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**CORONARY ARTERY
BYPASS GRAFTING –
TO DO IT OR NOT?**



**THE 'BLUE BABY'
CONDITION**



**ARRHYTHMIA –
DOC, I CAN FEEL MY
HEART POUNDING, IS
THIS NORMAL?**



COMBATING CARDIOVASCULAR RISK FACTORS WITH EXERCISE

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By Dr Lim Chih Yeh, Consultant, Department of Cardiology

Being physically active is one of the best gifts you can give to your heart. Not only does regular exercise help with strengthening heart muscles, but it combats risk factors for heart disease by lowering blood sugar and blood pressure, controlling cholesterol levels, and maintaining healthy body weight.



High blood sugar

Exercise has both short-term and long-term benefits in people with high blood sugar or Type 2 diabetes (T2D). During an exercise workout, the exercising muscle takes up sugar from the blood circulation. After exercising, the blood sugar level will tend to be lower. Reduction in blood sugar is closely associated with individual's physical activity duration and intensity. When one exercises, the body becomes more sensitive to insulin (that is the hormone that allows cells in the body to use blood sugar for energy). The effect of increased insulin sensitivity after any physical activity can last from two to 72 hours. In the long term, exercise improves glycaemic control in adults with T2D. Exercise reduces glycated haemoglobin (Hba1c) values by approximately 0.5 to 0.7 percentage points.

If you have been diagnosed with pre-diabetes (higher-than-normal blood sugar level and at risk of developing T2D), lifestyle changes coupled with moderate-intensity exercise and modest weight loss, are greatly beneficial and may even reverse the condition.



EXERCISE TIPS

(Applicable for most individuals)

Exercise can be broadly split into low, moderate and high (vigorous) intensity categories. Exercise intensity refers to how hard the body is working or the amount of physical energy used when exercising. In low-intensity exercise, there is a steady heart rate without a noticeable change in breathing, for example, you can chat and sing while exercising without running out of breath. At moderate intensity, there may be an increase in heart rate, breathing rate, and body temperature, for example, you are able to hold a short conversation while exercising, but probably not able to sing without getting out of breath. In a high-intensity exercise, you will not be able to say a few words without catching a breath.

Ideally, most individuals are recommended to:

- accumulate at least 150 to 300 minutes of moderate-intensity exercise or 75 to 150 minutes of high-intensity exercise a week;
- exercise at least three or more days a week;
- participate in two to three sessions of resistance exercise a week, with a rest day between the training days.

Flexibility exercise (also refers to stretching) enhances joint flexibility and is highly beneficial for health and well-being, especially in older adults. They generally do not improve glycaemic control unless combined with another type of physical activity or other forms of exercise. Flexibility exercise is generally a low-intensity exercise and is easy to perform, thereby easier for older adults or those who are less fit to start off and adopt into their lifestyle.

Aerobic exercise such as brisk walking, jogging, cycling or swimming, is the best type of exercise for heart health. Brisk walking is the safest form of exercise to start if you are uncertain of the level of intensity. Inactive adults should start gradually, with light intensity at a shorter duration (less than 10 minutes), and gradually progress to longer duration and more intensive exercise. Adults with T2D should do no more than two consecutive days of exercise due to the transient nature of exercise-induced improvements in insulin action. Older adults with T2D should aim to get as much aerobic exercise as their physical and mental health allows.

Resistance exercise such as weight lifting, using resistance bands, push-ups, and sit-ups, typically results in 10% to 15% improvements in strength, bone mineral density, blood pressure, lipid profiles, skeletal muscle mass, and insulin sensitivity.

Balance exercise such as lower body and core resistance exercises, yoga, and tai chi may reduce the risk of falls as it improves muscle strength and balance coordination of the lower limbs. This form of exercise has shown to have benefitted adults with diabetes with affected nerves issues.

For the majority who plan to participate in low- to moderate-intensity exercise, it is not necessary to have pre-exercise medical evaluation. However, it is advisable to seek advice from your doctor prior to starting any exercise programme if you are:

- Currently taking medication or insulin to manage your diabetes and planning to start a high-intensity exercise programme;
- Suffering from complications of diabetes such as nerve damage, kidney damage, eye damage and foot damage;
- Experiencing symptoms such as chest pain, chest tightness, chest pressure, shortness of breath, and pain in the neck, jaw, throat, upper belly area or back.



High blood pressure

Individuals with high blood pressure are advised to participate in at least 30 minutes of moderate-intensity exercise for five to seven days per week.

This is associated with a reduction in systolic blood pressure of 5 to 7mmHg. These reductions would translate to a reduced risk of cardiovascular disease of 20 to 30%. Additional resistance training is highly effective in reducing blood pressure further. In the event that high blood pressure is poorly controlled (that is, resting systolic blood pressure surpasses 200 mmHg, and diastolic blood pressure surpasses 110mmHg), one should stop exercising till blood pressure returns to normal level.

