

## Can audit improve patient care? Effects of studying use of digoxin in general practice

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### Abstract

**A survey of monitoring of digoxin treatment in five practices examined the indications for prescribing digoxin, its long term use, and how its use could be monitored. These data were used to generate a protocol for monitoring treatment with digoxin in general practice. The findings of the survey and the protocol were distributed to and discussed with all the partners in the practices participating in the study. One year later similar analysis showed that record keeping (recording of pulse rate and rhythm) had improved significantly in the group of principals carrying out the audit but not in other principals in these practices. Audit may change only the auditors.**

### Introduction

A combination of audit and personal contact is thought to influence clinical behaviour of general practitioners.<sup>1</sup> We tested this hypothesis with reference to prescribing digoxin in general practice. Six of us are members of a young principals group; we examined the long term use of digoxin in our practices, attempting to define its indications and how its use could be monitored. After analysis of the initial results we designed a protocol to optimise our performance. We tried to establish whether any improvement in monitoring was confined to us or whether the other principals in the practices were influenced by the audit.

### Methods

Five practices with a combined population of 51 100 patients served by 23 principals took part in the study. They covered rural, suburban, and urban areas of the east Midlands. Two practices were training practices and one participated in undergraduate medical education.

We recorded the following details of all patients who were receiving repeat prescriptions for digoxin: their name, age, and sex; the date they started treatment; the indication for treatment; the dose of digoxin; and the date their pulse was last recorded, its rhythm and rate, and the site of measurement. Some practices could easily generate a list of patients for the study. In other practices anyone writing a prescription for digoxin during a period of three months (the maximum duration of a supply of digoxin) noted the name of the patient to identify most of the patients who were prescribed digoxin regularly. We did not attempt to assess compliance. A written and graphical summary of the pooled information was made available to all

principals in the participating practices. They were encouraged to discuss the results and implications for their practice.

Information from the survey, from published reports,<sup>2,8</sup> and from five cardiologists, five consultants in geriatric medicine, and four general physicians, all working locally, was used to generate a protocol for monitoring treatment with digoxin (appendix). We presented this protocol to the other principals in our practices in a consultative and non-didactic manner.

Analysis of the records of the same group of patients was repeated one year later, noting whether the information was recorded by a group member or another principal.

### Results

Of the combined practice population of 51 100, 266 patients obtained repeat prescriptions for digoxin, a prevalence of 5.21/1000 patients (range 3.6-6.3/1000). Seventy three (60%) of the 121 male patients and 116 (80%) of the 145 women receiving repeat prescriptions were aged 70 and over (table I).

Atrial fibrillation had been diagnosed in 192 patients, comprising 25 with valvular heart disease, 31 with ischaemic heart disease, two with cardiomyopathy, two with thyrotoxicosis, and 132 in whom the cause was unspecified. Other supraventricular tachycardias had been diagnosed in 11 patients, cardiac failure in 22, vague symptoms—for example, fainting—in 15, and no symptoms in 26. Thirty six patients had been receiving digoxin for less than one year, 96 for one to five years, 64 for six to 10 years, and 53 for more than 10 years; data were not available for 17 patients.

The pulse rate had last been recorded less than six months previously for 77 patients, six months to a year previously for 54, one to two years previously for 44, two to three years previously for 24, more than three years previously for 25, and not at all for 42. Thus 49% of patients had had a pulse rate recorded in their notes within the previous year, but in 16% of records there was no evidence that a pulse rate had ever been recorded. The pulse rhythm was recorded as irregular in 81 patients and regular in 52 and had not been recorded in 133.

When the records were again analysed one year after the initial survey 35 of the original population had died, 17 had had treatment withdrawn, nine had moved and were not traced, and 205 were still receiving digoxin. Of those still receiving digoxin, 139 had had a pulse rate recorded in the previous year; this was a significant increase ( $d=2.17$ ,  $p<0.05$ ). All patients whose treatment had been stopped had also had their pulse rate and rhythm recorded in the previous year. The pulse had been noted as irregular in 86 of the 205 patients still receiving digoxin and as regular in 55; it had not been noted in 64. The proportion of records that noted the rhythm of the last recorded pulse was

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TABLE I—Age and sex distributions of patients receiving repeat prescriptions for digoxin ( $n=266$ )

Age (years):	0-9	-19	-29	-39	-49	-59	-69	-79	-89	-99
Male ( $n=121$ )	1		1		4	9	33	49	21	3
Female ( $n=145$ )					1	6	22	48	54	14

significantly higher than it had been in the initial analysis ( $d=2.18, p<0.05$ ).

