
Memo 72

One vs three channels

Ambulatory ECG Holter Monitor results

About Cardiac Monitoring Service

Cardiac Monitoring Service 's team of cardiac technicians meet the highest compliance and analytical standards, while delivering the latest heart monitoring software and devices.

Over 30 years of reputable and trusted cardiac monitoring

500k hearts analysed and reported on each year

Trusted by medical experts in 8 countries worldwide

About Dr Harry Mond

Cardiac Monitoring Service Medical Director Dr Harry Mond is a founding member of Cardiac Monitoring Service and remains among the world's top experts in the interpretation of ECG and Holter studies.

As an international educator and author of 260+ peer-reviewed manuscripts and books, he provides regular training and professional development to our team of certified cardiac technicians to ensure the highest clinical standards.

Notable achievements

- Pioneer in Cardiac Pacing and Electrophysiology of the US Heart Rhythm Society
- Lifetime Achievement Award, Royal Melbourne Hospital
- Medal of the Order of Australia
- Founding member & Medical Director, CardioScan (Australia, Hong Kong, Singapore, UK)
- Medical Director, Cardiac Monitoring Service (USA)
- Fellow Royal Australasian College of Physicians
- Associate Professor University of Melbourne & Monash University
- Cardiac fellow Emory University, Atlanta, Georgia
- Honorary Fellowship, Hong Kong College of Cardiology

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Ambulatory ECG Holter Monitor results



By Dr Harry Mond

"I was recently asked about the differences between one and three channel ambulatory ECG monitor recordings and whether, one was superior to the other.

At Cardiac Monitoring Service, we always use and recommend three channel 24-hour Holter monitors to be sure about our diagnosis of arrhythmias. Anyone with experience with early model one channel event recorders will remember how useless those recordings were mainly because of artefact. We stopped reporting on one channel event recorders about two years ago."

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The technology has changed

Traditional 3-channel Holter monitors record continually for at least 24-hours and up to two weeks, usually requiring five electrodes on the chest. Models with fewer leads record fewer channels, whereas those with 7 or 10 leads can record 12-lead ECGs, which is useful for ventricular tachycardia.

A major advancement has been the development of the patch Holter in which the electrodes are embedded. These also have a metal snap to which a V lead can be attached (for the third channel) using a standard electrode and cable. If this electrode/cable becomes detached, then the recorder automatically reverts to two channels of ECG data.

The patch electrode and monitor that Cardiac Monitoring Service uses is myPatch and allows two or three channels. When fully charged its battery can record for up to two weeks, although its major use is for 24hr to 3 day Holter monitoring. Although relatively expensive, such patches are hopefully able to provide better quality recordings and can be used with activities such as swimming. Single channel recorders with patches have also become available, and hopefully will provide better recordings than in the past.