Resistance exercise that involves straining to lift, push or pull very heavy object, tends to hold one's breath during muscle contraction

and can result in extremely high blood pressure. This is called Valsalva manoeuvre, which is forcefully breathing out against a closed windpipe. It is best to avoid Valsalva manoeuvre during resistance exercise such as intensive heavy weightlifting.

Some blood pressure medications may lead to sudden excessive reductions in post-exercise blood pressure. Hence, if you are taking blood pressure medications, do not stop or end an exercise suddenly, but do cool-down exercises before gradually ending your exercise.



High cholesterol level

Hyperlipidaemia (high cholesterol) means your blood has too much lipids (or fats), such as cholesterol and triglycerides. Physical activity can reduce triglycerides

by up to 50% and increase good cholesterol (HDL) by 5 to 10%. Exercise may reduce bad cholesterol (LDL) by up to 5%. These improvements can be achieved through three and a half to seven hours of moderate- to high-intensity exercise per week. Low-intensity exercise rarely reduces bad cholesterol (LDL) to normal or near normal values. Medication, particularly with statins, coupled with exercise and lifestyle intervention, will greatly help in reducing bad cholesterol (LDL) and improving prognosis.



Obesity

Exercise is important in the prevention of obesity. Maintaining adequate physical activity reduces the risk of weight gain.

For weight loss, the goal is to increase energy expenditure by 1,000 to 1,200 calories per week, or slightly more than 150 calories per day. The amount of energy expended depends upon the duration and intensity of the exercise and your initial weight. For example, at 70kg, walking slowly for 60 minutes will burn around 147 calories. Whereas, at 100kg, same activity and duration will burn around 206 calories.

Non-weight-bearing exercises such as cycling or swimming help to prevent obese individuals from musculoskeletal injuries. Obese individuals should limit high-volume weight-bearing exercises on a hard surface (such as jogging) to less than two hours a day until a considerable weight reduction is achieved.

When weight loss is the desired goal, a diet should be combined with physical activity and the activity gradually increased over time as tolerated. For many individuals, more than 60 minutes per day of activity may be required to prevent weight regain following a significant weight loss.



**SCAN TO CHECK OUT
SOME EXERCISES YOU
CAN DO!**

Kanaley JA, Colberg SR, Corcoran MH, et al. Exercise/Physical Activity in Individuals with Type 2 Diabetes: A Consensus Statement from the American College of Sports Medicine. *Medicine and Science in Sports and Exercise*. 2022 Feb;54(2):353-368. DOI: 10.1249/mss.0000000000002800. PMID: 35029593.

2020 ESC Guidelines on Sports Cardiology and Exercise in Patients With Cardiovascular Disease: The Task Force on Sports Cardiology and Exercise in Patients With Cardiovascular Disease of the European Society of Cardiology (ESC). *Eur Heart J* 2020;Aug 29

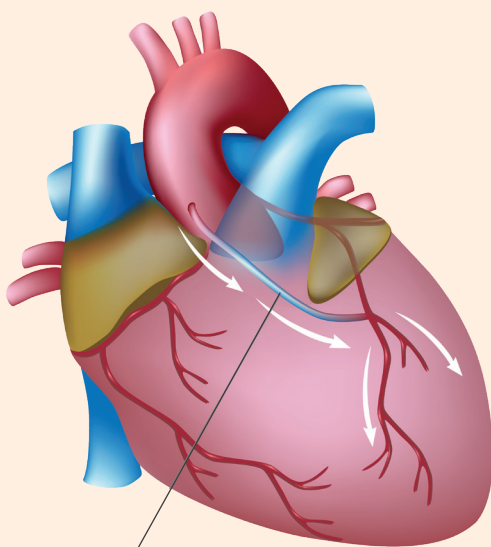
CORONARY ARTERY BYPASS GRAFTING – TO DO IT OR NOT?

