BCGuidelines.ca

Ambulatory ECG Monitoring
(Holter Monitor and Other Devices)

Effective Date: April 15, 2013

Scope

This guideline applies to the use of ambulatory electrocardiography (ECG) monitors to detect arrhythmias for adults aged ≥19 years. This is not intended to be a guideline on the diagnosis and management of arrhythmias.

Key Recommendations

- Ambulatory ECG monitoring should only be ordered after a thorough clinical evaluation, risk assessment, and baseline ECG have been completed.
- Use of Holter monitoring should be limited to: investigating a patient with frequent symptoms, assessing the risk of a patient in a special population (see below), or monitoring a patient's response to therapy.
- If the initial Holter monitoring is inconclusive due to low frequency of symptoms, a repeated Holter monitoring may not be appropriate and second line investigations should be considered.

Testing

Ambulatory ECG monitoring uses electrocardiographic recorders (Holter monitors and other devices) to document the cardiac rhythm of a patient during their daily activities over an extended period of time. They are used to detect, document and characterize patients' cardiac rhythm abnormalities.

The main indications for ambulatory ECG monitoring include detection and characterization of arrhythmias to: [1, 2]

- attempt to correlate a possible arrhythmia with patient symptoms: palpitations; syncope, near syncope or episodic dizziness; and/or other cardiac symptoms (e.g., shortness of breath, chest pain, episodic fatigue, or diaphoresis)
- determine the risk of the arrhythmia in the individual clinical setting
- detect, assess and manage atrial fibrillation
- monitor the efficacy of pharmaceutical therapy (e.g., antiarrhythmic therapy)

▸ Special Populations

Patients with conditions that may require documentation of an arrhythmia can include:

1) Structural heart disease (e.g., post myocardial infarction (MI), cardiomyopathy, valvular disease)
2) Primary electrical heart disease (e.g., sick sinus syndrome, cardiac conduction disease, Wolff-Parkinson-White syndrome (WPW))
3) Family history of sudden death or arrhythmia
4) Subjective complaints of symptoms

When is Ambulatory ECG Monitoring Innappropriate?

- Patients requiring an emergency assessment without delay. These include patients who are at immediate risk of life threatening arrhythmia, injury or sudden death, or arrhythmia causing ischemic chest pain, and pulmonary edema.
- Patients with symptoms such as chest pain which may be due solely to coronary artery disease. Other investigations such as stress testing are more reliable for diagnosing coronary artery disease.

Which Ambulatory ECG Monitoring Test Should Be Ordered?

- Choice of device depends on:
  - the type and frequency of patient's symptom(s);
  - the ability of the patient (e.g., to activate a device while having symptoms, to fill out a diary); and
  - the accessibility of the device.
- Holter monitoring should only be used as a first line investigation: in a patient with frequent symptoms, for assessing the risk of a patient in a special population (see above), or for monitoring a patient's response to therapy.
- Based on frequency of symptoms, repeated Holter monitoring may not be appropriate and second line investigations should be considered (see table below).
- Consultation with an internist/cardiologist can help determine which device is best suited to the clinical scenario. The consultant may help arrange the test.

Device	Frequency of Symptoms[3,4]	Device Characteristics[1,3,4,7]	Duration of Test[3]	Yield[a]
Holter monitoring	Daily (mainly palpitations)	External device worn constantly, with continuous tape recording which is retrieved and interpreted once the device is returned. Only suitable for patients with symptoms occurring within the monitoring period, or when establishing risk/response to therapy.	24 hours[b]	Syncope <20%[5] Arrhythmia ~35%[3]
Event recorders[c]	Weekly to monthly	External device worn intermittently, stores data when **activated by patient** during an event. Not suitable when investigating syncope since a patient cannot activate it if suddenly unconscious.	Up to a month	Arrhythmia ~60%[4]
External loop recorders[c]	Weekly to monthly	External device worn constantly, with memory loop recording capability. The data is stored before and after the patient activates the device. There is also a built-in automatic trigger algorithm that allows the device to store data for asymptomatic arrhythmias. Suitable as a first line investigation for patients suspected with an arrhythmic cause for syncope.	Up to a month	Syncope[5] ~25-40%
Implantable loop recorders[c]	Less than monthly	Device is subcutaneously implanted, with a loop memory recording that stores data once it is manually activated by the patient or activated automatically. Suitable for patients with spontaneous symptoms with recurrent unexplained syncope.	Up to 3 years	Syncope[6] ~70% Arrhythmia[3] ~70%

Notes: [a] Diagnostic yields are only approximate since they are depended on many variables.
[b] In some circumstances, the duration of a Holter monitoring can be extended. However, the diagnostic yield of an extended time or repeat test is low.
[c] These tests are usually arranged in consultation with a specialist.

