Cardiac event recorders yield more diagnoses and are more cost-effective than 48-hour Holter monitoring in patients with palpitations

Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Diagnostic tests for patients with intermittent palpitations.

Type of intervention
Diagnosis.

Economic study type
Cost-effectiveness analysis.

Study population
Patients with palpitations. The mean age of the population was 45 years (+

Setting
Hospital/primary care. The economic study was carried out in New South Wales, Australia.

Dates to which data relate
The dates for effectiveness and resource data were not clearly stated. 1994 - 1995 prices were used.

Source of effectiveness data
Single study.

Link between effectiveness and cost data
Costing was undertaken on the same patient sample as that used in the effectiveness study. It is not clear whether costing was taken prospectively or restrospectively.

Study sample
634 patients referred to a cardiovascular unit were examined. Of these 526 (83%) were excluded from study for the following reasons; patient already being monitored for silent ischemia (7%), assessment of therapy (18%), syncope (18%), other research studies or inpatient monitoring (16%) and those patients who had already had Holter monitoring for their symptoms. Of the 108 patients eligible a further 63 did not participate as the interviewers were not available to conduct interviews. Power calculations were not used to determine the sample size although the authors noted that the study did in fact have a small but sufficient statistical power.

Study design
The study was a randomized crossover trial. Each patient was randomly allocated to either the Holter monitoring group or the event monitor group. At the end of a three month period, or after two recordings were obtained, the patient was switched to the other monitor. Cardiologists reading the results of both monitors were blinded to the results of the other monitor. There was a loss to follow up of 2 patients (4%) due to discomfort during Holter monitoring.

**Analysis of effectiveness**

It seems that the analysis of effectiveness was based on treatment completers only. The primary health outcomes were, firstly whether or not a diagnostic rhythm strip electrocardiogram was provided by the monitor during symptoms, and secondly the detection of clinically significant cardiac arrhythmia.

**Effectiveness results**

The event monitor provided diagnostic rhythm strip electrocardiograms in 67%(53% to 81%) of treatment completers (29 patients) compared to 35% (21% to 49%) provided by Holter monitors (15 patients). This was a statistically significant difference (P< 0.001). 8 clinically significant arrhythmias (19%, 8% - 30%) were detected by the event monitor compared to 0, (0% 0%-3%) for the Holter monitors.

**Clinical conclusions**

Holter monitoring was a poor diagnostic test for intermittent palpitations compared with event monitors which were twice as likely to produce a recording during symptoms.

**Measure of benefits used in the economic analysis**

Intermittent palpitations detected.

**Direct costs**

The costs of medical capital, labour, consumable goods and telephone costs were measured. The source of these cost figures was not stated. The Holter monitors and analysis systems were costed, as were the 13 event monitors. The event monitors' cost was based on information from an industrial source. 1994-1995 prices were used. Discounting was not stated other than for capital which was assumed to have a five year life span and was discounted at a rate of 5%. The proportion of Holter monitor use taken up by patients with intermittent palpitations was 17%. 4.1% of the annual capital cost was estimated to be the annual service cost for the monitors.

**Currency**

Australian dollars (Aus$).

**Sensitivity analysis**

Multi-way sensitivity analysis was conducted on the discount rate, service and labour costs, the proportion of Holter monitor use devoted to patients with intermittent palpitations from 17% to 10% and on effectiveness (varied by 95% Confidence Interval) to test final cost-effectiveness.

**Estimated benefits used in the economic analysis**

Event monitoring proved twice as likely to make a recording of cardiac rhythm whilst patients were undergoing symptoms than Holter monitoring.

**Cost results**

5 Holter monitors cost Aus$106,193. Thus the annual cost was Aus$24,258.13 event monitors were estimated to cost
Aus$6,500 with an annual cost of Aus$1,561. The cost of treatment for the 43 patients for the 21.5 week period of the study was Aus$4,245 (Aus$2,650 - Aus$4,994) for Holter monitors and Aus$1,258 (Aus$1,049 - Aus$1,471) for event monitors. No other costs were explicitly stated.

**Synthesis of costs and benefits**
The incremental cost effectiveness ratio for event monitors in terms of additional electrocardiograms recorded during symptoms was -Aus$213 whilst in terms of additional clinically significant arrhythmia detected this was -Aus$373.

**Authors’ conclusions**
The use of event monitors rather than Holter monitors was more cost-effective and provided better data. Event monitors should be used whenever this is clinically possible to do so. (Only one-third of patients in this study were able to use such a device.)

**CRD Commentary**
A well designed study. However, the dates for effectiveness data collection were not explicitly stated; only capital has been discounted; sample size, though significant was small, and, as noted by the authors, other studies of Holter monitors have found that they have detected arrhythmia. In addition, the source of much of the costing information was not provided nor was a more detailed account of the breakdown of costs included.

**Implications of the study**
A larger well designed study may be required to confirm the incremental cost-effectiveness of event monitors with respect to Holter monitoring.

**Source of funding**
None stated.

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