By Dr Tham Yi Chuan, Associate Consultant, Department of Cardiothoracic Surgery

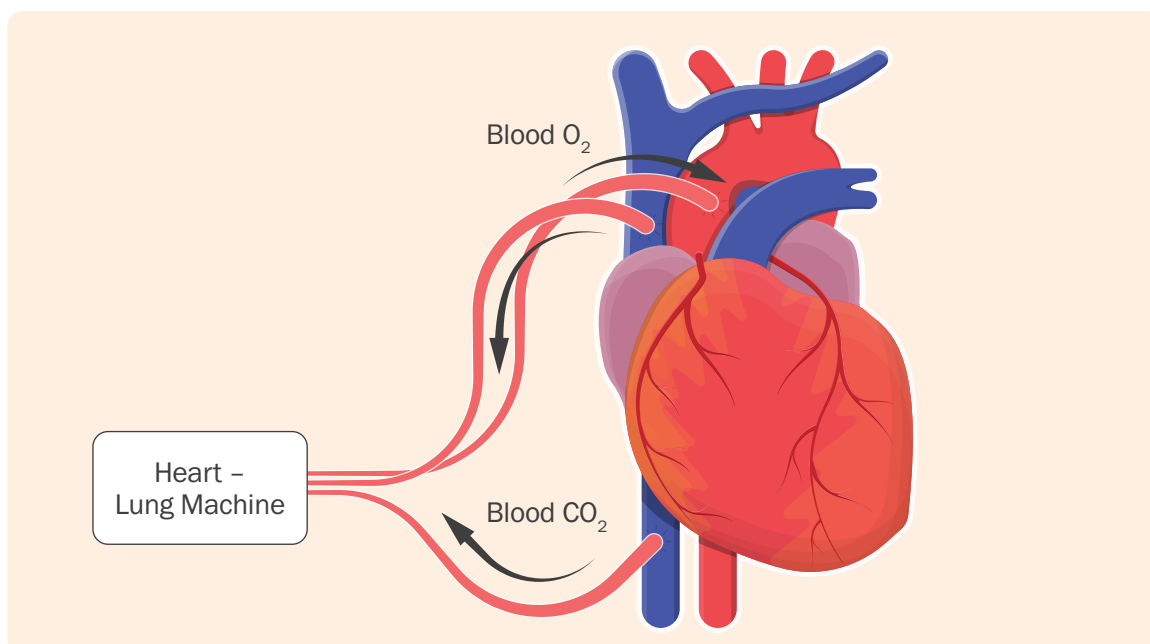
Coronary artery bypass grafting (CABG) is a surgical procedure in which patient's own blood vessels are used as graft to bypass narrowed or blocked coronary arteries. It helps improve blood and oxygen supply to the heart and thus improve patients' symptoms and enhance quality of life.

The development of coronary angiogram in the 1960s, allowed the identification of diseased coronary artery, and hence laid down the foundation in understanding and treatment of this disease. While many sporadic efforts were made to treat this disease, we cannot run away from discussing CABG without first mentioning Vineberg and Favaloro.

Arthur M. Vineberg, the immediate forerunner of CABG¹, developed the procedure of direct implantation of internal mammary artery into myocardium in 1951, with the operation later known as 'the Vineberg operation'. It received widespread clinical application during the 1960s and decades later, it was demonstrated that this procedure brought new blood flow to the left ventricular myocardium. Then in 1967, Rene Favaloro, the pioneer and 'father' of CABG, began performing CABG with vein graft, hence creating blueprint of how CABG is performed today.



Bypass graft



The heart and lung bypass machine does the work of the heart and takes over the pumping of the blood when the heart is stopped.

The CABG Surgery

CABG is a type of revascularisation procedure used to treat coronary artery heart disease and restore or increase blood supply to the myocardium (muscles of the heart). Patients with coronary artery disease may face risk of angina (chest pain caused by reduced blood flow to the heart), and if severe, may require CABG to improve blood supply. For these patients, there is also a risk of getting heart attack.

conventional sternal-splitting CABG. Additionally, CABG could be performed without heart-lung machine. Recently, there is also growing interest in hybrid revascularisation procedure, however, with different measurement outcomes. Despite the various attempts, the only time-tested outcome improving technique in recent years is to increase the number of arterial grafts when performing CABG.

Key to Best Outcomes

Many patients thought that CABG cures coronary artery disease. In fact, CABG only address the consequences of underlying multiple cardiac risk factors that contributed to development of the disease, it does not prevent the progression of disease. CABG is a matured procedure in the treatment of coronary artery disease and it is very effective in providing durable relief of angina and performed primarily to improve survival of patients with coronary artery disease. The essence of good treatment lies with the joint decision-making process of patients and their cardiac surgeons and cardiologists. Guideline-directed medical therapy that includes adoption of lifestyle modification are the key to improved long-term outcomes.

In conclusion, CABG has proven to provide significant improvement in symptoms, quality of life and survival for appropriately selected patients with multi-vessel coronary artery disease. Patients with more advanced multi-vessel coronary artery disease, left ventricular dysfunction or diabetes are particularly likely to benefit from CABG.

Long-term Benefits & Latest Developments

The evidence of CABG is undisputable, with the disease being one of the most researched topics in the history of medicine. From the pivotal randomised controlled trial in the 1970s and 80s (Veteran Administration Cooperative Study, European Coronary Surgery Study and Coronary Artery Surgery Study), they had cemented CABG as one of the most important treatments for patient with coronary artery disease. The relative survival benefit of CABG over medical therapy is consistent across many studies. However, because of the early surgical risk associated with CABG, its survival advantage does not become apparent until one to two years after surgery and they tend to increase with longer follow-up.

SYNTAX trial is another landmark study that compared CABG to PCI². Overall, patients with three-vessel disease (TVD) in this study had survival benefit with CABG, and in particular, patients with more complex TVD undergoing CABG had better long-term outcome compared to patients that had PCI. Patients with diabetes mellitus especially, have improved outcome when undergoing CABG compared to PCI, with less patients had to return for repeat revascularisation procedure.

