

The Harley Street Heart & Vascular Centre (HSHV) has 3 clinics at Mount Elizabeth Orchard, Gleneagles Hospital and Mount Elizabeth Novena Specialist Centre. At each of our clinic location, we offer direct access cardiac tests for our GP and specialist partners. The tests can be ordered for your patients, to be done at the location of your choice. Our experienced cardiac physiologists will perform the required assessment and our Cardiologists will provide a report that will be sent to your clinic.

In this short booklet we detail the tests that can be performed along with common indications, how to prepare the patient and what to expect in the report.

**To request a test:**

- Call any HSHV Clinic branch to check availability and book test
- Fill up HSHV referral form and pass the form to patient. Remember to indicate bill patient or bill clinic.
- You can download a copy of the form via our website <https://www.harleystreet.sg/referral-forms/> or email us at [appointment@harleystreet.sg](mailto:appointment@harleystreet.sg) to request a copy of the form

**Reporting:**

- Reporting time varies with tests so please allow some lead-time. Our staff will advise when report can be ready when you make the appointment. If report is urgent, please inform our staff and we will try our best to accommodate.
- A hard copy of the report will be sent via mail to you. Alternatively, you can request a soft copy of the report to be emailed to you.

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**Electrocardiogram (ECG)**

The 12 lead ECG is a standard test to look at a patient's cardiac electrical signals. The patient lies on the bed and stickers are placed on the chest and limbs. These are attached to a monitor to create the tracing. It takes 10 minutes to perform.

**Common indications** - Chest pain, breathlessness, high blood pressure, palpitations, syncope, pre-op.

**How to prepare your patient** - No preparation required. Sometimes shaving small areas of the chest hair will be required.

**In your report** - A detailed description of any abnormalities found on the ECG.



## **2D Echocardiogram (Transthoracic Echocardiogram)**

A 2D echo is a non-invasive ultrasound examination of the heart. It is focused at the heart structure and function. The patient lies on a couch and the operator puts ultrasound gel on their chest, then uses the ultrasound probe to examine the heart in detail.

**Common indications** - Heart murmurs, shortness of breath, ankle swelling, high blood pressure, abnormal ECG, arrhythmia

**How to prepare patient** - Come in clothing with separate top and bottom to facilitate the test. Patient can take their usual daily medication and eat and drink normally before the test.

**In your report** - There will be detailed comments on the size, structure and function of the heart. The most important information will probably be the left ventricular ejection fraction, and the function of the heart valves.



## **Exercise Treadmill Test (ETT) ECG**

The exercise treadmill ECG is the standard cardiac stress test. It is the most commonly used test to assess a patient's exercise capacity and their ECG response to exercise. It takes around 30-45 minutes to perform. Electrode stickers are placed on a patient's chest and they are attached with wires to the ECG monitor. A blood pressure cuff is fitted to the patient's arm. A standard exercise protocol is used with increase in gradient and/or treadmill speed every 3 minutes. Most patients end up brisk walking rather than running. The test is stopped when a target heart rate level is reached, the patient is unable to continue or there are significant BP/ECG changes.

**Common indications** - Chest pain, breathlessness, palpitations, known CAD, pre-exercise screening, syncope

### **How to prepare patient -**

Wear loose-fitting, comfortable attire and shoes appropriate for walking/running

- Stop any beta-blocker for 3 days prior to test (Beta-blocker medications may slow down the heart rate and prevent reaching target heart rate during the test).
- Continue to take usual medications before the test, unless otherwise stated by your Doctor
- Avoid taking a heavy meal if possible for at least 2 hours before the test
- For safety, please inform the doctor beforehand if you have any conditions that may affect your ability to move or balance on the treadmill.
- An exercise test should not be performed if you have a fever, viral infection, or any acute illness

**In your report** - The report will include details of the exercise capacity, ECG changes, blood pressure response, symptoms and whether positive or negative for ischemia. Sometimes tests have borderline results, and these patients will often need further assessment by a cardiologist or a different test used.



## **Carotid Intima-Media Thickness Test (CIMT)**

This is an ultrasound of the neck arteries. It looks at thickness of the artery walls and for evidence of any plaque disease.

**Common indications** - Enhanced risk stratification for people at low to moderate CV risk based on standard risk scores.

**How to prepare patient** – No preparation required

**In your report** – Thickness of the carotid wall, with a description of any plaque present. We will give a risk assessment based on [age and gender](#).



