trial. In this way, as Franks11 cogently observed to the United States Atomic Energy Commission in 1947, we shall not acquire as much knowledge but we shall be a little more certain that the "facts" we "know" might be correct.

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Appendix

There were two major problems inherent in analysing these data statistically.

Firstly, we had to decide whether to view the comparison between observer A (a consultant surgeon) and observer B (a more junior person) as comparisons between observers or as comparisons between one observer (B) and a standard (A). In the former case methods such as those advocated by Kendall and Stuart* would have been applicable; in the latter measures such as those of Yerushalmy.9 We adopted the former method. Although the consultant had an advantage in terms of experience, we considered that no one individual is sufficiently authoritative to be regarded as "the standard." When the clinician and his findings are measured against the findings of a pathologist it may be more appropriate to use "standard-setting" methods.

Secondly, as often happens in clinical medicine, some features of breast lesions are judged to be absent much more often than they are present. The customary form of notation for expressing the outcome of dichotomous observations made by two independent individuals is as follows:

						Observer A		
						+		Total
Observer B						P	P.,	Р.
						P ₁₁ P ₂₁	P ₁₂ P ₂₂	P ₁ . P ₂ .
Total						P.1	P.2	1

Here the "usual" means of measuring observer agreement $(po=P_{11}+P_{22})$ is totally inadequate. This has been characterised as the "index of crude agreement" by Rogot and Goldberg.15 We used in this case a combination of the methods of Dice16 and Rogot and Goldberg, and attempted to produce an index of agreement which reflects the chance of the "other" observer agreeing with a positive finding by either. We opted to avoid the chance-corrected agreement statistics of Scott¹⁷ and Cohen¹⁸ since the latter assume homogeneity and independence. We also ignored the statistic of Cichetti¹⁹ for assessing disagreement along a continuum—for example, tumour size since we are by no means sure (on medical grounds) how to allot correct "weighting" to the gravity of the "error."

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Upper gastrointestinal endoscopy—a GP service

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Summary

Since 1974 there has been an open endoscopy service available to general practitioners in the Bournemouth and Christchurch area. Patients are referred directly with a standard form. A retrospective comparison of requests for barium-meal examinations and for endoscopy by general practitioners showed that the reasons

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for referral were similar. Forty per cent of patients in each group showed no abnormality. Ulceration was found in 21.1% of patients who underwent endoscopy and 9.7% investigated by barium meal. Duodenitis or gastric erosions were found in a further 16% of endoscopies. More hiatus hernias and deformed duodenal caps were found at barium meal. Despite these differences the results of follow-up were similar.

Introduction

Fibreoptic instruments permitting upper gastrointestinal endoscopy have been available for routine use only in the past decade; their use has been largely confined to patients selected by hospital doctors. Direct referral by general practitioners for barium-meal examination has been widely available for several years, but there has been no report of a direct referral upper gastrointestinal endoscopy general practitioner service.

GPs have been able to request barium-meal examinations at

this hospital for the past 10 years. In 1974 an upper gastrointestinal endoscopy service was made freely available. Reports have suggested that fibreoptic examination of the upper gastrointestinal tract may be more useful than radiology, disclosing more disease and enabling lesions to be biopsied.

We have reviewed the outcome of 304 patients who underwent endoscopy at the discretion of general practitioners over the first 27 months of the service. There was no prior requirement for a barium meal. For comparison we have summarised the results of 191 GP-requested barium-meal examinations from February to July 1977.

Methods

In February 1974 the GPs in the Royal Victoria Hospital catchment area were informed that the endoscopy service would start. They were supplied with request forms that were to be sent to the staff nurse in charge of the endoscopy unit. She is responsible for booking the patients and instructing them on the regimen. It is important that patients should realise that they cannot drive themselves home and that they will remain in hospital for about three hours.

TABLE I—Reasons for referring patients for examination

		unde ende	nts who erwent oscopy = 304)	Patients who underwent barium meal (n = 191)	
		No	0	No	0.0
Dyspepsia Vomiting Dysphagia	 	 260 6 13	(85·5) (2) (4·3)	156 23 10	(81·7) (12) (5)
Anaemia or g bleeding or	estinal • •	 25	(8.2)	2	(1)

TABLE II—Summary of findings in the endoscopy and barium meal groups

	Patients who underwent endoscopy (n = 304)		Patients who underwent barium meal (n = 191)	
	No	0	No	00
Desophagitis or hiatus hernia or both	59	19-4	57	29.8
and/or inflamed pylorus (3 only) Prepyloric ulcer or duodenal	43	14.1		
ulcer or both	41 25	13·5 8·2	11	5.6
Gastritis	21 2	6·9 0·7	5 3*	2·6 1·6
Deformed duodenal cap or pylorus but no duodenal ulcer sastric erosions	6 5	2% 1.6	24	12.6
Desophageal stricture benign malignant	6 5 4 1	1.3	3 1	1.6
Normal	119	0·3 39 %	80	0·5 41·9
volvulus of stomach, or malabsorption)			7	3.7

^{*}Two were subsequently shown to be benign. Note: Some patients at endoscopy had more than one lesion present—for instance, gastric and duodenal ulcers.

