MEDICAL PRACTICE

*Contemporary Themes***Can preliminary screening of dyspeptic patients allow more effective use of investigational techniques?**

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Abstract

A total of 1041 patients with undiagnosed dyspepsia were interviewed to determine whether they required investigation for organic disease. The interviewer, a research assistant without medical qualifications, used a standard data sheet. The information obtained was analysed by computer, and, according to the results, patients were predicted to be at high, medium, or low risk. They were then followed up and the final diagnosis was compared with the risk predicted by computer. Patients predicted to be at low risk had a 10% chance of having ulcer disease and a 0.3% chance of having cancer, whereas patients predicted to be at high risk had a 20% chance of having ulcer disease and a 10% chance of having cancer.

Appropriate preliminary screening of patients with acute dyspepsia can separate a group at low risk who will require investigation only if their symptoms do not resolve and a group at high risk requiring urgent outpatient consultation.

Introduction

In 1980 Gear and Barnes estimated that roughly 1% of the patients on the list of an urban general practice present each year with

dyspeptic symptoms of more than two weeks' duration.¹ The general practitioner has to decide which of these patients have non-ulcer dyspepsia and require only reassurance and antacids and which have organic disease requiring investigation and specific treatment. The decision is difficult, as the high proportion of negative investigations in previously published reports suggests.²⁻⁴

In the Airedale district of west Yorkshire general practitioners can refer dyspeptic patients either to a hospital based clinic for investigation of dyspepsia by endoscopy or to the department of radiology for a barium meal. The difficulty of predicting which patients have organic disease can be judged by our records showing that 72% of all barium meal examinations requested by general practitioners yield normal x ray pictures. A normal x ray picture, it can be argued, will reassure both the patient and the doctor but it is perhaps an expensive luxury. If the radiological waiting lists are long the x ray report can be misleading as an ulcer may well heal before the x ray examination is performed. A long waiting list will also result in a delay in the diagnosis and treatment of organic disease, especially important for patients with cancer.

Patients referred to the dyspepsia/endoscopy clinic are presumably those with severe symptoms; an examination of our records showed, as expected, a higher proportion of active pathology (50%) in this group of patients, but even this ratio is far from ideal. Against this background we set up the present study to identify those dyspeptic patients who require investigation. In 1975 de Dombal and Horrocks showed that a physician's assistant without medical qualifications can be taught to take an accurate and structured case history⁵ and that, with the aid of simple computer techniques, these data can be used to produce an accurate diagnostic prediction.⁶ They then went on to show that such a programme can be transferred from one geographical area to another without loss of accuracy.⁷ Using these techniques we screened patients presenting to their general practitioner with dyspeptic symptoms of more than two weeks' duration, patients about to undergo barium meal examination for dyspepsia, and patients attending a clinic for investigation of dyspepsia by endoscopy. We report the results of this study.

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Patients and methods

At the start of this project one of us (PMD), who had been trained as a medical secretary, was taught to take a structured and reproducible case history, using a special form (figure), from patients with dyspeptic symptoms. Subsequently, she interviewed 1041 patients presenting with

senting symptoms of over 400 patients with confirmed upper gastrointestinal tract disease. The computer was programmed to display the percentage probability of the patient having gastric cancer, gastric or duodenal ulcer, hiatus hernia, functional dyspepsia, or cholecystitis (box).

