, and what kind of medical care aligns with your values and preferences. You may want to consider factors such as your quality of life, pain management, spiritual beliefs, and cultural traditions.
2. Choose your nominated healthcare spokesperson – think about the people you trust and choose the person you can entrust with making medical decisions on your behalf when you are unable to.
3. Make a record of your choices – make an appointment with an ACP facilitator to record your preferences.



ACP can be done at government hospitals, polyclinics and social care providers. At NHCS, you may approach our ACP team at **6704 8966/67**.



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September – December 2022

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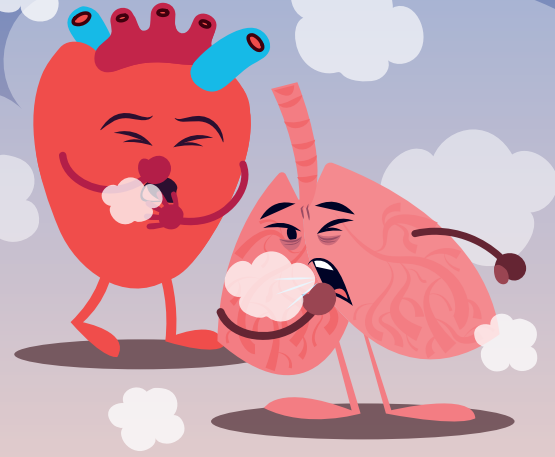
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