Near patient testing in general practice: attitudes of general practitioners and practice nurses, and quality assurance procedures carried out

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SUMMARY

Background. *The evaluation of near patient testing in British general practice has largely been confined to studies examining individual tests or comparing equipment.*

Aim. *This study set out to determine the attitudes of practice staff to near patient testing, and the extent to which staff undertook quality assessment.*

Method. *Four types of near patient testing machines were introduced into 12 general practices in two regions of England, south west Thames and west Midlands. General practitioner and practice nurse attitudes to near patient testing were assessed by semi-structured interview before and six months after the introduction of the machines. The extent to which routine quality assurance procedures were carried out within the surgery and as part of local and national schemes was examined.*

Results. *Although 80% of general practitioners anticipated changing patient management with near patient testing, only two fifths reported having done so after six months. Nurses generally were enthusiastic at the outset, although one third were unhappy about incorporating near patient testing into their work schedules. Time pressure was the most important factor restricting uptake of near patient testing. Nurses performed quality control regularly but complete local external quality assurance procedures were established in only half the practices. All the practices participated in a national scheme for cholesterol assays.*

Conclusion. *General practitioners in this study did not find near patient testing a very useful addition to their resources. Pressure on nurses' time was the most frequently reported limitation.*

Keywords: near patient testing; practice based diagnostic tests; doctors' attitude; nurses' attitude; quality in general practice.

Introduction

RAPID, surgery based diagnostic technology (near patient testing) has not yet become widespread in general practice in the United Kingdom although the opportunities for expansion are considerable.[1,2] The availability of rapid results should mean greater convenience for doctors and patients, but organizational factors are also influential in determining the spread of the technology. The problems of introduction into general practice will need to be outweighed by improvements for patient, doctor and nurse and in financial terms. Problems include the establishment of reliable quality assessment systems; the best methods for this are not yet clear.[3,4]

Prior to this study, the evaluation of near patient testing in British general practice had been confined to studies examining individual tests[5-7] or comparing equipment.[8] None had assessed the impact of near patient testing on patient care. From 1989 to 1992 a detailed evaluation of a range of near patient testing technologies introduced into group practices in two regions of England was carried out. Test uptake, cost effectiveness and effect on patient care have been reported elsewhere.[9]

The aim of this study was to determine the attitudes of practice staff to near patient testing, the extent to which staff undertook quality assessment and patient satisfaction with near patient testing.

Method

The study methodology has been described in detail elsewhere.[9] Twelve group practices participated in the study: six in the South West Thames Regional Health Authority and six in the West Midlands Regional Health Authority. Four types of near patient testing equipment were introduced into the practices: for biochemistry: the Reflotron® analyser (Boehringer Mannheim) (with test sticks for cholesterol, haemoglobin, urea and gamma-glutamyl transferase) and the Nova® 1 ion analyser (Nova Biomedical) for sodium and potassium; for bacteriology: Multistix® 8SG urinary dipsticks (Ames Miles) in conjunction with a Clinitek® 10 reader (Ames Miles) and Clearview® chlamydia test kits (Unipath). The equipment and test reagents were provided without charge to the practices. The practices were free to use the test as they felt appropriate; no protocols for allocation of staff time were introduced by the study, but Department of Health guidelines on good practice for extra-laboratory procedures were provided.

Test utilization was monitored, using specially adapted laboratory request forms, throughout a baseline period of three to six months, followed by a period in which practices were able to use bacteriology and biochemistry near patient testing, each for a period of six months.[9]

Sixty five general practitioners and 19 nurses in participating practices were interviewed at the outset of the study regarding their current behaviour and attitudes to near patient testing. As a result of changes in personnel, post-study interviews concerning biochemistry testing were completed with 59 general practitioners and 26 nurses, and with 57 doctors and 19 nurses concerning bacteriology testing. Questions about organizational issues were asked at the post-study interviews. Patient satisfaction with near patient testing and laboratory testing arrangements was assessed by means of short questionnaires, randomly distributed to patients receiving near patient testing and patients receiving laboratory tests in the participating practices.