NAME:		AGE:	SEX:	SURVEY NO:
DURATION OF PAIN/SYMPTOMS:		REFERRING DIAGNOSIS:		
PAIN:		NAUSEA: Yes/No VOMITING: Yes/No		
SITE: ONSET: CURRENT:		• HAEMATEMESIS: Yes/No REFLUX: Yes/No		
SEVERITY: Moderate/Severe		APPETITE: Normal/Decreased		
PROGRESS: Better/Same/Worse		• DYSPHAGIA: Yes/No • PREV INDIG: Yes/No		
• AGGRAVATING FACTORS:		• JAUNDICE: Yes/No • RECTAL PAIN: Yes/No		
• RELIEVING FACTORS:		WEIGHT: Steady/Decreased/Increased		
• RADIATION:		• BOWELS:		
• TYPE OF PAIN: Intermittent/Steady/Colic/Continuous/Episodic/Cont Attacks		• MICTURITION:		
• RELATIONS TO MEALS:		DETAILS AND/OR OTHER SYMPTOMS:		
• NIGHT PAINS: Yes/No				
PAST HISTORY: (give details)		SOCIAL HISTORY: (give details)		
PREV SIMILAR PAIN: Yes/No		DRUGS:		
PREV ABDO SURGERY: Yes/No		FAMILY HISTORY:		
OTHER SIG ILLNESS: Yes/No		SMOKING:		
		ALCOHOL:		
		OCCUPATION:		

Case history of patient with undiagnosed dyspepsia and probabilities of possible causes calculated by computer

Male	Night pain
Age 60-69	No nausea
Retrosternal pain	No vomiting
No radiation	No haematemesis
Duration 2-4 weeks	Reflux
Continuous	Anorexia
Severe	No previous indigestion
Same	No jaundice
Aggravated by posture	Constipation
Unrelated to food	Normal micturition
Odd relieving factors	Decreased weight
Taking drugs	

PROBABILITIES	
Functional	0%
Cholecystitis	0%
Duodenal ulcer	0%
Gastric ulcer	8%
Gastric cancer	90%

On the basis of these probabilities patients were placed in one of three risk categories. The high risk group consisted of all patients with a greater than 10% probability of having gastric cancer (308 patients); the medium risk

Standard form used to take structured, reproducible case history.

TABLE 1—Computer predicted risk compared with final diagnosis in 1041 patients with undiagnosed dyspepsia aged above and below 50. Figures indicate numbers (%) of patients

Final diagnosis	Computer risk group									Total (n=1041)
	Low			Medium			High			
	Aged <50 (n=169)	Aged ≥50 (n=132)	Total (n=301)	Aged <50 (n=265)	Aged ≥50 (n=167)	Total (n=432)	Aged <50 (n=76)	Aged ≥50 (n=232)	Total (n=308)	
Normal	146	73	219 (73)	160	72	232 (54)	58	111	169 (55)	620
Hiatus hernia	10	37	47 (16)	16	24	40 (9)	7	35	42 (14)	129
Duodenal ulcer	12	13	25 (8)	79	55	134 (31)	7	31	38 (12)	197
Gastric ulcer	1	5	6 (2)	9	13	22 (5)	2	21	23 (7)	51
Cancer: Gastric	0	1	1 (0.3)	1	1	2 (0.5)	2	22	24 (8)	27
Other	0	0	0	0	0	0	0	7	7 (2)	7
Other	0	3*	3 (1)	0	2†	2 (0.5)	0	5‡	5 (2)	10

*Oesophageal stricture; oesophageal ulcer; achalasia. †Oesophageal ulcer; achalasia. ‡Oesophageal stricture × 3; Ménétrier's disease, leiomyoma.

TABLE 2—Comparison between risk scores calculated by the system of Mann et al⁸ and final diagnoses in 397 patients with undiagnosed dyspepsia

Final diagnosis	No of patients interviewed in a general practice surgery					No of patients interviewed in a dyspepsia/endoscopy clinic				
	Factor score				Total	Factor score				Total
	6-8	9-10	11-12	≥13		6-8	9-10	11-12	≥13	
Normal findings	56	46	20	2	124	41	21	20	5	87
Hiatus hernia	8	15	5	7	35	12	15	11	4	42
Duodenal ulcer	3	10	11	6	30	7	16	17	2	42
Gastric ulcer	2	2	2	0	6	1	3	3	7	14
Cancer	1	1	2	0	4	1	2	5	3	11
Other			1	1						
Total	70	74	41	16	201	62	57	56	21	196

undiagnosed dyspepsia. Four hundred and ninety six were interviewed in the hospital outpatients department immediately before being seen by the medical staff of the dyspepsia/endoscopy clinic. Three hundred and forty four patients, who had been referred by their general practitioner for a barium meal, were interviewed in the department of radiology immediately before undergoing x ray examination. Finally, she visited three group practices once each week and interviewed 201 patients with dyspeptic symptoms of over two weeks' duration.