What is the Accessibility of These Devices?

- Holter monitoring is usually arranged by the primary care provider, whereas the other types of tests are usually arranged in consultation with a specialist.
- Accessibility of these devices may vary depending on community and hospital.
- Locations of ambulatory ECG can be accessed through Healthlink or contacting your local lab, private clinics and hospital.
- Locations may provide patient guides on their websites.

What is the Diagnostic Value of Ambulatory ECG Monitoring? [4,7]

- The key to the diagnostic value of ambulatory ECG monitoring is the correlation between symptoms and the timing of the arrhythmia.
- If no symptoms are present but an arrhythmia documented, there is likely an asymptomatic arrhythmia.
- If symptoms are present but no arrhythmia documented, an arrhythmia can likely be excluded as the mechanism.
- If no symptoms are present during the monitoring period and no arrhythmia documented, the test is considered non-diagnostic to the symptoms.

		Arrhythmia documented during monitoring	
		Yes	No
Symptoms present during monitoring	Yes	Symptoms attributable to arrhythmia	Arrhythmia as cause of symptoms likely excluded
	No	Asymptomatic arrhythmia	Test non-diagnostic

Can Ambulatory ECG Monitoring be Performed on Pediatric Patients?[2]

- Though outside of this guideline's scope, ambulatory ECG monitoring can be performed on patients under the age of 19.
- Indications for monitoring and selection of devices are similar to adults, but you may want to consult with a pediatrician/cardiologist.

Resources

References

1 Podrid PJ. Ambulatory monitoring in the assessment of cardiac arrhythmias. In: Zimetbaum PJ, Downey BC, editors. MA: UpToDate; 2012.
2 Crawford MH, Bernstein SJ, Deedwania PC, et al. ACC/AHA Guidelines for ambulatory electrocardiography: A report of the American College of Cardiology/American Heart Association Task Force of practice guidelines. J Am Col Cardiol. 1999;34:912-948.
3 Zimethbaum P, Goldman A. Ambulatory arrhythmia monitoring: Choosing the right device. Circulation. 2010;122:1629-1636.
4 Raviele A, Giadda F, Bergfeldt L, et al. Management of patients with palpitations: A position paper from the European Heart Rhythm Association. Europace. 2011;13:920-934.
5 Angaran P, Klein GJ, Yee R, et al. Syncope. Neurol Clin. 2011;29:903-925.
6 Edvardsson N, Frykman V, van Mechelen R, et al. Use of an implantable loop recorder to increase the diagnostic yield in unexplained syncope: Results from the PICTURE registry. Europace. 2011;13:262-269.
7 Moya A, Sutton R, Ammirati F, et al. Guidelines for the diagnosis and management of syncope of the European Society of Cardiology (ESC). Eur Heart J. 2009:30;2631-2671.

Resources

- Healthlink BC – Health information for patients, health services locator and other, www.healthlinkbc.ca or by telephone 811

This guideline is based on scientific evidence current as of the Effective Date.

This guideline was developed by the Guidelines and Protocols Advisory Committee, approved by the British Columbia Medical Association, and adopted by the Medical Services Commission.

THE GUIDELINES AND PROTOCOLS ADVISORY COMMITTEE

The principles of the Guidelines and Protocols Advisory Committee are to:

- encourage appropriate responses to common medical situations
- recommend actions that are sufficient and efficient, neither excessive nor deficient
- permit exceptions when justified by clinical circumstances

Contact Information:

Guidelines and Protocols Advisory Committee
PO Box 9642 STN PROV GOVT
Victoria BC V8W 9P1

Email:hlth.guidelines@gov.bc.ca
Website: www.BCGuidelines.ca

Disclaimer