

Arrhythmic indications for ambulatory ECG monitoring

What is a cardiac arrhythmia?

A cardiac arrhythmia is a rhythm disturbance of the heart which may require investigation using ambulatory electrocardiographic (ECG) monitoring.

This may be a 24 hour or greater (Holter) or medium term (events and telemetry) recording which can be up to 30 days. Longer term recording is available as an implantable loop recorder which may last for up to two years.

Cardiac palpitations

Due to the infrequent nature of cardiac palpitations, sometimes medium-term monitoring is indicated. Although one can envisage the need for an implantable device for the diagnosis of palpitations, this has yet to be established.

This is by far the most common indication for ambulatory ECG monitoring. Generally a Holter monitor is performed. A negative test in the presence of symptoms can be diagnostic and often therapeutic.

Unexplained syncope or dizziness

This is a very important group. If symptoms are frequent such as daily dizziness, Holter monitoring is very useful. Overall, however, the success of Holter monitoring is low unless of course symptoms occur during the study. Despite this, Holter monitoring is generally the initial investigation in patients even with relatively infrequent episodes. Medium-term automatic (nonpatient activated) and more recently long-term implantable loop recorders are very important investigative tools for patients with syncope.

Suspected slow heart rhythms

A Holter monitor is preferable to all other monitoring as it provides a 24-hour window of the heart rate changes and can be partnered to symptoms. The study occasionally needs to be done at infrequent intervals such as six-monthly depending on the symptoms. Holter monitoring remains the most important investigation in the evaluation of symptomatic patients who are being assessed for pacemaker implantation. It is also a critical investigation in the evaluation of patients requiring implantable cardioverter defibrillators.

Hereditary "electrical" abnormalities

This diverse group involves a number of hereditary abnormalities associated with cardiac arrhythmias. The most common is the Wolff-Parkinson White syndrome manifested by an accessory pathway, ventricular pre-excitation and atrioventricular re-entrant tachycardia. There is an incidence of sudden death probably from conduction of atrial fibrillation through the accessory pathway resulting in a very rapid ventricular response culminating in ventricular fibrillation. Ambulatory ECG monitoring may be undertaken to document the re-entry tachycardia or even atrial fibrillation, but recording these arrhythmias is very unlikely, unless the patient has frequent symptoms.

Evaluate the abnormal ECG; ectopy and heart block

This is a very specialised and important group. Frequent ventricular ectopy may require electrophysiologic ablative therapy. Such patients generally require repeated Holter monitoring to record changes in the frequency of ectopic activity either with pharmacological intervention or ablation. Frequent supraventricular ectopy may be evaluated for paroxysmal atrial fibrillation requiring oral anticoagulation to prevent embolic stroke. Symptomatic patients with bundle branch block, bifascicular block or atrioventricular block may be investigated with Holter monitoring to determine if higher degrees of block are present. There is little or no role for medium- or long-term monitoring, unless the patient presents with syncope.

Cryptogenic Stroke Evaluation "Neuro-cardiology"

This is a relatively new indication for ambulatory ECG monitoring. In patients and in particular the elderly, who present with a cerebrovascular accident of no known cause, the most likely diagnosis is occult asymptomatic atrial fibrillation or flutter. Although there is low return with short-term monitoring, nevertheless, Holter monitoring is generally the first line of investigation after an unhelpful ECG. Because the patient is asymptomatic, patient activated event monitoring has no role. What is clear and not surprising, the longer the period of monitoring, the more likely atrial fibrillation will be diagnosed.

Evaluation of success of either antiarrhythmic or ablative therapy

Ambulatory ECG monitoring remains the gold standard for assessment of patients with both supraventricular and ventricular arrhythmias who have undergone either drug or electrophysiologic ablative therapy. Most patients following successful ablation of supraventricular tachycardia do not require ambulatory ECG monitoring as they are clinically aware of a recurrence of the tachycardia. With ventricular ectopic activity and ventricular arrhythmias, ambulatory ECG monitoring may be desirable to provide both quantitative assessment and correlation of symptoms with ECG findings.

Another suggested indication is the documentation of pro-arrhythmic responses following initiation of antiarrhythmic agents in high-risk patients. Following successful pulmonary vein ablative therapy for atrial fibrillation, patients frequently request cessation of oral anticoagulation. The initial studies are frequently short-term Holter monitoring, but there are emerging indications to perform both midterm and long-term studies with specific atrial fibrillation recognition algorithms.

Evaluation of ventricular tachycardia

Ambulatory ECG monitoring is a valuable tool to document ventricular the arrhythmias, and in particular the success or otherwise of therapeutic or ablative intervention. Although Holter monitoring is mainly used, there is a small but expanding role for medium and long-term monitoring depending on physician preference. There are a number of unusual or rare situations where ambulatory ECG monitoring is necessary to exclude intermittent ventricular tachycardia such as myocardial contusion or foreign body irritation such as the presence of prosthetic heart valves and functioning or redundant implanted pacemaker and cardioverter defibrillator leads.

Following acute myocardial infarction

Although not necessarily routine, it is not uncommon to perform ambulatory ECG monitoring to detect cardiac arrhythmias in the recovery phase following an acute myocardial infarction. In such cases, arrhythmias are usually documented during the early phase and monitoring review is necessary to guide therapeutic intervention and risk stratification. Arrhythmias include atrial fibrillation, ventricular ectopy and tachyarrhythmias as well as combinations of atrio-ventricular block and bradycardias. Generally, Holter monitoring is the first-line investigation and depending on the results and symptoms, event monitoring may be indicated.

Congestive and hypertrophic cardiomyopathy

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Monitor cardiac implantable electronic device therapy

Cardiac implanted electronic devices (CIEDs) include pacemakers and implantable cardioverter defibrillators. These highly sophisticated devices deliver electrical therapy to the heart, whether it be low voltage for slow heart rhythms and biventricular pacing for cardiac resynchronisation therapy, or high voltage for defibrillation. Holter monitoring is also valuable in the evaluation of cardiac resynchronisation therapy. For effective therapy, these patients need to be paced in both ventricles at least 90% of the time. Although the implanted device counts the number of sensed beats, nevertheless, the requesting physician may be concerned that the paced beats are ineffective for ventricular resynchronisation because of intermittent ventricular fusion, which should be recognised in the Holter monitor tracings.

For more information on diagnosis, common heart conditions, symptoms and treatment, visit www.cardiacmonitoringservice.com/resources/patient-fact-sheets



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