The resulting structured case history, which took about 10 minutes to obtain, was then coded and entered into an Apple II desktop microcomputer. Each case history was matched against a database produced from the pre-

group of all those predicted to have ulcer disease (432 patients); and the low risk group of the 301 patients remaining. All 1041 patients were then followed up until a final diagnosis was reached. This diagnosis was compared with the risk category predicted by computer.

Results

Table 1 shows the results of the 1041 interviews, compares the computer assigned risk group with the final diagnosis, and shows the proportion of patients in each risk group in whom particular diagnoses were made. Few

patients in the low risk group were found to have serious pathological abnormalities; duodenal ulcers were found mainly in patients predicted to be at medium risk; and almost even numbers of patients predicted to be at medium and high risk were found to have gastric ulcers. Of the 27 patients with gastric cancer, 24 (89%) were in the high risk group as were all seven with non-gastric cancers.

Table I also shows the results of all the interviews when the groups were divided according to age into patients above and below the age of 50.

Table II shows results obtained using the scoring system devised by Mann *et al.*⁸ Relevant data were available on 397 of our patients, 201 of whom were from the group interviewed in a general practitioner's surgery and 196 from the group interviewed in the dyspepsia/endoscopy clinic. Of the patients interviewed in a general practitioner's surgery, 70 (35%) scored a factor of eight or less. Six (9%) of these 70 patients had serious disease, which would have been missed if we had, as recommended by Mann *et al.*, investigated only those patients to score more than eight. In those who did score more than eight the incidence of serious disease was only slightly higher (17%). Of the patients interviewed in the dyspepsia/endoscopy clinic, 62 (32%) scored eight or less. Nine (15%) of these had serious disease compared with 58 (43%) of those with a score of over eight. The factor scoring system was thus more successful in the setting of the dyspepsia/endoscopy clinic than in the general practice surgery. It should be noted that two of the 15 cancers were found in patients with a score of eight or less.

Table III shows that the computer prediction did not depend on the stage of a patient's illness. Similar results were obtained at first presentation to the general practitioner's surgery, after referral for a barium meal examination, and at a dyspepsia/endoscopy clinic. Fewer pathological abnormalities, however, were found in the group of patients referred for radiological examination (28%) than in those referred to the dyspepsia/endoscopy clinic (50%).

TABLE III—Comparison between computer predicted risk and final diagnosis in patients interviewed at three different sites. Figures indicate number (%) of patients

Final diagnosis	Computer risk group		
	Low	Medium	High
<i>Patients interviewed in dyspepsia/endoscopy clinic (n=496)</i>			
Normal	85 (69)	98 (44)	68 (45)
Duodenal ulcer	9 (7)	80 (36)	23 (15)
Gastric ulcer	6 (5)	16 (7)	16 (11)
Cancer	1 (0.8)	2 (0.9)	24 (16)
Total	124	222	150
<i>Patients interviewed in general practice clinic (n=201)</i>			
Normal	49 (70)	42 (54)	32 (61)
Duodenal ulcer	3 (4)	22 (28)	5 (9)
Gastric ulcer		4 (5)	2 (4)
Cancer			4 (7)
Total	70	78	53
<i>Patients interviewed in department of radiology (n=344)</i>			
Normal	85 (79)	92 (70)	69 (66)
Duodenal ulcer	13 (12)	32 (24)	10 (10)
Gastric ulcer		2 (1.5)	5 (5)
Cancer			3 (3)
Total	108	132	104