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Quality assessment involved: internal quality control, carried out as specified by the manufacturers to ensure correct functioning of machinery; fortnightly parallel laboratory testing of split samples for the biochemistry analysers; standard samples from local laboratories (each practice was requested to establish a regular system with local chemical pathology laboratories); and national schemes (all practices were registered at the outset with the Wolfson Research Laboratories national external quality assessment scheme for cholesterol tests and received bimonthly samples for analysis; an equivalent scheme for haemoglobin became available from the Royal Postgraduate Medical School during the study although the samples were animal rather than human and were unsuitable for the Reflotron). Pathologists at the laboratories local to the practices were interviewed following the study to seek their views on the quality assurance procedures that had been carried out.

Staff were trained in quality control procedures by the relevant company representatives. Research staff emphasized the importance of internal quality control and overall quality assurance procedures, and offered initial support in the establishment of these, but thereafter quality assurance was explicitly the responsibility of the practice.

Results

Staff attitudes and organizational issues

The views of general practitioners and nurses before and after the introduction of near patient testing are shown in Table 1. At the initial interview both groups were concerned about the ways in which near patient testing would be incorporated into the practice routine and nurses underestimated the time requirements of near patient testing. No practice dedicated specific nurse time to the use of near patient testing, and three nurses commented that the usage would have been greater if practice protocols had been developed for the use of near patient testing. While at the outset 42% of 19 nurses expressed concern about learning new techniques, 21 of the 26 who used the Reflotron (81%) felt that they were given sufficient information and 24 were confident in its use (92%). Of the 19 who used the Clinitek, 17 (89%) were confident as were 15 of the 19 (79%) who used the Clearview. However, only nine of 26 (35%) felt they had sufficient confidence to use the Nova (Table 1).

General practitioners generally had a high regard for the quality of service provided by the laboratories: the haematology service scored highest with 89% of 65 general practitioners scoring it at eight or above on a 0–10 point scale. Of the 65 doctors 78% scored the bacteriology laboratory similarly highly and 75% the biochemistry laboratory.

Prior to the introduction of near patient testing 57% of the 65 general practitioners and 53% of the 19 nurses were enthusiastic, whereas 12% of the general practitioners were sceptical or reluctant, and commented that decisions in general practice rarely required instant results. Of the 65 general practitioners 31% were concerned about quality control and accuracy; none of the 19 nurses was. Although 80% of general practitioners anticipated changing clinical management in response to near patient testing, only two fifths of respondents actually reported doing so (Table 1), with 17% of 59 reporting that the biochemistry near patient testing helped in decisions about treatment or referral, and 30% of 57 saying that the bacteriology near patient testing helped with treatment or referral decisions. Six doctors (10%) felt they could reassure the patient immediately about absence of pathology. Half of the 59 doctors (53%) felt that their investigation patterns had been changed by near patient testing — most often that they had ordered more cholesterol tests and fewer laboratory tests of mid-stream urine samples. Of 59 general practitioners 13 (22%) reported forgetting periodically that biochemistry near patient testing was available and 19 of 57 (33%) that bacteriology tests were available.

One third of 57 doctors (33%) thought that their prescribing habits had been changed by bacteriology near patient testing, particularly in relation to suspect urinary tract symptoms. Only 10 doctors (17%) thought biochemistry near patient testing had changed their prescribing habits, most commonly in respect to not issuing repeat prescriptions for diuretics and iron for anaemia.

The Clinitek urine stick test reader was the machine most frequently reported as having been useful to doctors, while the Clinitek and Reflotron machines were reported by nearly all of the nurses to have been easy to use (Table 2). There was very low confidence in the results produced by the Clearview testing kit. The majority of tests on the Reflotron and Clinitek machines were carried out while the patient was waiting. Where the test took longer than 15 minutes, where the machines were perceived as unreliable or when the pressure of work was too high the majority of nurses tended to carry out the tests in a batch at the end of a session.