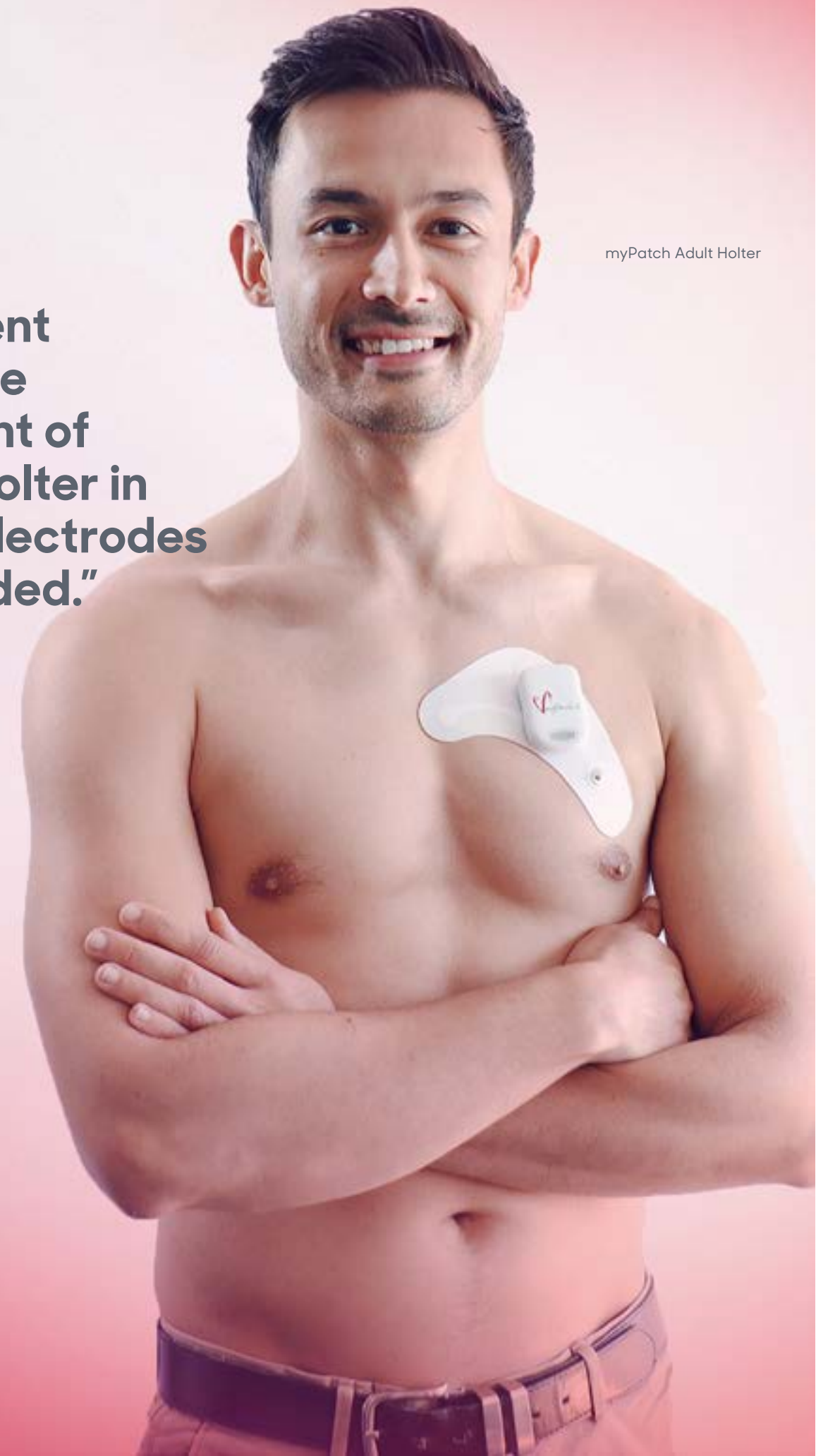
myPatch Neonate Holter



myPatch Pediatric Holter

“A major advancement has been the development of the patch Holter in which the electrodes are embedded.”

myPatch Adult Holter



The question being asked; is one channel as good as three?

Since I was asked the question, I have reviewed the way I report three channel Holter monitors and I strongly believe that three channels are much easier to report than just looking at one.

Firstly, each channel confirms the findings of the other making the report not only easier, but faster and probably more accurate. This is most certainly with atrial fibrillation. Secondly, when there is artefact on one or more channels, there is hopefully enough information on one channel to prevent misdiagnosis.

Here are a few examples

Image 1
The artefact here is predominantly in one channel. If this was the only channel, it would make interpretation very difficult.



Image 2
In this example, you require three channels to diagnose artefact and exclude ventricular tachycardia.

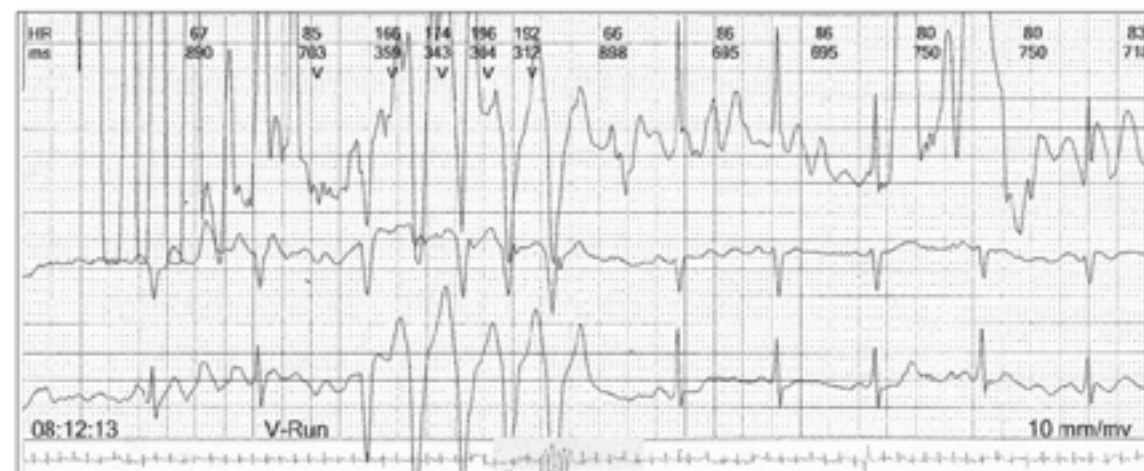


Image 3
This trace demonstrates that you need all three channels to confirm sinus rhythm

