Peptic ulcer in hospital

An analysis of a 10% in-patient enquiry throughout England and Wales

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EDITORIAL SYNOPSIS This study corresponds to an estimated 142,250 admissions for peptic ulcer to the wards of National Health Service hospitals in England and Wales during the two years 1956 and 1957. It presents a picture of the incidence and mortality of complications and surgical treatment throughout England and Wales.

In planning the management of patients with peptic ulcer it is necessary to be able to assess as accurately as possible the risks associated with the disease and the alternative hazards of surgical intervention. In order to establish base lines for this purpose an analysis has been made of unpublished material from the Hospital In-patient Enquiry of the Ministry of Health and the General Register Office. From this it is hoped that a useful picture has been derived of the dangers to life for a patient in Britain of any stated age, sex, and lesion, ill enough to need treatment in hospital, and considered, or not considered, to require surgery.

The figures used were those for the years 1956 and 1957, and concerned every tenth discharge or death in the hospitals which had agreed to take part, data for teaching and non-teaching hospitals having been collected separately. In 1956, 79% of teaching hospital beds and 66% of regional board hospital beds in England and Wales were covered, excluding 'mental', convalescent, private, and staff beds. In 1957 these figures rose to 88% and 81%. Returns were made by registration departments and the diagnoses recorded were those entered as final in the case notes.

There were 10,689 patients in the survey, of whom 523 had died in hospital. After multiplying by appropriate factors, calculated from the percentage bed coverage, for each year and type of hospital, it is estimated that this represents 142,250 admissions to the wards of National Health Service (N.H.S.) hospitals during the two years, with about 7,000 deaths, that is, seven out of 10 of the deaths attributed to peptic ulcer in the Registrar General's Annual Statistical Review.

Private beds were not included in the enquiry. However, it is known that peptic ulcer patients constituted 1 in 48·2 of all the discharges and deaths reported. From the known totals for all kinds of patients in private beds in N.H.S. hospitals, it may be calculated that, if the same proportion applied, there were only about 1,500 additional private in-patients with peptic ulcers with about 70 deaths per annum. Appropriate small additions have been made to the national estimates to cover these beds (Table XV). No figures were added for beds in private nursing homes or in hospitals not under the N.H.S., for though their number could be ascertained their use varied too much for assessment. It is thought that these might amount to another 1,500 or 2,000 patients and 100 deaths, making a grand total of some 75,000 admissions and 3,700 deaths in hospitals of all kinds per annum for peptic ulcer in England and Wales.

Patients had been grouped in the enquiry into those without mention of haemorrhage or perforation, those with haemorrhage recorded, those with perforation, and those with both. Pyloric stenosis had not been given a separate category. However, patients admitted from waiting lists had been kept apart from those admitted immediately, and it may be judged that those with gross clinical evidence of pyloric obstruction were among the latter. There was a small category for 'other admissions', such as transfers from other hospitals.

Data had also been divided by sex, by age group, and by ulcer site. These were recorded as gastric, duodenal, or gastrojejunal. No direction had been given for classification of duodenal ulcers recurrent after Billroth I gastrectomy, nor was there a

separate category for concomitant duodenal and gastric ulcers, shown by the writer (1955 and 1957) to be a more dangerous condition than adding the known risks of each ulcer alone would imply. A 'spot' enquiry has led to the belief that combined ulcers were mostly put with gastric ulcers in the returns. This may be one of the reasons why gastric ulcer emerges as a more dangerous disease than duodenal ulcer. There is no question of any patient with two ulcers having been entered twice.

Finally, the material had been divided under the headings 'partial gastrectomy', 'total gastrectomy', and 'no gastrectomy'. Patients managed conservatively were not separated from those subjected to any other operation which did not include resection of the stomach, though these may well have constituted only a small proportion.

Tables I and II show the main distributions in the material collected as between teaching and other N.H.S. hospitals, sites of ulceration, sex, and presence or absence of haemorrhage or perforation, with overall mortalities. The proportions of patients admitted with one or other of the main complications were 31% at regional board hospitals and 25% at teaching hospitals, though this difference may be due to a larger proportion of patients requiring elective surgery having been referred to teaching hospitals.

Table III shows mortalities by sex, age groups, and ulcer sites, for all peptic ulcers in hospitals, and for gastrectomy for all benign ulcers, emergency and elective, partial and total, together. The overall mortality for gastrectomy is 4·5%, though more than a third of these operations had been performed on patients who had been admitted immediately (1,213 out of 3,232), and 14% (438) had been. emergency operations for haemorrhage or perforation. The figure of 4·5 is particularly creditable when it is considered that this is not a selected series assembled for publication, but a sample of work

TABLE I

ALL CASES IN THE SURVEY, BY ULCER SITES AND SEX, WITH OR WITHOUT COMPLICATIONS, WITH MORTALITIES

	Males	Deaths	%Deaths	Females	Deaths	%Deaths	Totals	Deaths	%Deaths
Gastric ulcer									
A	1,918	57	3·0	1,098	22	2·0	3,016	79	2·6
H	517	74	14	352	47	13	869	121	14
P	329	38	12	78	21	27	407	59	14
P and H	10	5	—	5	—	—	15	5	—
Total	2,774	174	6·3	1,533	90	5·9	4,307	264	6·1
Duodenal ulcer									
A	3,287	61	1·9	1,007	9	0·9	4,294	70	1·6
H	671	59	8·8	222	20	9·0	893	79	8·8
P	840	75	8·9	114	15	13	954	90	9·4
P and H	13	6	—	1	—	—	14	6	—
Total	4,811	201	4·2	1,344	44	3·3	6,155	254	4·0
Gastrojejunal ulcer									
A	139	6	4·3	31	2	—	170	8	4·7
H	33	4	—	6	1	—	39	5	—
P	18	1	—	—	—	—	18	1	—
Total	190	11	5·8	37	3	—	227	14	6·2
Grand total	7,775	386	5·0	2,914	137	4·7	10,689	523	4·9