Many attempts have been made to improve outcomes of CABG. Minimally-invasive CABG seeks to reduce the invasiveness of the

¹ The Vineberg procedure: the immediate forerunner of coronary artery bypass. J B Shrager. *Ann Thorac Surg.* 1994 May

² PW Serruys et al. Percutaneous Coronary Intervention versus Coronary-Artery Bypass Grafting for Severe Coronary Artery Disease. *N Engl J Med* 2009; 360:961-972

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4th Edition Kirklin Barratt-Boyes *Cardiac Surgery* textbook

THE 'BLUE BABY' CONDITION

By Asst Prof Foo Jie Sheng, Consultant, Department of Cardiology

Congenital heart defect is a type of birth defect that affects the heart's structure. Some cases of congenital heart defect in children are simple and do not require treatment, while others such as Tetralogy of Fallot, are more complex and may need several surgeries for treatment.

Tetralogy of Fallot (TOF) is the most common cyanotic (blueish discolouration of the skin due to lack of oxygen in the blood - "Blue baby") congenital heart disease that affects 1 in 2,000 live births (5 to 7% of all congenital heart disease).

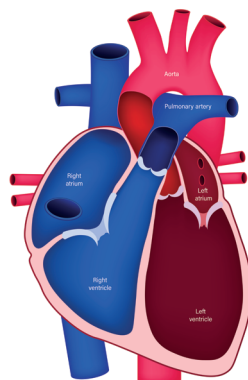
Without surgery, most patients die in childhood with a rate of survival of 66% at 1 year of age, 40% at 3 years, 11% at 20 years and 3% at 40 years¹.

TOF consists of four defects that commonly occur together:

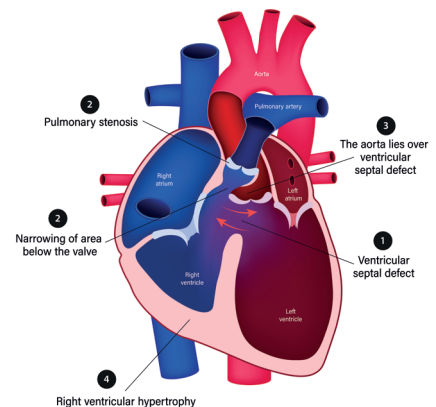
1. A hole (ventricular septal defect) between the two lower heart chambers (ventricles).
2. Obstruction from the right ventricle to the lung caused by thickened muscles (infundibular stenosis) and/or narrowing of the pulmonary valve (pulmonary stenosis).
3. The aorta, which is the major artery that supplies oxygen-rich blood to the body, lies over the ventricular septal defect (overriding aorta).
4. The muscle of the right ventricle thickens (right ventricular hypertrophy).

Less oxygenated "blue" blood returning to the right side of the heart is mixed with the oxygenated "red" blood from the left side of the heart through the hole and the overriding aorta. Babies with unrepaired TOF are often blue. Sometimes the pulmonary valve is also

Normal heart



Tetralogy of Fallot



completely obstructed (pulmonary atresia). Other associated problems can include an atrial septal defect (hole between the two upper heart chambers) and abnormalities of coronary arteries (which supplies blood to the heart muscles).

Treating 'Blue Baby'

In early infancy, babies with TOF may need a procedure to temporarily increase blood flow to the lungs (Blalock-Taussig shunt). Total surgical repair will be done later when the baby is older. With advances in surgery, survival into adulthood is expected, although repeat procedures are common.

Common problems which can remain in adults after repair include:

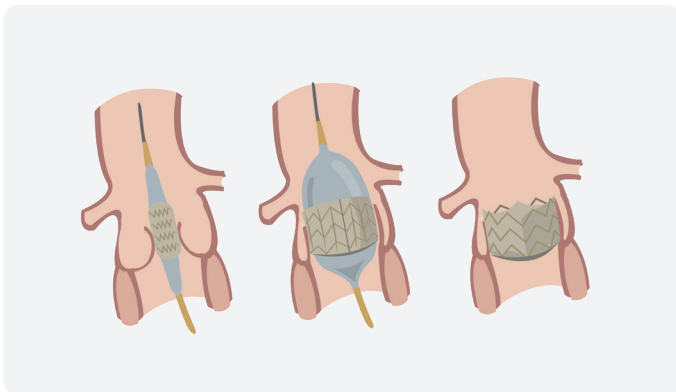
- Residual pulmonary valve narrowing or leaking. Also known as pulmonary valve stenosis or regurgitation
- Branch pulmonary artery narrowing
- Abnormal heart rhythms (arrhythmias)

Pulmonary valve regurgitation is very common in TOF patients with over 80% having at least moderate to severe pulmonary regurgitation². A pulmonary valve replacement may be required depending on

the patient's symptoms, right ventricle enlargement, function and presence of arrhythmias. The options include surgical replacement or percutaneous pulmonary valve implantation (PPVI).