General practitioners relied on nurses to operate the equipment — 53% of doctors reported having used the Clinitek reader at least once, but only 24% had ever used the Reflotron analyser, 12% the Nova analyser and 7% the Clearview testing kit. At the initial interview eight nurses (42%) were concerned about incorporating near patient testing into their workload.

Patient questionnaires were randomly distributed to patients receiving near patient testing and were returned by 133 patients who had cholesterol tests and 76 patients who had urine tests. Not all questions were answered by all patients. Of 132 patients who had a cholesterol test 64.4% had the test carried out immediately, a further 18.9% waited for a mean of 14 minutes and the remainder were asked to return later. Of 69 patients who had a

Table 1. Attitudes of practice staff to near patient testing before and after its introduction.

	% of GPs			% of nurses		
		After introduction			After introduction	
	Before introduction (n = 65)	Biochemistry (n = 59)	Bacteriology (n = 57)	Before introduction (n = 19)	Biochemistry (n = 26)	Bacteriology (n = 19)
Pressure on nurse time	*61*	*47*	*46*	*32*	*62*	*53*
Skills required by operator	*15*	*0*[a] *0*[c]	*0*[b] *0*[d]	*42*	*8*[a] *65*[c]	*11*[b] *21*[d]
Affect clinical management	*80*	*39*	*42*	–	–	–

n = total number of respondents. [a]Reflotron. [b]Clinitek. [c]Nova. [d]Clearview.

Table 2. Views of practice staff on the use of near patient testing.

	% of respondents			
	Reflotron analyser	Nova analyser	Clinitek reader	Clearview testing kit
Machine useful (GPs, *n* = 59/57)	*63*	*20*	*77*	*28*
Machine easy or fairly easy to use (nurses, *n* = 26/19)	*92*	*62*	*95*	*47*
Confident or fairly confident in results				
GPs, *n* = 59/57	*68*	*54*	*81*	*23*
Nurses, *n* = 26/19	*69*	*58*	*95*	*42*
Test carried out while patient waiting (nurses, *n* = 26/19)	*85*	*42*	*84*	*11*

n = total number of respondents for Reflotron, Nova/Clinitek, Clearview.

urine test 91.3% had their test immediately, 5.8% had to wait for a mean of 10 minutes, the remainder were asked to return later. Once tested, 77.5% of 129 patients received their cholesterol test result immediately and 18.6% had to wait a mean of five minutes; 79.2% of 72 patients received their urine test result immediately and 4.2% after six minutes.

Randomly distributed questionnaires were also returned by 164 patients who had cholesterol tests and 83 patients who had urine tests carried out at the laboratory. Of 160 patients who had a cholesterol test 46.9% had to telephone the surgery for the result after a few days, and 25.6% had to make an appointment to get their results. The remainder had to make other arrangements. Of 79 patients who had a urine test 27.8% received their result immediately, a further 27.8% had to telephone the surgery to make an appointment, and 26.6% had to telephone the surgery after a few days; the remainder had to make other arrangements.

When asked for the reasons why they would choose biochemistry near patient testing 76% of the 59 general practitioners cited rapidity of results, 47% patient convenience and 22% their own convenience. Comparable figures for bacteriology near patient testing were 63%, 44% and 26% of 57 doctors. However, half of 59 general practitioners (51%) commented that the limited range of tests available on the biochemistry machines meant that many samples would be sent to the laboratory anyway and, 31% found the local laboratory services more convenient; 47% cited lack of nurse time and 34% lack of general practitioner time as reasons for not choosing biochemistry near patient testing. Figures for bacteriology tests were comparable.

Quality assessment

Quality control. At least one nurse at each practice was able to fit internal quality control procedures into the daily routine. The exception was the Clinitek reader where a minimum check to test strip quality was not carried out routinely.

Parallel testing. Arrangements for parallel laboratory testing every fortnight were only established routinely in two practices. However, the majority (10 of the 12 practices) sent specimens periodically and results for these split samples were all reported by laboratory staff to be within the biochemistry laboratory's acceptable range. The only exception was gamma-glutamyl transferase, a chemically less stable test stick.