Discussion

The difficulty of distinguishing between dyspeptic patients with and without organic disease is well recognised. In a survey of barium meal studies performed in north east Scotland over four years 51% of 19 667 examinations yielded normal results.⁴ Provision of an open access endoscopy service for general practitioners has also brought problems, with the number of endoscopies performed rising dramatically and the waiting list lengthening to three months without a corresponding decrease in the number of barium meals requested by the general practitioners.² Thus the inability of most doctors to separate dyspeptic patients with organic disease from those without organic disease results in a large number of investigations being performed in patients without organic disease. In these days of scarce resources this is an expensive luxury; but of even more importance are the delays, produced by long waiting lists, in the diagnosis and treatment of those patients who have ulcer disease or cancer.

In 1980 we set up the screening programme described above for dyspeptic patients using techniques developed at Leeds.⁵ Of the patients whom we predicted to be at low risk, few had organic disease and only one was found to have cancer (out of 34 patients

with cancer in this study). This was a 56 year old man who was completely symptom free at the time of interview (by research assistant and consultant) and whose condition would have remained undetected by this or any other system relying on the symptomatic picture. The medium risk group contained 63% of all the patients with peptic ulcer disease and two patients with cancer. The high risk group contained 61 (25%) of the patients with ulcers and 31 of the 34 patients with cancer.

We subdivided the high risk groups further by age into those patients above and below the age of 50. As expected,⁹ most of the pathological abnormalities in the high risk group were found in older patients. If, however, instead of using the screening programme all patients over the age of 50 had been investigated the number of patients requiring investigation would have risen from 232 to 531 and three patients with cancer would have been missed (table I).

The interviews were conducted at one of three different stages of the patient's illness, and the results of the screening programme were similar for all three stages, showing the programme to be as effective in the early stages of a patient's illness as at a later stage.

Our results show that the techniques developed in Leeds⁵ can be used to differentiate a group of dyspeptic patients at low risk, who should be investigated only if their symptoms fail to resolve with simple measures such as antacid treatment, a group at medium risk and a group at high risk. Patients predicted to be at medium risk and those at high risk aged below 50 should be referred for routine barium meal investigation or endoscopy. Patients predicted to be at high risk and aged over 50 require urgent investigation. One of the prime purposes of this study was to delineate a group of patients at high risk, and this appears to have been achieved quite successfully.

What would have happened had such a policy been in force during this study? The benefits are obvious—a fall of almost one quarter in the number of investigations required. The costs (to the patients with organic disease in the low risk group “missed” by the system) were perhaps not excessive as we never envisaged that these patients would be abandoned but merely that their investigation would be deferred in the first instance. In most of those with peptic ulcer, symptoms persisted, and they would thus have come to investigation a few weeks later. (None in fact perforated or came to harm during this period.)

There remains the problem of the single asymptomatic patient with cancer. We have no wish to minimise the gravity of this error by our screening programme but would point out that no symptom based system would have identified this lesion. Indeed, at the time of his investigation experienced clinical opinion was highly sceptical about its possible value. Moreover, it can be argued that this error and its consequences would have been more than counterbalanced by the rapid recourse to appropriate investigation in the 31 high risk patients who had cancer. Indeed, Clamp and Wenham have recently indicated that waiting time can be dramatically reduced in this group.¹⁰

Finally, the scoring system devised by Mann *et al.*⁸ when applied to our data was less effective as a method of preliminary screening of dyspeptic patients.

