case, and it appeared to be so in case 6 also. Buckner *et al* in Seattle recently reported the results of using cryopreserved autologous bone-marrow cells (supplemented in some cases by peripheral blood leucocytes) in the support of patients with CGL treated for transformation.²² They noted that reconstitution of lymphoid cells was defective in some of their patients. If, therefore, blood is a better source of pluripotential stem cells for autografting than bone marrow,² this might be partly because relatively larger numbers of stem cells with lymphoid potential can be collected from the blood than from the marrow.

This approach to the management of CGL can in no sense be regarded as curative. Instead, our preliminary results suggest that it may prolong life in some cases for one or more years.

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Biochemical testing for acute medical emergencies in four district general hospitals

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Summary and conclusions

Comparable samples of 200 medical emergency admissions in four district general hospitals showed a threefold difference in the mean number of biochemical test values provided per patient, nearly all of which were obtained from blood specimens. Hospitals had consistently high or low mean numbers of values per patient for specific tests and clinical presentations and whether first or repeat tests were considered. Only 30 out of 188 different test types were reported at all four hospitals.

Clinicians and chemical pathologists might benefit from regular expert advice on the most discriminating use of test information in cases with various clinical presentations.

Introduction

The growth in the number of requests for clinical biochemistry tests has been disproportionately greater than the growth in the numbers of patients treated in hospitals.¹ Automation of some tests and a change in the clinicians' approach to testing from being selective in their ordering to requesting complete biochemical profiles of their patients are generally accepted to have contributed to this increase.² The work loads of radio-diagnostic and physiotherapy departments have not increased so appreciably.³ The necessity for so much biochemical investigation has been challenged,⁴ and the need to evaluate its effectiveness in improving clinical treatment and outcome suggested.⁵ Some idea is first needed, however, of the range of biochemical tests being carried out by laboratories in specific clinical cases, such as we report here for acute medical emergencies.

Patients and methods

We selected four district general hospitals in four large urban areas of the Trent region, each of which had a busy accident and emergency department and provided a wide range of clinical services. Hospitals A and B were teaching hospitals, hospital B having only recently been designated and being without clinical teaching at undergraduate level. In each hospital a consultant chemical pathologist headed the clinical biochemistry department. The degree to which testing was automated varied. In hospital A 10 types of test were performed by one machine during normal working hours; at other times a smaller, six-test machine was used. The machine at hospital B provided only two simultaneous estimations. Hospital C used a four-test and a

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TABLE III—Mean numbers of primary values obtained for each group of tests used for two most common clinical presentations

Hospital	No of patients	Test group							Total
		Urea and electrolytes	Cardiac enzymes	Glucose	Liver function	Lipid profile	Blood gases	Other	
Chest symptoms and signs									
A	115	4.3	2.4	0.7	2.9	0.1	0.7	3.2	14.4
B	63	3.2	2.0	0.7	0.6	0.7	0.4	0.8	8.4
C	85	3.9	1.6	0.9	0.7		0.4	0.5	8.0
D	101	5.6	0.7	0.7	0.6	1.2	0.8	0.4	10.1
Known overdose									
A	19	1.6		0.1	0.1			2.2	4.0
B	79	0.9		0.1	0.3		0.1	1.0	2.2
C	48	0.8		0.1	0.9			0.5	2.4
D	41	3.2		0.1	1.0		0.6	2.1	7.0

Each hospital reported three values in the lipid profile battery. Two values (serum cholesterol and triglyceride concentrations) were included in each hospital's profile. Three hospitals reported the serum appearance, while the fourth reported Frederickson's classification. For patients with chest symptoms hospital D made considerably more use of these tests than the other hospitals, and they were not used at all for patients with chest symptoms in hospital C.

There was a twofold difference among the hospitals in the mean number of primary blood gas values imparted per patient with chest symptoms. Other tests—measurement of serum creatinine concentrations in particular—were used most frequently in hospital A. In cases of known drug overdosage wide differences in the average numbers of electrolyte and LFT values existed between hospitals. The high level of reporting other test values in hospital D was largely due to measurements of the serum salicylate and barbiturate concentrations, while that in hospital A did not reflect a resort to any particular test.

Discussion

In this survey we found that extremely dissimilar types and amounts of biochemical test data were imparted in different hospitals for groups of patients with comparable clinical presentations. Since the rate of growth of acute services is being curtailed by economic circumstances, it would have been encouraging if a high volume of initial testing had permitted more rapid clinical appraisal and hence earlier discharge. Hospitals with high volumes of primary testing, however, also had high volumes of repeat testing and, if anything, tended to keep patients longer. What the higher level of investigation achieved is difficult to say. It did not reduce the likelihood of death. It may, however, have found the occasional result that was outside normal limits, leading to further investigation. The multiplicity of results may also have clouded the main issue for the investigating doctor, causing him to order additional clarifying tests. The onus, therefore, is on high-volume laboratories like that in hospital A to justify so much investigation.

Exactly how much of the information supplied by these laboratories was superfluous for diagnostic precision and control of treatment is not known, nor is to what extent these functions suffered from lack of data and whether the general physicians were satisfied with the information they received. As well as variations in the amounts of data, there were appreciable qualitative differences, but whether these reflected the choices of the ordering physicians or the heads of the laboratories is uncertain. Enzyme studies are usually invoked to investigate possible organ damage, as in myocardial infarction, but the range of enzyme types varied between hospitals. Even before this study doubts existed about whether the routine measurement of enzyme activity in myocardial infarction affects decisions on diagnosis or treatment.⁶ Blood lipid concentrations are more often used to investigate cardiovascular disease in some hospitals than in others. The value of liver function tests, electrolyte studies, and estimations of serum drug concentrations in cases of drug overdosage also appears to merit further examination.

In teaching hospitals overinvestigation may be necessary to teach effectively. In this study the repertoire of tests used in

the teaching hospital that had clinical students was in fact no broader than that in the other hospitals. This hospital simply used the same tests more frequently, reflecting perhaps a tendency to confirm for students the exclusion of diagnoses that could be excluded clinically and to show them the biochemical effects of treatment.

What then can be done to rationalise the use of laboratory investigation? Laboratories already co-operate to monitor the accuracy and precision of testing procedures through the national quality control scheme. Both clinical biochemists and ordering physicians may be receptive, therefore, to circulated advice on the value of individual tests in specific clinical circumstances, such advice necessarily arising from the pooled experience of acknowledged experts until evaluative trials become a routine source of information. As a method of promoting good and efficient practice in the fields of clinical and resource management precedents for this exist in the *Notes on Good Practices* circulated by the DHSS to health authorities; in *Prescribers' Journal*, an independent journal that carries expert opinion on matters related to drug prescribing; and in the cost comparisons of different pharmaceutical products having similar pharmacological actions, which are circulated by the DHSS to individual practitioners. (While such an advisory service might serve to promote more judicious selection of the type of test indicated or even to show how more discriminating use might be made of information already collected,⁷⁻⁹ clinicians do not always respond to advice on overutilisation even when they have agreed on the criteria for using certain tests.¹⁰) In formulating these criteria test information must be appraised according to its effect on clinical outcome.⁵

It follows that testing equipment should be built to specifications and used in ways that reflect the clinical usefulness of the data it produces.

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