Standard samples from local laboratories. Systems for testing standard samples were set up successfully in the six south west Thames practices, but not in the west Midlands practices. Arrangements differed between each laboratory and practice and were largely determined by the enthusiasm of the senior biochemists, and practice staff availability. Biochemistry laboratories serving these practices were satisfied with the overall performance; however, the nurses involved in quality assessment at each practice commented that the information fed back to the surgeries was more suitable for interpretation by medical laboratory staff. No quality assessment procedures were carried out for the chlamydia test kits, as this was the subject of a separate study.

National schemes. For cholesterol tests 95% of results were within the acceptable range of the external assessment scheme. The scheme for haemoglobin was unsuccessful, partly because it was set up in the later stages of the study, but also because animal samples, rather than human samples, were supplied for analysis. The manufacturers of the Reflotron analyser recommend that material is analysed within 24 hours of collection. However, only 54% of the 26 nurses reported that samples for quality control from the laboratories were analysed within a day of arriving in the surgery and some were seven days old when analysed.

None of the general practitioners was involved in the routine quality assurance procedures.

Discussion

Overall the general practitioners in this study did not find the near patient testing apparatus a very useful addition to their resources. There may be two main reasons for this: use of the equipment placed increased pressure on nurses' time, and the fact that most investigations in general practice do not require an immediate result. Indeed, one of the perceived advantages of the time delay in obtaining results from the laboratory is that it allows extra time for self-limiting conditions to resolve, or for 'unorganized illness' to evolve. Half of the general practitioners drew attention to the limited range of tests available with biochemistry near patient testing. Most were very satisfied with the service provided by local laboratories and indeed some forgot at times that the near patient equipment was available

The availability of rapid test results should lead to greater convenience for doctors and patients. While near patient testing was not used as frequently as staff had anticipated, its introduction did have some limited effect on clinical management and prescribing habits.[9] Two of the four machines in this study were used mainly while the patient was waiting, and were genuine near patient tests. This did produce advantages for patients, in that patients reported fewer return visits or contacts with the surgery.

A principal concern regarding near patient testing, widely expressed by pathologists, has been the risk of inadequate quality assessment procedures, with unreliable results as a consequence.[10] This is an important aspect of any evaluation of new diagnostic technology in general practice.[11] Non-laboratory trained users of near patient testing are unaware of the general concepts of quality control, and this was borne out by the fact that none of the nurses interviewed raised quality assurance as an issue of concern before the introduction of near patient testing. Our impression from this study is that good quality assessment by general practice staff is feasible but depends on the availability of an enthusiastic nurse who understands the importance of the procedures and assumes responsibility for quality assurance. Nurses' enthusiasm, and the time they could make available for the tasks varied. Local laboratories were extremely helpful in providing samples and advice, but more formal arrangements, including regular visits from laboratory staff might be necessary to ensure that quality assurance procedures are continued. In Hobb and colleagues' study laboratory technicians visited the practice to supervise quality assurance.[7] This factor may explain

the higher level of substitution of near patient testing for laboratory tests in their study compared with the previously reported part of this study.[9]

One general justification for near patient testing is its ease of use by personnel not trained in laboratory skills. In this study general practitioners and their practice nurses were able to use sophisticated equipment, but those machines which were easiest and quickest to use were most popular. Local external quality assessment procedures were established by half of the practices, demonstrating their feasibility in the general practice setting. However, local laboratory involvement in practices' quality assurance procedures is highly desirable. Another justification for near patient testing is the immediacy of results. In this study, pressure on staff time was an important factor limiting near patient testing use. Patients were not always tested while they were at the surgery, defeating much of the purpose of near patient testing. Other factors limiting use were the restricted range of tests provided, and the perceived high quality and convenience of existing laboratory services. This study does not support the widespread introduction of near patient testing into general practice under present conditions.

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