We use a day ward with 11 beds for preparation and recovery and a separate clinical investigation room to perform the gastroscopies. In most examinations an Olympus GIF-K Oblique Viewer fibrescope with Olympus CLE light source was used. An Olympus GF B2 sideviewing fibrescope was used for the remainder.

Immediately before the examination the patient's throat was sprayed with a local anaesthetic and 5-20 mg diazepam (Valium) was injected intravenously, the patient lying in the left lateral position. This dose of diazepam was exceeded in some cases, usually in fit young adults with high tolerance to sedation. As experience was gained we used less diazepam to premedicate. The gastroscopies were performed by the gastrointestinal unit, two members of which are clinical assistants from general practice, trained in using fibreoptic instruments. Two half-day sessions a week are used for this service, 8-12 patients being examined in each session.

After examination reports were sent directly back to GPs unless there was serious disease, when a hospital appointment would be made. Patients who were discovered to have peptic ulcers were asked to return about two months later for another endoscopic examination. Lesions were biopsied at the discretion of the operator.

Three to 30 months after endoscopy and five to eight months after barium-meal examinations, the GP's records were studied to find out what happened to the patients. The amount of information was limited but we have tried to enumerate those patients who have recovered, those still needing treatment or future investigation, and those who had subsequent surgery.

Results

GPs referred 304 patients for gastroduodenoscopy in the 27-month period under review. Eighty GPs were informed and 45 used the service. The number of patients referred by each doctor varied from one to 40. The average age of patients was 50 years, and the average waiting time between referral and examination was 29 days.

The reasons for referral are given in table I and the indications for endoscopy and barium meal are broadly similar. Table II summarises the findings of both endoscopic and barium-meal examination. In most cases GPs referred patients with symptoms attributable to peptic ulceration, both doctor and patient wishing to know if there was a lesion that could be treated to avoid symptoms and complications. Using endoscopy 21·1% of patients had ulcers (both gastric and duodenal), whereas only 9·7% of patients had ulcers shown on barium meal. If we also include the patients who have endoscopically diagnosed gastric erosions or duodenitis 35·2% of patients had abnormalities justifying specific treatment.

A higher proportion of hiatus hernias were disclosed by radiology as might be expected. We do not know how many of these hiatus hernias were causing symptoms. The numbers and types of oesophageal stricture discovered by both procedures were similar.

Gastritis was included in the follow-up results (table III) because it featured on 25 endoscopy reports. This diagnosis was made macroscopically, however, and the findings do not necessarily correlate with histological appearances.

TABLE IV—Results of follow-up endoscopy of 62 patients with ulcers. Percentages given in parentheses

	Total	Healed	Referred for surgery	Lost to follow-up or not rescoped
Duodenal ulcer	41	19 (46·3)	5 (12·2)	17 (41·5)
Benign gastric ulcers	21	11 (52·4)	3 (14·3)	7 (33·3)

TABLE III—Follow-up (3-30 months later) of 304 patients referred by GPs for gastroscopy

	Total	Symptoms settled	Continuing symptoms	Referred for surgery	Lost to follow-up
Oesophagitis or hiatus hernia or both Duodenitis or erosions or inflamed pylorus Prepyloric ulcer or duodenal ulcer or both Gastritis Gastric ulcer { benign malignant	59 43 41 25 21 2	36 (61) 31 (72) 26 (63·4) 15 (60) 14 (66·7)	20 (33·9) 7 (16·3) 4 (9·7) 8 (32) 3 (42·3)	5 (12·2) 3 (42·3) 1 (50)	3 (5·1) 5 (11·6) 6 (14·6) 2 (8) One died two week
Deformed duodenal cap or pylorus but no ulcer Gastric erosions Oesophageal stricture { benign malignant	6 5 4 1 119	4 (66·7) 5 (100) 3 (75) 92 (77·3)	2 (33·3) 19 (16)	1 (25) 1 (100)	after 'scopy 8 (6·7)

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TABLE V-Follow-up (five to eight months later) of 191 patients referred by GPs for barium meal

	Total	Symptoms settled	Symptoms continue	Referred for surgery	Lost to follow-up
Normal Reflux or hiatus hernia or both	80 57	68 (85) 52 (91·2)	11 (13·7) 5 (8·8)		1 (0·12) 1 (4·2)
Deformed duodenal cap or pylorospasm or both Duodenal ulcer Oesophageal stricture { benign malignant	24 11 3	23 (95·8) 10 (91) 3 (100)		1 (9)	1 (4·2)
Gastric ulcer { benign malignant	5 3	4 (80) 2 shown to be benign at gastroscopy		1 (20)	1 (Died)
Other	7	Oesophageal foreign boo	ly, duodenal diverticulae (3 lae (?) and malabsorption	, volvulus of stomach,	

Morbidity from these examinations was low; superficial thrombophlebitis at the site of diazepam injection being the most frequent complaint. No death could be attributed directly to endoscopy, although one patient died one week later from a myocardial infarct and another from complications of carcinoma of the oesophagus, two weeks after it was discovered at endoscopy.