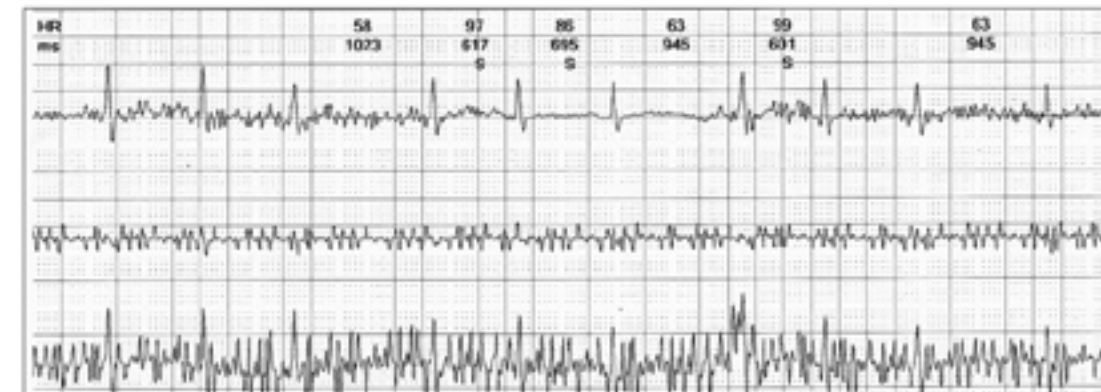


Image 4
This example reveals you need all three channels to confirm sinus rhythm.



Image 5
To exclude an atrial tachyarrhythmia diagnosis you require all three channels.

Image 6
The timed spikes are the sinus QRS waves. Three channels are required to exclude a ventricular tachyarrhythmia.



Image 7
This shows a run of an atrial tachyarrhythmia with aberration. Difficult diagnosis with only one channel.

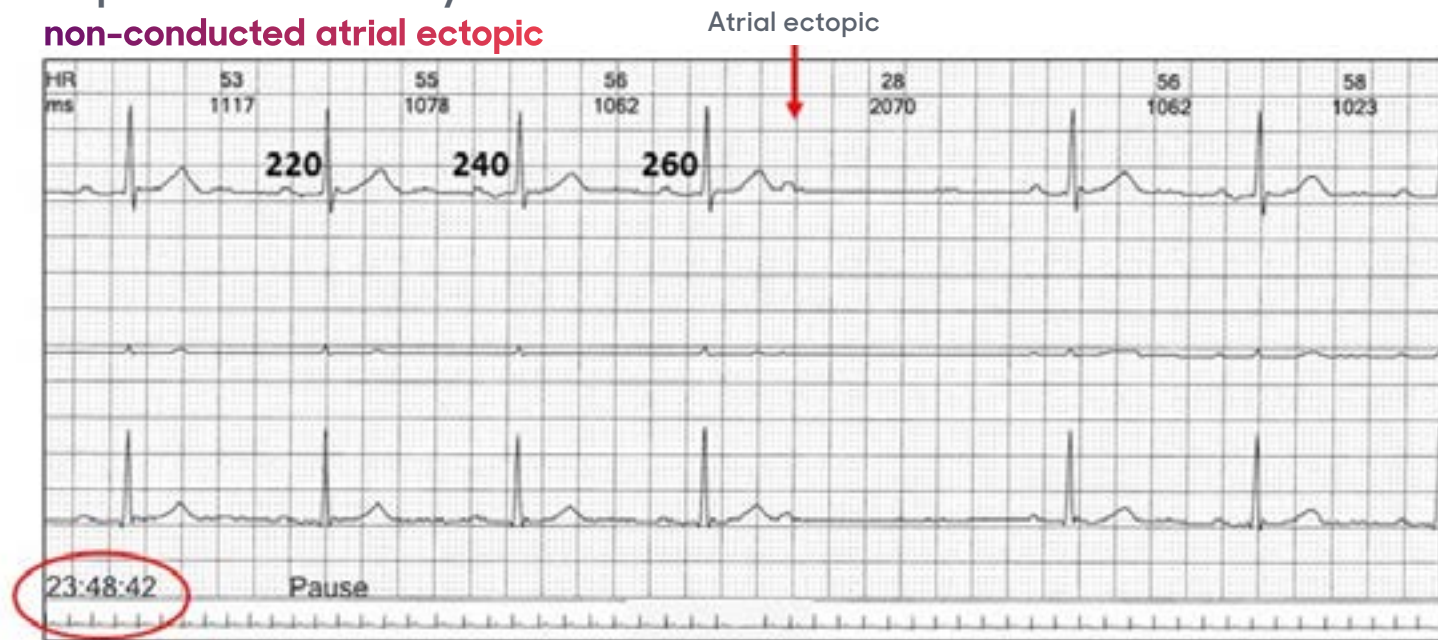


Image 8
The artefact on the top channel makes the diagnosis difficult. The bottom two channels confirm the artefact and ventricular

The arrhythmias in the next three Holter recordings are more difficult to diagnose and dependent on the three leads complementing each other. There is at least one channel which is almost iso-electric and by itself gives very limited information.