The six members of the young principals group had made 75 pulse records at one year and the 17 other principals had made 63. We did not know who had made the records in 18 cases, but assuming that they had all been made by principals who were not members of the group this gave a recording rate per principal of 12.5 for group members but 4.8 for other principals ( $\chi^2=5.37, p<0.05$ ). In one practice, which operated a personal list system, the initial survey showed no difference in record keeping between group members and other principals before the protocol was devised; analysis one year later showed change in only the group members (table II).

TABLE II—Numbers (percentages) of recordings of pulse made by principals in one participating practice with personal lists

	Members of young principals group	Non-members
Initial survey	8/17 (47)	14/29 (48)
At one year	10/11 (91)	8/26 (31)

### Discussion

We chose to audit long term treatment with digoxin for several reasons. The drug's role in clinical practice has changed over the past decade,<sup>2,3</sup> and it is in widespread use, particularly in the elderly, who are at increased risk of side effects and toxicity.<sup>3</sup> It has a low therapeutic ratio,<sup>4</sup> but clinical monitoring is straightforward. Monitoring may improve compliance,<sup>5</sup> though poor compliance does not necessarily correlate with clinical deterioration, thus emphasising the importance of correctly selecting patients for treatment.<sup>6</sup>

The epidemiological characteristics of the population we studied were broadly similar to those in a study by Cupples *et al*, who found that the indications for treatment with digoxin required review in 45% of patients.<sup>7</sup> We found that the indications for treatment required review in 20-25% of our patients.

Patients in sinus rhythm may safely have their digoxin withdrawn.<sup>2,8</sup> For some of these patients, however, it may be appropriate to continue digoxin—for example, to control ventricular rate in paroxysmal atrial fibrillation—and this should be clearly recorded to avert inappropriate intervention.

We found an alarming lack of records of basic data on the use and monitoring of this potentially toxic yet efficacious drug. Recording data may not always have been essential for good practice, but in these days of group practice and vocational training it is essential for continuity of care. Almost half of our patients had been receiving treatment for more than five years.

Our second survey showed significant but not dramatic improvement in record keeping. We were unable to show that continuing treatment was monitored adequately for one third of the patients who had not had a pulse recorded in the past year. Taking the patient's pulse is generally seen to be a quintessential part of medical care, and recording the pulse rate and rhythm in a patient taking digoxin implies consideration of both the continued need for treatment and any necessary adjustment of dose. Further assessment may be necessary, but it would be difficult to justify not recording a pulse rate and rhythm at least yearly.

This study also showed that identifying a problem and feeding back information to other partners in the practice were insufficient to motivate change outside the group carrying out the audit despite the use of a written protocol. This approach produced significant change only in those who were highly motivated to

change. Protocols evolved within individual practices might generate more enthusiasm and the participation of all partners.<sup>9</sup> Had we more thoroughly explored the beliefs and values of our partners in relation to monitoring digoxin treatment we might have been able to influence behaviour more positively.

We are aware that merely studying behaviour may affect the behaviour studied, but the time scale of our study probably negated this "Hawthorne effect."<sup>10</sup> Various factors might influence the acceptance of innovation,<sup>11</sup> but ultimately changes in professional behaviour are the responsibility of the individual. This study shows that unsolicited feedback of clinical information from a pooled survey is unlikely to influence clinical behaviour, at least over one year. Ranked performance ratings for each principal might have been more effective but also much more threatening.

We acknowledge the cooperation of all our partners and consultant colleagues and the encouragement from the department of general practice, University of Nottingham.

### Appendix

This protocol was distributed to principals in participating practices.

In our attempt to maximise the efficiency of monitoring of patients receiving long term treatment with digoxin we have formulated a simple protocol. This represents a consensus view of our group and seeks to define a minimum practicable policy. We would not expect to cover all eventualities, but the adoption of such a protocol might be expected to improve our record keeping, reduce unnecessary prescribing, and maximise the benefits of treatment.

(1) From the patient's records it should be possible to see that the patient is being prescribed digoxin.

(2) The main indications for starting treatment in general practice are symptomatic atrial fibrillation and cardiac failure that has failed to improve after first line treatment—for example, with diuretics.

(3) Monitoring should include annual assessment of the rate and rhythm of the pulse and appropriate inquiry as to the wellbeing of the patient. It will be necessary to evaluate the apical rate at the start of treatment and if suspicion of toxicity or poor control supervenes. The results of monitoring should be available in the notes.

(4) The aim of treatment is clinical and symptomatic improvement. Inadequate control should be suspected if the pulse rate is outside the range 70-90 beats/minute.

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(Accepted 16 March 1988)

### Correction

#### Rational decisions in managing sore throat: evaluation of a rapid test

An editorial error occurred in this paper by Dr Peter Burke and others (11 June, p 1646). In the 11th line of the abstract the number of episodes in which there was a change in prescribing decision is incorrect; the sentence should read, "Test results rarely caused previous prescribing decisions (34 (13%) episodes) to be altered."