



The Cardiac Society of Australia and New Zealand

Guidelines for Ambulatory Electrocardiographic Monitoring

These guidelines were originally developed by a Working Party comprising A/Prof David Richards, Dr Luke Galligan, A/Prof Harry Mond, Dr Charles Thorburn, Dr William Heddle and Ms Elizabeth Dewar. Review of these guidelines was co-ordinated by Dr Stuart Thomas, Chair, Electrophysiology and Pacing Council.

The guidelines were reviewed by the Continuing Education and Recertification Committee and ratified at the CSANZ Board meeting held on Friday, 11th May 2012.

Background

Ambulatory electrocardiographic monitoring has been employed to assist with correlation of symptoms and electrocardiographic features. Devices for such recordings have evolved over the years and now fall into several categories. Ambulatory electrocardiographic monitoring should complement clinical examination and should not be used as an alternative to careful history taking and clinical observation. Guidelines for ambulatory electrocardiographic monitoring (1,2) and for clinical competence in ambulatory electrocardiography (3) have been published by The American Heart Association, The American College of Physicians and The American College of Cardiology. These American guidelines provide a basis for Australian and New Zealand practice.

Clinical Evaluation

In patients with suspected arrhythmias, it is important to note the nature of onset and offset (abrupt or gradual) of symptoms, the perceived heart rate, the regularity of the pulse during palpitations and any associated features. In a patient with recurrent rapid regular palpitations with abrupt onset and abrupt offset a formal electrophysiological study to document the mechanism of arrhythmia should be considered as an early option, as the history suggests a significant re-entrant arrhythmia that is likely to be amenable to curative catheter ablation therapy. Prior documentation of the arrhythmia by ambulatory monitoring is desirable but not essential.

Patients who experience skipped beats and/or extra beats usually have atrial or ventricular ectopics, which of themselves are rarely of pathological significance. An appropriately detailed history may reveal an association between the occurrence of symptoms and the use of stimulants such as caffeine and sympathomimetic agents, menstrual activity and other circumstances. Failure to confirm the presence of ectopic beats on ambulatory monitoring, does not exclude their presence at other times and should rarely influence management.

Physician competence in ambulatory electrocardiographic monitoring

Supervised postgraduate training should include tuition in the interpretation of normal and abnormal body surface electrocardiogram morphology, of normal and abnormal native and paced rhythms, and of technical specifications and performance characteristics of ambulatory electrocardiographic monitoring systems. Supervised postgraduate training in ambulatory electrocardiographic monitoring should be undertaken in institutions with recognised excellence in this discipline. A minimum of 100 ambulatory electrocardiograms, representing as wide a range as possible of normal and abnormal rhythms should be reported under supervision by an expert physician electrocardiographer.

Hardware and software

A wide range of hardware and software is now available for ambulatory electrocardiographic monitoring.

Full disclosure Holter systems are capable of continuous recording of the electrocardiogram, usually on two or more channels, for 12 or more hours. The complete recording can be inspected and samples of the electrocardiogram can be printed from the recording to be correlated with symptoms when they occur. Continuous full disclosure systems are useful for patients with symptoms which occur every day and where there is a high probability of recording those symptoms during the period of ambulatory monitoring.

Event recorders (memory loop devices) are more appropriate than ambulatory monitoring in patients whose symptoms occur less frequently than daily. Such devices record the ECG continuously, but storage of a short rhythm strip is dependant on patient activation during symptoms. Usually two channels are available and a series of strips can be sequentially stored. These recordings may be transmitted transtelephonically to a central station for interpretation.

Implantable devices may be used to provide ambulatory monitoring in selected cases, such as in patients with infrequent, brief arrhythmias causing syncope (4). However, the appropriateness of other tests (e.g. tilt table, electrophysiologic studies) should be considered prior to implantation. Implantable ECG Loop Recorders are covered under the CSANZ Guidelines for Cardiac Implantable Electronic Devices (5).

Quality of recording

The quality of ambulatory recordings is critically dependent on the care with which the device is used. The skin must be carefully prepared, and the electrodes secured so that noise-free recordings may be made. The cables must be in good condition and all connections must be sound. Failure to ensure high quality recordings will inevitably lead to over-diagnosis or arrhythmias because of noise or failure to correctly interpret electrocardiographic features, the presence of which may be masked by noise. Skin preparation and electrode placement is particularly important with event recorders and it is essential that sufficient time is spent with patients prior to recordings, to educate them in the proper manner of electrode preparation, recording and telephone transmission.

Indications

The major indications for ambulatory electrocardiographic monitoring are in patients in whom the probable mechanism of palpitations is not clear from clinical history and in patients with syncope or presyncope in whom bradycardia or tachycardia is suspected. Ambulatory monitoring may also be indicated in patients with pacemakers, in whom pacemaker malfunction is suspected, for risk assessment post myocardial infarction, for follow up of drug therapy for arrhythmias.

Requests for ambulatory monitoring should be made after careful consultation by clinicians experienced in the interpretation of rhythm disorders. It is inappropriate to request ambulatory electrocardiographic monitoring prior to careful evaluation by a clinician experienced in the pitfalls and benefits of such monitoring.

Patients with suspected myocardial ischaemia are generally better assessed by some sort of graduated stress evaluation, rather than by analysis of the ambulatory electrocardiogram, since it is unusual to detect asymptomatic (silent) ischaemia during an ambulatory monitor in patients without stress induced ischaemia. Nevertheless, ambulatory monitoring may be useful in assessing the frequency and severity of episodes of silent ischaemia. Heart rate variability analysis remains highly subjective, and its role in clinical practice is very limited at present.

Interpretation

Ambulatory electrocardiographic monitoring should be performed and analysed by skilled technologists and reported by physicians explicitly trained in the acquisition and interpretation of ambulatory

electrocardiograms. An appreciation of the technical limitations of the systems employed is mandatory. High quality examples of rhythms on which conclusions are based should be included with the report. Care must be taken to avoid over-diagnosis of arrhythmias where quality or recordings is poor. Any symptoms a patient observes should be correlated with a diary record.

Conclusion

Ambulatory electrocardiographic monitoring may complement careful clinical examination in selected cases. It is important that appropriate hardware and software are selected to investigate particular symptoms. Precautions must be taken to ensure high quality recordings and the interpretation of the recordings must be made by a physician experienced in the interpretation of the symptoms in question and in the potential pitfalls and benefits of ambulatory monitoring. High quality recordings of the electrocardiogram on which the diagnosis is based, should be included with the report.

References

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3. Knoebel SB, Williams SV, Achord JL et al. Clinical competence in ambulatory Electrocardiography. *Circulation* 88, 337-341, 1993.
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5. The Cardiac Society of Australia and New Zealand Guidelines for Cardiac Implantable Electronic Devices.