

# Ambulatory electrocardiographic monitoring in a market town health centre

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**SUMMARY.** *An ambulatory electrocardiographic monitoring system was made available to a group of 10 general practitioners in one health centre and the use of the service was studied over a period of 12 months. The participating doctors were asked to assess the value of the reports received and to indicate any effect on patient management. Over the year 77 recordings were made for 73 patients and among the 69 technically satisfactory recordings 10 abnormalities were detected. A considerable variation in the use of the service by the doctors was detected but overall they appeared to find the reports received helpful. The management of 48 of the patients was changed as a result of the investigation. Results from a two-year follow-up period suggested a steady request rate for recordings of approximately two requests per 1000 patients per year. The detection rate of abnormalities following recording was 11% for the three years combined. Such a system has a valuable place in the management of some patients.*

## Introduction

**A**MBULATORY electrocardiographic (ECG) monitoring (Holter monitoring) is a widely accepted method for investigating suspected disturbances in cardiac rhythm. The procedure is well tolerated by patients and demands only outpatient contact with the hospital. Yet, in most areas, such investigation is available only by means of hospital referral.<sup>1,2</sup>

In this study the value of an ECG monitoring service made available to a group of general practitioners on direct request and the influence of the service on patient management have been examined.

## Method

Clitheroe is a small market town with one health centre serving a population of approximately 20 000 people. The age-sex distribution of the health centre population is comparable with the national average with 15.7% over 65 years of age. At the time of study the health centre was served by 10 principals all of whom were involved in the study which lasted for 12 months. At the start of the study the ECG monitoring system and its capabilities were demonstrated to the doctors and a treatment room nurse was instructed in the method of recording. One recorder was dedicated to the project and the recordings were analysed and reports written at Hope Hospital, Salford, 30 miles from Clitheroe. One general practitioner visited Salford each week and delivered the tapes for analysis; the results were returned by post.

Although some guidance about indications for investigation was given, the doctors were free to request an investigation whenever they felt it to be necessary. As the recorder was only

a single channel instrument it was suggested that its use for ST segment analysis should be avoided but where ST changes were obvious they were reported (for example in Prinzmetal's angina). The three practices within the health centre were given priority days to ensure equal access, and if the equipment was not required on a given day patients from another practice were called if there was a demand. It was felt that the overall level of use would be such that this limitation would cause no practical problems.

The equipment was connected to the patients by the treatment room nurse and patients were encouraged to fill in diary cards of symptoms noting the time and describing the event. They were also shown how to use the 'event marker' to indicate symptoms on the tape. The patients returned the following day to be disconnected and filled in a brief questionnaire about acceptability. Most of the patients involved in the study had had a traditional ECG before Holter monitoring.

The tapes were analysed using the Oxford Medilog ECG analysis system and were scrutinized both for events and for other predetermined rate and rhythm changes. The Clitheroe health centre has had a terminal connected to the Wythenshawe ECG analysis computer<sup>3</sup> since 1976 so the principals were familiar with high quality multichannel tracings with computerized reports. Samples of the cardiograph at regular intervals and all abnormalities were printed out and sent from the ECG analysis department to the consultant for reporting together with the diary card and a request form indicating medical problems, suspected rhythm disturbance and therapy. All the recordings were analysed by the same technician and all the reports were written by the same doctor.

The referring general practitioners were asked to assess the value of each report received on a visual analogue scale (-1 confusing, 0 no help to +3 very helpful) and to indicate any effect on the management of the patient.

A similar study has been undertaken by Drs MacMillan and Taylor in Canterbury (unpublished results) and the results of the two studies were compared.

Six months after the study year had ended the principals were invited to comment on the service. The request rate for recordings in the two years following the study period and the detection rate of abnormalities were noted.

## Results

Over the 12-month study period 77 recordings were made on a total of 73 patients. Among the patient group there were 16 women aged 65-75 years and 11 men aged 55-65 years. Most requests (79%) were to investigate cardiac symptoms rather than cardiac causes of 'fits, faints and funny turns'. Eight recordings (10%) were technically unsatisfactory. The abnormalities detected in the remaining 69 recordings were atrial fibrillation (3), paroxysmal atrial tachycardia (4), intermittent heart block (1), Wolff-Parkinson-White syndrome (1) and Prinzmetal's angina (1). The patients found the procedure highly acceptable and minor irritation only was reported on a few occasions. Only four patients failed to complete the diary card.