PPVI is a minimally invasive procedure to correct pulmonary valve stenosis or regurgitation. Only selected patients may be suitable for PPVI if they have a previous pulmonary valve replacement or conduit (tube replacement). It is performed in the cardiac catheterisation laboratory and the patient will be given general anaesthesia. The patient will lie on an X-ray table and an X-ray camera will move over the patient's chest during the procedure. This allows the cardiologist to insert a thin tube (catheter) into a vein, typically in the leg and guide it to the heart. A deflated balloon is placed through this catheter and into the opening of the narrowed valve or conduit. The balloon is then inflated, which pushes the valve or conduit open so the blood will flow better.

Subsequently, an artificial heart valve attached to a wire, mesh-like tube (stent) is placed on the catheter and guided to the pulmonary valve. Once in place, the balloon is inflated to open up the valve into position. The catheter is removed from the body and the artificial heart valve becomes the new pulmonary valve.



In PPVI, the deflated balloon is inflated to open up the artificial valve into position in the diseased valve.

The long term 10 year results³ of PPVI have been excellent and comparable to open-heart surgery, with 79% of patients not requiring reoperation. This is consistent with our experience at National Heart Centre Singapore, where the initial patients with TOF who had undergone PPVI have presented favourable five year results so far. The major advantage of this method over open-heart surgery is the shorter hospital stay and faster recovery time. Major guidelines⁴ have recommended PPVI over surgery for eligible patients.

¹ Life expectancy without surgery in tetralogy of Fallot. E G Bertranou, E H Blackstone, J B Hazelrig, M E Turner, J W Kirklin. American Journal of Cardiology 1978;42:458-66

² Late complications Following Tetralogy of Fallot Repair: The Need for Long-term Follow-Up. Ho KW, Tan RS, Wong KY, Tan TH, Shankar S, Tan JL. Annals of the Academy of Medicine, Singapore, 01 Nov 2007, 36(11):947-953

³ Jones TK, McElhinney DB, Vincent JA, Hellenbrand WE, Cheatham JP, Berman DP, Zahn EM, Khan DM, Rhodes JF Jr, Weng S, Bergersen LJ. Long-Term Outcomes After Melody Transcatheter Pulmonary Valve Replacement in the US Investigational Device Exemption Trial. Circ Cardiovasc Interv. 2022 Jan;15(1):e010852

⁴ 2020 ESC Guidelines for the management of Adult Congenital Heart Disease

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ADULT CONGENITAL HEART DISEASE (ACHD) PROGRAMME

NHCS ACHD programme aims to improve the quality of life of the adult congenital patients with the provision of comprehensive care ranging from regular surveillance of their underlying congenital heart defects to providing appropriate surgical and minimally invasive treatments, as well as psychological and educational support through the patient support group comprising fellow patients and healthcare professionals.

SERVICES

- Adult Congenital Heart Disease Clinic
- Cardiac Pregnancy Clinic (joint clinic with obstetricians from Singapore General Hospital)
- Congenital Echocardiography
- Congenital Heart Catheterisation
- Congenital Heart Intervention (e.g. Atrial Septal Defect Device Closure, Patent Foramen Ovale Device Closure, Patent Ductus Arteriosus Device Closure, Percutaneous Pulmonary Valve Implant, Pulmonary Valvuloplasty, etc.)
- Pulmonary Hypertension
- Right/Left Heart Catheterisation and Pulmonary Vasoreactivity Studies
- Screening for Marfan Syndrome

OUR SPECIALISTS

Assoc Prof Tan Ju Le	Director, Adult Congenital Heart Disease and Senior Consultant
Asst Prof Foo Jie Sheng	Consultant
Asst Prof Lee Phong Teck	Consultant
Dr Yan Limin	Consultant

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



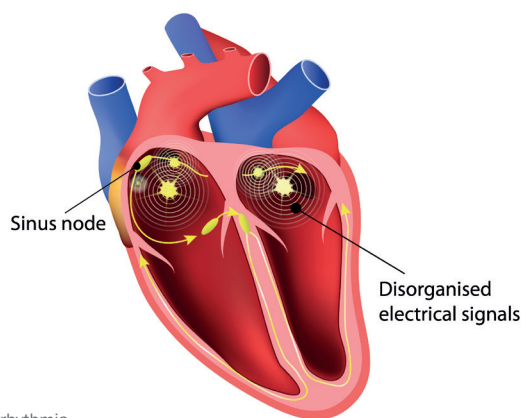
ARRHYTHMIA

DOC, I CAN FEEL MY HEART POUNDING, IS THIS NORMAL?

By Dr Julian Tay Cheong Kiat, Associate Consultant, Department of Cardiology

An arrhythmia refers to irregular or abnormal heart rhythm – either the heart rate is beating too fast or slow, or the heart rhythm is erratic with too early or premature heart beats. This happens when the electrical signals coordinating the heart beats do not work properly.

Arrhythmias can be broadly classified into four main types: tachycardia, bradycardia, premature (extra) beats, and atrial fibrillation/ flutter.



Cardiac arrhythmia - disorganised electrical signals that happen in the chamber of the heart.