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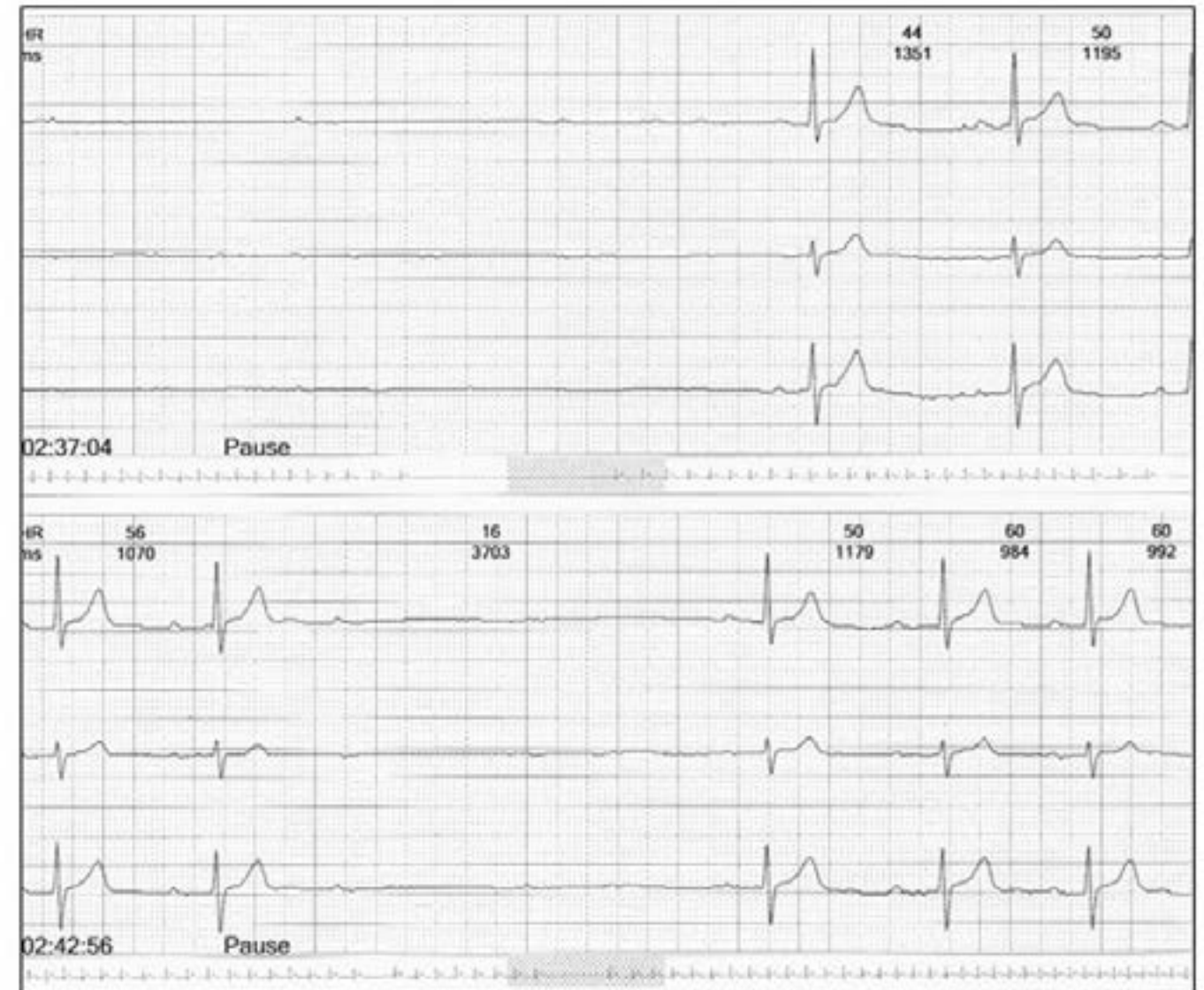
Wenckebach AV block sequence terminated by a non-conducted atrial ectopic



Wenckebach AV block sequence terminated by a non-conducted focal atrial tachycardia run



Mobitz type II AV block and sinus arrest



These examples are seen every day with Holter recordings and are not unusual studies. I have no doubt that even with improved technologies such as patches, three channel recordings are far superior to one channel.

Dr Harry Mond



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