A screening programme of this type therefore has some potential benefits both for use of resources and for patients, it could be made self financing by the reduced number of investigations performed. Interviewers would be employed by the local hospital and would visit general practitioners' surgeries each week and interview all new dyspeptic patients. The actual computer program can be adapted to run on any desktop microcomputer with a 12K memory store. It may, moreover, be possible to simplify the screening procedure further by the use of weighted tables rather than a computer. Certainly, cautious wider usage (with thorough evaluation) is indicated by experience to date, and comparative studies are now being carried out to look at the various possibilities raised by the present trial.¹¹

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Needs and Opportunities in Rehabilitation

Aids and the environment

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Aids

"Logistics is part of rehabilitation," a consultant said to me—"getting the right thing to the right person or place at the right time."¹ Many people are providing this kind of service; but I have heard much about failures in all these aspects. In particular, delays in the supply of aids and in making adaptations may run into months or even years. Meanwhile the need may have changed or passed, or the patient may have found some unsatisfactory solution.^{1a}

The need for an aid may not be identified in the first place because the right questions are not asked or no professional looks at the patient's home and life, or no one knows of the existence of the relevant aid. Some aids moreover are incorrectly prescribed or supplied or are not the best possible; while others are not used to the best advantage, perhaps through lack of demonstration and discussion or because they are not simple enough solutions to the problem. The aids to concentrate on are those that are crucial to the patient, not the ones someone else thinks he or she should have, like the stair hoist installed for a woman who turned out to sleep downstairs. Aids that are not used are commonplace.² In a survey of 500 people with aids by Page *et al* half of all the aids were not being used.³ Apart from deficiencies in the items prescribed, in some cases an aid was not an acceptable solution—what was needed was personal help. Better aids, these authors conclude, better information about the aids, and better matching of aids to people are called for. The need for instruction in use and follow up visits by occupational therapists emerges from studies in Leeds of bath and toilet aids.^{4,5} Staff shortages are the difficulty here, but expensive problems later could be prevented.

A guide to aids and adaptations is provided in *Coping and Disability*⁶ and a summary of the types of aids and appliances is given in *Rehabilitation Today in Great Britain*⁷; sources of aids and information on them are listed in a DHSS booklet.⁸ Two series of detailed information about different categories of aids are published (see last article, 12 January, p 132). One off devices to meet special needs are produced by REMAP (box). Aids centres (figure),^{8,9} of which the Disabled Living Foundation was the first, are spreading: there are now 17, most supported by statutory services; but they cannot be accessible to everyone, and the client usually must get the equipment elsewhere. Mini displays in hospitals would be a possi-

REMAP

One off aids for people with special needs are produced by Rehabilitation Engineering Movement Advisory Panels (REMAP—part of the Royal Association for Disability). These groups of engineers, doctors, remedial therapists, and social workers give their time freely and the work is done in members' homes and sometimes educational establishments, etc. No charge is made except occasionally for materials. Requests are mainly from social service departments and health authorities. Apart from aids to daily living of many kinds, a lot of imaginative items have been produced to cater for special interests, such as wheelchair binoculars on a gantry for an arthritic bird watcher, a camera fixed to a wheelchair for a one handed person, arm supports for archery and for a violinist, a holder for a mouth organ, a stool on wheels for table tennis, a fishing aid for use after a stroke, and periscopes for use on a wheelchair and for a housebound person who had had an amputation.

bility, given adequate space, since manufacturers may loan or donate their wares, though costs are making this increasingly difficult for expensive items. Some hospitals should be able to provide certain aids out of their own stock to avoid the delays inherent in ordering through social service departments, and then have the cost reimbursed by social services; but this is not as straightforward as it sounds. There are about 20 joint schemes for supplying aids—that is, funded both by health authorities and by social service departments—and these are said to have resulted in a quicker and more effective service. A survey to assess problems and benefits is thought by some to be needed. An important point is the role of general practitioners: the time will come, it is hoped, when they will make more use of both occupational therapists and aids centres.

A rehabilitation department I visited itself provides aids on occasion; more often patients are encouraged to buy small things for themselves. A mail order catalogue of inexpensive products for the disabled should surely be kept in every GP's surgery and every day centre, together with a list of local and national information