Tachycardia

Tachycardia is a heart rhythm disorder where the heart beats at very high rate of 100 times a minute. It can either begin in the top chamber of the heart (atria) – known as supraventricular tachycardia (SVT) or from the bottom chamber of the heart (ventricles) – ventricular tachycardia (VT).

In SVT, the heart may suddenly beat faster and then slow down abruptly due to “short-circuits” within the heart. This type of arrhythmia is usually not life-threatening and occurs in both the young and old but causes bothersome symptoms at times.

On the other hand, VT can be life-threatening as it can degenerate into more dangerous arrhythmia such as ventricular fibrillation (VF) and generally requires immediate medical attention. This type of arrhythmia usually occurs in patients with pre-existing heart condition or cardiac history such as heart attack (myocardial infarction), heart muscle inflammation (myocarditis) and weakness (cardiomyopathy).

Bradycardia

This condition refers to heart rate that is slower than normal, at fewer than 60 beats a minute. It can be due to a problem with the sinus node – our own natural “pacemaker” or the conduction system – the electrical wiring system that conducts electrical signals within the heart to facilitate normal heartbeat. Generally, these signals can sometimes be blocked or slow down due to aging but in other situations, the disrupted signals can occur due to diseased processes or medications. Any slowing or block in the sinus node or conduction system can lead to heart failure or fainting with bodily injuries in some cases.

Extra beats

These are extra heartbeats, also known as ectopic beats, which can originate from one of the bottom of two heart chambers - atria or ventricles. Ectopic beats are also known as premature atrial contraction (PAC) or premature ventricular contraction (PVC). They are common, mostly harmless and may not cause any symptoms. Although typically not life-threatening, they would disrupt the regular heart rhythm. In majority of the cases, they may not require any treatment unless necessary, as advised by doctor based on the frequency of occurrence.

Atrial fibrillation (AF)/ flutter

This refer to an disorganised, rapid and irregular rhythm that originates from the atria. While it is not life-threatening, it is considered serious because it could create blood clots in the heart. Blood may pool in the left atrium and form clots which can block

GLOBAL PREVALENCE OF AF

(globally, 43.6 million individuals had prevalent AF/AFL in 2016)

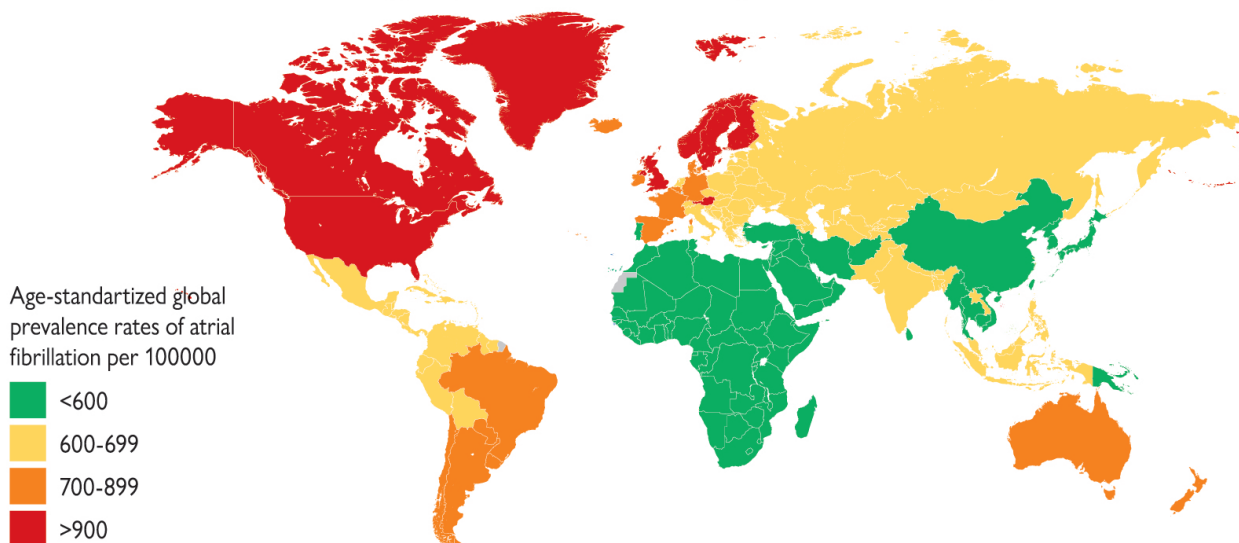


Figure 1: Global prevalence of AF (Source: 2020 ESC Guidelines for the diagnosis and management of atrial fibrillation)

blood flow to the brain or other parts of the body. Patients with AF are at risk of stroke as well as heart failure.

Are arrhythmias common?

There have been numerous studies conducted globally to investigate the incidence and prevalence of arrhythmias. In a large-scale study comprising half a million community dwelling adults in the United Kingdom in 2018, the overall incidence of all these arrhythmias were 4.72 per 1,000 person years – which meant that for every 1,000 people followed up for one year, approximately five people would be newly diagnosed with any one of these arrhythmias¹. As the current world population stands at 8 billion people, this translates to roughly 40 million new patients with newly diagnosed arrhythmias per year which is indeed a staggering number. Out of the many arrhythmias, the highest incidence was AF with an incidence of 3.11 per 1,000 person years in the same study.