### **Exercise Stress Echocardiogram**

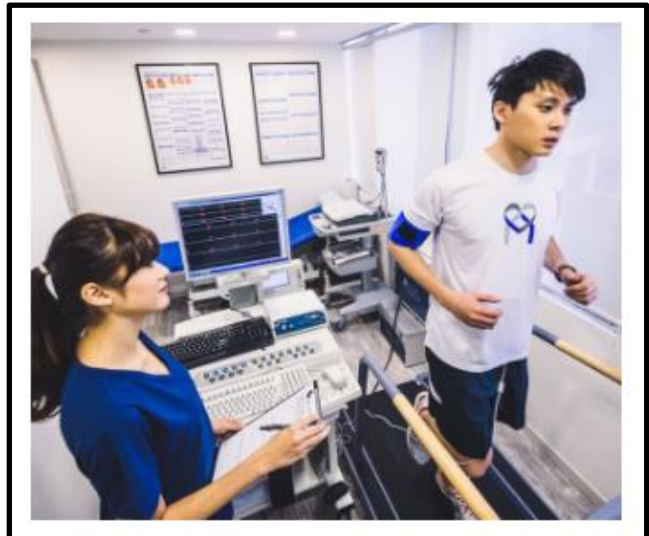
The stress echo tends to be more accurate than a treadmill ECG and has a lower false positive and negative rate, it is also useful in people that have an abnormal baseline ECG. This is performed in the same way as an exercise ECG with 2 major differences. At the beginning of the test the patient gets a basic echocardiogram to record the heart motion in set views. This same scan is then repeated straight after exercise so the images are captured at peak stress. The doctor looks at the way the heart walls moves at peak exercise to determine if there is a blockage in the artery that supplies that region.

*(Note – this is not a full echo examination, just a limited study to look at the wall motion.)*

**Common indications** - Chest pain, abnormal treadmill ECG stress test, dyspnea, assessment of known coronary disease, stress testing patients with abnormal ECG.

**How to prepare patient** – Same as for treadmill ECG

**In your report** – Baseline LVEF and any resting wall motion abnormalities, baseline and Stress ECG results, exercise capacity, Stress echo result – positive or negative for ischemia.



## **Dobutamine Stress Echocardiogram**

This is a stress test for people that are unable to exercise on a treadmill. It uses dobutamine and atropine to stress the heart and is considered very safe. The patient lies on a couch and a basic echocardiogram is done to look at the heart motion. An IV cannula is inserted in the patients arm. To stress the heart, the patient is infused with dobutamine. This causes the heart rate to increase. The dose is increased at 2-3 minute intervals. Sometimes the patient also requires some atropine to help increase the heart rate. The patient will have repeat ultrasound performed during the stress portion and at peak stress. The doctor looks at the way the heart walls moves at peak exercise to determine if there is a blockage in the artery that supplies that region.

**Common indications** - Same as stress echo, but patient cannot exercise.

### **How to prepare patient –**

- Avoid food and drink for at least 2 hours before the test.
- Patients can take medicines as usual and on schedule
  - Hold off Beta Blockers 3 days before test (bring dose to take after the test)
- Patients advise to bring a list of all the medications they are currently taking
- Patients who have prostate problems or glaucoma (a condition causing eye pain due to excessively high pressure in the eyeball) should not receive atropine. Please inform the technologist or doctor supervising the test if you have these conditions.

**In your report** – Baseline LVEF and any resting wall motion abnormalities, Baseline and Stress ECG results, positive or negative for ischemia.



## **24 Hr Ambulatory Blood Pressure Monitor (24 Hr ABP)**

The 24 hour monitor measures the BP at repeated 15-30 minute intervals during the day, whilst the patient goes about their usual day to day activities. The 24 hour ABPM mean BP has been shown to be more closely related to morbid or fatal events than office BP. A BP cuff is fitted to the patients arm and a small BP device is attached that the patient carries with them. It is relatively unobtrusive.

**Common indications** - The diagnosis of hypertension. Assessment of BP control. Particularly useful if you suspect an element of white coat hypertension.

### **How to prepare patient –**

- Loose and comfortable clothes are recommended to be worn on the day of test.
- Do not wear tight fitting or sleeveless clothes as it will show under the clothes and may interfere with the BP measurement.

- Please check with the clinic staff on the attire if you have any enquiry.
- Patient is encouraged to have a shower prior to the appointment, if possible, as device is not water proof.

**In your report** – A summary is provided with mean day, night and 24 hour BP. Our cardiologist will also report the grade and pattern of hypertension if it is present.



### **Non-invasive ambulatory ECG monitoring**

In order to record a patient's ECG while they are going about their normal day to day business we have 3 different types of devices

- 1) 24 hour Holter
- 2) Patch Holter
- 3) Renew Patch Holter

**Common indications** - Palpitations, giddiness, syncope, suspected rhythm problems

#### **How to prepare patient –**

- Loose and comfortable clothes are recommended to be worn on the day of test.
- Wear loose cloths (ladies are advised to come in a two-piece blouse and skirt outfit).
- Please check with the clinic staff on the attire if you have any enquiry.
- Patient is encouraged to have a shower prior appointment, if possible, as device is not water proof (for 24 Hr non-water proof Holter).