The effect of the investigation on patient management is shown in Table 1. The general practitioners' evaluation of the usefulness of the reports received is shown in Table 2. A considerable variation in the use of the service by the doctors was detected and this is also shown in Table 2, with the doctors iden-

**Table 1.** Effect of investigation on the management of the 73 patients.

	No. (%) of patients
Treatment changed	12 (16)
Disposal changed	9 (12)
Diagnosis changed	13 (18)
Further investigation initiated	14 (19)

**Table 2.** Evaluation of the usefulness of the reports received and the variation in the use of the service by the 10 participating general practitioners and their trainees.

Year of qualification	Total number of recordings	Number of unsatisfactory recordings	Usefulness score <sup>a</sup>				
			-1	0	1	2	3
1969	23	2	—	1	3	9	8
1952	19	2	—	1	1	5	10
1960	7	1	1	2	3	—	—
1957	6	1	—	—	2	3	—
1963	6	—	—	—	5	1	—
1953	5	2	—	—	—	2	1
1962	3	—	—	—	2	1	—
1966	3	—	—	—	1	1	1
1975	2	—	—	—	—	2	—
1976	2	—	—	—	—	1	1
Trainees	1	—	—	—	1	—	—
Total	77	8	1	4	18	25	21

<sup>a</sup> - 1 confusing, 0 no help to +3 very helpful.

tified by their year of qualification. The frequent and well recognized disparity between symptoms and lack of ECG abnormalities<sup>4</sup> was commented on by the general practitioners but this observation, together with a diary card showing symptoms and a normal recording, was often helpful and formed the basis of reassurance on many occasions.

The results of the comparison with the Canterbury study are shown in Table 3.

Six months after the study period seven of the 10 principals responded to the request for comments on the service. Five doctors considered a normal report helpful and reassuring to doctor and patient but four felt the delays in receiving the report provoked anxiety for patients. One doctor commented that investigation had averted referrals to hospital.

In the two years following the study period the request rate for recordings dropped to 33 in the first year and 34 in the second year, suggesting a steady request rate of approximately two requests per 1000 patients per year. The detection rate of cardiographic changes requiring intervention was similar to that found in the study period; among the 67 requests in the two year follow-up period two examples each of paroxysmal atrial tachycardia, heart block and ventricular tachycardia were found. Over the three year period there were a total of 144 requests for recording and 16 abnormalities (11%) were detected.

**Table 3.** Comparison between this study and the study carried out by MacMillan and Taylor in Canterbury.

	Clitheroe	Canterbury
Total patient population	20 000	29 000
Number of GP principals	10	11
Number of requests for recordings per annum	77	84
Number (%) of unsatisfactory recordings	8 (10)	9 (11)
Number of patients monitored	73	68
Request rate (per 1000 patients per annum)	3.9	2.9

## Discussion

The system reported here appears to have been well used and helpful. Few difficulties were encountered, though on one or two occasions the inevitable delay between recording and the availability of results caused some anxiety. Significant abnormalities were reported by telephone but delay in delivery of the tapes may have already occurred. The system has subsequently been improved by posting the tapes to the hospital using first class mail and receiving all the results by telephone.

The variation in the use of the system is interesting, in particular the low uptake by trainees and younger principals who in general see more acute illness.<sup>5</sup> It is not clear from this study whether this variation reflects the doctors' own interests or selection by patients. Most requests for recording appeared to be to investigate cardiac symptoms rather than suspected cardiac causes of the groups of problems referred to as 'fits, faints and funny turns'.<sup>6</sup> No patient was investigated specifically to dispel cardiac anxiety and no asymptomatic patients were investigated.

The relatively high incidence of abnormalities found indicates a good index of suspicion and though this detection rate may suggest that thresholds for investigation were too high, most significant pathology is likely to be symptomatic and will not escape discovery. In any case this study did not take into account symptomatic patients who were referred directly to outpatient clinics for a further opinion.

Of the 10 significant abnormalities found in the study year only two were detectable by routine 12-lead cardiography — one case of persistent atrial fibrillation and one patient with Wolff-Parkinson-White syndrome who was being investigated for suspected tachycardia.

The dramatic drop in request rate for recordings in the two years following the study may indicate loss of enthusiasm among the doctors but more probably reflects the true presentation rate, the backlog of cases largely having been dealt with in the study period. The results suggest a steady rate of approximately two requests per 1000 patients per year and a detection rate of cases that require therapy of approximately 11%. This information may be of value in planning an open referral service.

In conclusion, open-access referral for 24-hour ambulatory ECG monitoring by general practitioners has a valuable place in the management of a limited number of patients. As a result of the procedure a few patients will be referred for a further opinion but many will be spared a hospital outpatient appointment.

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