AF is now the most common sustained arrhythmia with an estimated global prevalence of 46.3 million². This is expected to increase with an aging population worldwide and better detection. In Asia, AF prevalence varies from 0.49 – 5.4% with a higher prevalence (4.6 – 8.2%) amongst those above 70 years of age³. Specific to Singapore, the AF prevalence was 1.5% in 2008⁴ but this number has significantly increased since then. AF tends to affect more affluent and Western countries with Singapore having an intermediate prevalence rate (Figure 1)⁵.

Symptoms of arrhythmias

Patients with arrhythmias can either be asymptomatic (free of symptoms) or present with a myriad of symptoms.

Patients with tachycardia commonly experience palpitations or rapid heart rate but sometimes may occasionally experience breathlessness, chest tightness or infrequently fainting if episodes are prolonged. On the other hand, patients with bradycardia tend to feel breathlessness, exercise intolerance, light-headedness/giddiness or have fainting spells.

Patients with premature or ectopic beats are mostly asymptomatic although some may experience the sensation of skipped beats from time to time.

On the other hand, patients with AF can have a broad range of symptoms encompassing all the above.

However, in some cases, these symptoms may not be due to underlying heart disorders but instead may be either due to underlying pulmonary, neurological or psychogenic conditions. Thus, accurate history taking, examination and appropriate testing is crucial in diagnosing arrhythmias.

How do we diagnose/ detect arrhythmias?

Arrhythmia can generally be diagnosed with the use of heart rhythm tracings such as electrocardiogram (ECG) and Holter monitor. However, detection of arrhythmia remains a challenge as often times, an arrhythmia can occur suddenly and unpredictably, and resolve spontaneously within seconds to minutes. This poses challenges for physicians to be able to reliably capture and diagnose arrhythmia on monitoring devices. For instance, a patient who experienced symptoms suggestive of an arrhythmia and rushed to general practitioner (GP) or the emergency department (ED) to seek medical attention, but was told that the ECG was normal with no abnormality found.

Fortunately, with the advancement in technology, there have been an influx of newer digital heart rhythm or mobile health (mHealth) devices which are able to facilitate better detection of arrhythmias (Figure 2). The selection of devices for arrhythmia detection would depend on nature and frequency of symptoms as well as patients' comfort and preference. It is also subject to the individual's savviness in using such a device and navigating the functions. The use of mHealth devices have shown to be useful in some cases, especially in those with short bursts of arrhythmias that would have been missed otherwise using traditional detection method.

Treatment

Depending on the type of arrhythmia detected, your physician may recommend the following treatment options:

(i) Vagal manoeuvres in SVT

A set of specific movement/ exercises that a person can carry out at home which can stop some type of arrhythmias.