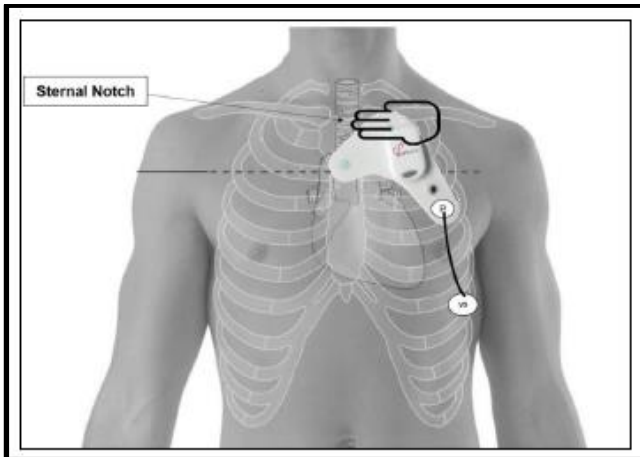
**In your report** – Presence of and type of arrhythmia, including quantification of ectopic beats.

#### **i) 24 Hour Holter Monitor**



Electrode stickers are fixed to a patient's chest. Wires are attached and the patient carries a recorder box with them. Patient cannot shower when this is fitted.

**ii) 1 Day, 2 Days & 3 Days Patch Holter**



Another form of ambulatory ECG monitoring in sticker format. No leads or wires so more convenient for patient. The report is available 24 hours after the device has been removed. Light showering is permitted.

**iii) Renew Patch Holter (1,2,3 Day Monitoring)**



Similar to the patch holter. This device can be placed for 1-3 days and is disposable. Light showering is permitted.

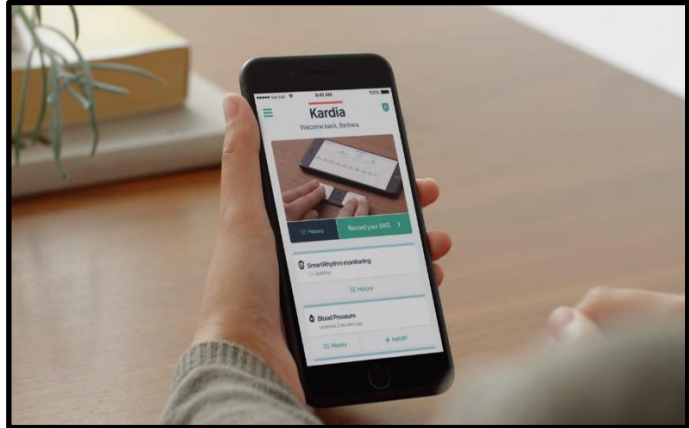
## Cardiac Event Recorders

We have 3 different event monitors that patients can take home for prolonged periods to help capture infrequent arrhythmias.

**Common indications** – infrequent palpitations

**In your report** – a description of any arrhythmia, if it has been captured.

### **i) Kardia Device (Available in 3 Clinics)**



### **ii) Omron Patient Event Monitor (Only Novena and Gleneagles clinics have this device)**



### **iii) InstantCheck ECG Recorder (Available in 3 Clinics)**





## **Cardiopulmonary Exercise Test (CPET)**

A non-invasive assessment of the exercise response of the cardiovascular, pulmonary and skeletal muscle systems.

**How it is done** – Similar to the treadmill exercise test, but the patient wears a mask during the test that assesses  $O_2/CO_2$

**Common indications** - Heart failure evaluation, diagnosing cardiac or pulmonary cause of dyspnea, assessing response to therapies, exercise prescription

**How to prepare patient** – Same as for the treadmill ECG, but in addition - Do not smoke 24 hours, eat heavily or drink coffee, tea or caffeinated drinks 24 hours prior the test. These may affect the accuracy of the test.

**In your report** – A detailed description of the patient's performance on exercise with a description of the potential cause of the patient's limitations.



## **Tilt Table Test**

This is most commonly used to assess patients that are suffering from giddiness or syncope. It can be used to confirm the diagnosis in patients with suspected vasovagal syncope (common faint) and is the test of choice to diagnose patients with postural orthostatic tachycardia syndrome (POTS).

**How it is done** – The patient is secured to a table and connected to ECG, oxygen saturations and BP monitoring, and an IV plug is inserted. The table is then tilted head up 60-80 degrees.

**How to prepare patient** – Ask them to fast for 2-4 hours prior to test and explain that during the test they can expect to possibly have a syncopal event. We will also give them a spray of a medicine under the tongue to try to trigger an event.

**In your report** – Details of BP and ECG response and what the likely diagnosis is.