Arrangements were made for most patients found to have ulcers to have another gastroscopy after about two months. No such arrangement was made after barium-meal examination. The results of followup endoscopy of the patients with ulcers is summarised in table IV.

Very few patients had both endoscopy and barium meal for the same symptoms. Of those who had, one patient was found to have a gastric ulcer at endoscopy after a normal barium meal, and another was not found to have a gastric ulcer at endoscopy after a barium meal had been suggestive. This patient subsequently had a haematemesis and was shown to have a gastric ulcer at operation. Two ulcers found at barium-meal examination were thought to be malignant but were biopsied at endoscopy and reported to be benign.

The results of follow-up are summarised in tables III and V. Most patients with ulcers settled with or without treatment. Some still needed treatment, mostly in the form of antacids at the time of follow-up. No patient developed complications from a lesion missed at the initial examination, except the patient discussed above who bled from a gastric ulcer missed at endoscopy after a barium meal. A high proportion of patients with oesophagitis continued to have symptoms. Lastly, both barium meal and endoscopy showed about 40% normal

Discussion

Cotton, using gastroscopy, found lesions of clinical importance in 32° of patients in whom barium-meal examinations within the past month had been reported as normal. We show that gastroscopy found two-and-a-half times as many peptic ulcers as radiology, and if we also include duodenitis and erosions the ratio is increased to over four times. The importance of macroscopically identified duodenitis in causing symptoms and the imperfect correlation with histology combined with the fact that in the survey duodenitis has been used to describe changes ranging from a mildly abnormal vascular pattern to multiple shallow ulcers makes interpretation of this finding difficult. Thomson et al^2 agree that symptoms may be correlated to duodenitis.

Not unnaturally doctors will be concerned about the dangers of gastroscopy when barium-meal examinations have been used with minimal complications for many years. Morbidity and mortality from endoscopy have been reviewed by Schiller and Prout³ and will of course vary with the experience of the endoscopist. We found no deaths directly attributable to endoscopy and GPs reported few troublesome side effects.

We believe that gastroscopy by having less false-negative results should reduce the complications of the patient's primary disease. In this small pilot study, however, most patients in both groups settled with or without specific treatment and only a few persisted in attending their GPs with the same complaint. No patient developed complications from a lesion missed at their investigations, except the one who bled from his gastric ulcer missed at endoscopy. The follow-up period for gastroscopy was longer than for radiology.

Of those patients reported as showing oesophagitis at endoscopy (61%), 33.9% continued to have symptoms at follow-up. Only 8.7% of patients diagnosed by barium meal to have hiatus hernias continued to have symptoms at follow-up. One explanation is that the demonstration of a hiatus hernia by barium meal may be irrelevant to symptoms—for example, duodenitis may be present.

The conclusions to be drawn from a pilot study such as this must be limited. No attempt was made to randomise the patients or match the two groups. Furthermore, the analysis is retrospective and the information available is limited by the brevity of the GPs' notes.

Few doctors would disagree that ideally one should use both radiology and gastroscopy to investigate the upper gastrointestinal tract in all patients with upper gastrointestinal symptoms. In this hospital about 550 GP-requested barium meals are performed a year and at the time of writing 600 GPrequested endoscopies a year. Neither department could take on the work-load of the other without drastically limiting the range of the service. Our practitioners are happy with both services and without them the waiting lists for an already overloaded gastroenterology outpatient clinic would lengthen.

We hope we have shown the feasibility of a direct referral GP gastroscopy service. Although we believe gastroscopy has a lower false-negative rate, we are unable to state whether the advantages to the patient of more accurate diagnosis will reduce the complications of the primary disease more than the increased risk of the diagnostic procedure. A properly controlled prospective trial with randomisation of patients might help to resolve this issue.

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WORDS Drugs, poisons, diseases, and injury that cause death are said to be fatal or lethal. Why fatal? In Greek mythology there were three Fates. These ladies controlled the thread of life. Clotho spun the thread and Lachesis mixed the strands of good and evil fortune. She passed it on to Atropos, who cut the thread of life. A-tropos, no turning; she could not be turned aside from her task. Hence, atropine from atropa belladonna, the deadly nightshade. The fates were concerned not only with death but with birth and the course of one's life. So perhaps fatal is not a suitable word for something causing death, and lethal (L letalis; letus, death) is the better choice. Anything to do with the river Lethe?