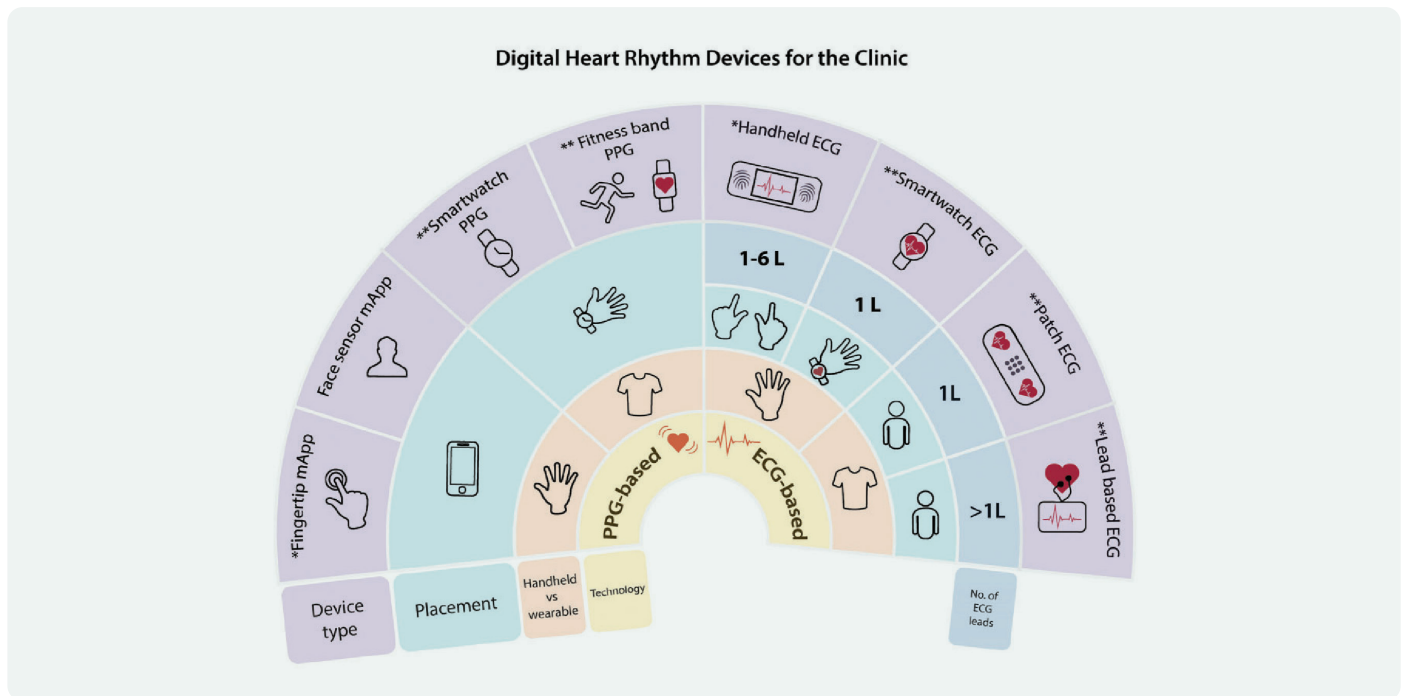


Figure 2: Array of digital heart rhythm devices for detection of arrhythmias
(Source: How to use digital devices to detect and manage arrhythmias: an EHRA practical guide)

(ii) Medications

While medications generally do not cure the arrhythmia, they can be useful in controlling number of episodes and improving symptoms.

In patients with AF, additional medications in the form of blood thinners (anticoagulants) may be required to prevent stroke.

(iii) Cardioversion

This uses electrical energy synchronised to one's rhythm to urgently stop dangerous heart rhythms such as VT or in patients who are unstable/ ill.

(iv) Ablation therapy

The electrophysiologist inserts catheters inside the heart to confirm the nature of the arrhythmia following which energy (either heat/ cold source) will be applied to destroy the diseased segments of the heart to correct to arrhythmia.

(v) Device therapies

Pacemakers – a small device that is usually implanted under the skin over the chest areas for those with irreversible bradycardias with abnormal rhythm.

Implantable cardio defibrillators – a slightly larger device than a pacemaker that is usually inserted in the same manner for those with known dangerous arrhythmias such as VT/VF or those with persistent heart muscle weakness (cardiomyopathies) despite treatment with medications.

If palpitations are accompanied by either severe chest pain, breathlessness, unusual profuse sweating or loss of consciousness, one should seek medical condition immediately.

Prevention

Prevention is better than cure. Most disease prevention strategies can be divided into three main prongs – trigger avoidance, healthy lifestyle, and cardiovascular risk factor control. Arrhythmias are known to be associated with some triggers such as alcohol, physical or emotional stress as well as certain medications such as appetite suppressants. Complete abstinence may be impossible to some habitual alcohol drinkers, but one can continue to drink

alcohol so long as it is in moderation. The Health Promotion Board (HPB) recommends no more than one drink a day for women and two drinks in a day for men – as heavy consumption or binge drinking has been shown to trigger arrhythmias. On the other hand, caffeinated beverages such as coffee and tea which used to be thought of as a trigger for arrhythmias, has since been debunked in numerous large studies and in fact been shown to be associated with lower incidence of arrhythmias^{6,7}.

In terms of healthy lifestyle, having a balanced diet as per HPB recommendations, regular exercises and smoking avoidance can help to minimise cardiac diseases such as arrhythmias. It is recommended that individuals have at least 150 minutes of moderate intensity aerobic exercises in a week to maintain general cardiorespiratory fitness. For those who are more sedentary or busy with work, they may find it challenging to achieve the 150 minutes of exercises, hence making some modifications to daily routines such as taking the stairs instead of the lift or trying to clock 10,000 steps can also be a form of exercise.

For those with known underlying cardiovascular risk factors such as diabetes, hypertension and hypercholesterolemia, good control of these conditions can reduce onset of arrhythmias as well.

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² Benjamin EJ, Muntner P, Alonso A, et al. Heart Disease and Stroke Statistics-2019 Update: A Report From the American Heart Association. *Circulation*. Published online 2019. doi:10.1161/CIR.0000000000000659

³ Chan NY, Orchard J, Agbayani MJ, et al. 2021 Asia Pacific Heart Rhythm Society (APHRS) practice guidance on atrial fibrillation screening. *J Arrhythmia*. Published online 2022. doi:10.1002/joa3.12669

⁴ Yap KB, Ng TP, Ong HY. Low prevalence of atrial fibrillation in community-dwelling Chinese aged 55 years or older in Singapore: a population-based study. *J Electrocardiol*. Published online 2008. doi:10.1016/j.jelectrocard.2007.03.012

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⁷ Kim E, Hoffmann TJ, Nah G, Vittinghoff E, Delling F, Marcus GM. Coffee Consumption and Incident Tachyarrhythmias. *JAMA Intern Med*. Published online 2021. doi:10.1001/jamainternmed.2021.3616

APPOINTMENTS & PROMOTIONS



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