A = without mention of haemorrhage or perforation
H = with haemorrhage but without mention of perforation
P = with perforation but without mention of haemorrhage
P and H = with both

TABLE II

DISTRIBUTION OF ALL PATIENTS IN THE SURVEY AS BETWEEN TEACHING AND NON-TEACHING HOSPITALS

	Teaching Hospitals		Regional Board Hospitals	
	No. of Cases	Deaths	No. of Cases	Deaths
Neither haemorrhage nor perforation	1,284	18 (1·4%)	6,196	139 (2·2%)
Haemorrhage	227	22 (9·7%)	1,574	183 (11·6%)
Perforation, or both haemorrhage and perforation	199	11 (5·5%)	1,209	150 (12·4%)
Total	1,710	51 (3·0%)	8,979	472 (5·3%)

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TABLE III

DISTRIBUTION OF PATIENTS, BY ULCER SITES, SEX, AND AGE GROUPS, WITH
MORTALITIES, COMPLICATED AND UNCOMPLICATED TOGETHER

	0—	5—	15—	25—	35—	45—	55—	65—	75—	Totals
All gastric ulcers										
Male	1	7 (1)	78 (1)	201 (4)	423 (4)	723 (18)	720 (41)	450 (66)	171 (39)	2,774 (174)
Deaths %	Under 35		2·1		0·9	2·5	5·7	15	23	6·3
Female	—	7	38	76	182 (2)	316 (8)	351 (11)	353 (34)	210 (35)	1,533 (90)
Deaths %	Under 35		0		1·1	2·5	3·1	9·6	17	5·9
Total	1	14 (1)	116 (1)	277 (4)	605 (6)	1,039 (26)	1,071 (52)	803 (100)	381 (74)	4,307 (264)
Deaths %	Under 35		1·5		1·0	2·5	4·9	12	19	6·1
All duodenal ulcers										
Male	5	20	258 (2)	675	928 (7)	1,226 (25)	934 (50)	538 (71)	227 (46)	4,811 (201)
Deaths %	Under 35		0·2		0·8	2·0	5·4	13	20	4·2
Female	—	10	66 (1)	142	254 (2)	352 (5)	226 (2)	189 (11)	105 (23)	1,344 (44)
Deaths %	Under 35		0·5		0·8	1·4	0·9	5·8	22	3·3
Total	5	30	324 (3)	817	1,182 (9)	1,578 (30)	1,160 (52)	727 (82)	332 (69)	6,155 (245)
Deaths %	Under 35		0·3		0·8	1·9	4·5	11	21	4·0
Gastrojejunal ulcer										
	—1	—	4	15	25 (1)	56 (3)	74 (3)	39 (3)	13 (4)	227 (14)
Deaths %										6·2
All gastrectomies										
	1	7	58 (1)	307 (1)	623 (5)	986 (30)	758 (34)	401 (58)	86 (15)	3,227 (144)
Deaths %	Under 35		0·5		0·8	3·0	4·5	14	17	4·5

All gastrectomies, emergency and elective, partial and total together
Figures in parentheses = deaths

believed to be fairly representative and recorded by registration departments.

The death rate among all patients with gastric ulcers in hospital was higher than for duodenal ulcer (Table I), but this is attributable to differences in age distribution, particularly among those with urgent complications. Men are more apt to die than women and this is not accounted for by age or ulcer site; it is mainly due to a lower death rate among older women compared with that in older men both with gastric and with duodenal ulcers, and might be on account of a difference in severity of the lesions as between the sexes.

PATIENTS WITHOUT MENTION OF HAEMORRHAGE OR PERFORATION

Of the 7,480 patients entered under this heading, 40% had gastric, 57% had duodenal, and 2% had gastrojejunal ulcers. The sex ratio among the gastric ulcers was five males to three females, among the duodenal ulcers there were three times as many men as women, and among gastrojejunal four times as many (Table V). This may not be a true index of the relative sex incidence of the disease because it is impossible to guess whether more men or women get on with their jobs in spite of symptoms which might take others to hospital.

Over 37% of the patients admitted without either haemorrhage or perforation underwent

gastrectomy, with a mortality of 3%, and of the remainder 1·6% died (Table IV). The proportion undergoing resection was higher at teaching hospitals (42%) than at non-teaching hospitals (36%), and a larger proportion of men than of women had the operation (41% and 29%), the difference being greatest for duodenal ulcers. The percentage of patients in each age group who had gastrectomies (Table XIII) did not vary much within the range 35 to 64 in regional board hospitals and 35 to 74 in teaching hospitals. Outside these ranges the operation was used much less.

Nearly a third of the patients in category A who were subjected to gastric resection had been immediate admissions, presumably with either severe exacerbations or urgent complications other than haemorrhage or perforation. If these and

FIG. 1. *Mortality per cent from elective gastrectomy by age groups.*

TABLE IV

SUMMARY OF CATEGORY A PATIENTS (WITHOUT MENTION OF EITHER HAEMORRHAGE OR PERFORATION)

	All Hospitals			All Ulcers		All Hospitals	All Ulcers	Totals
-	Gastric Ulcer	Duodenal Ulcer	Gastro-jejunal Ulcer	Teaching Hospital	Regional Board Hospital	Male	Female	
No gastrectomy	1,919	2,643	124	747	3,939	3,169	1,517	4,686
Deaths	37	32	5	6	68	53	21	74
Deaths %	1·9	1·2	4·0	0·8	1·7	1·7	1·4	1·6
With gastrectomy	1,097	1,651	46	537	2,257	2,175	619	2,794
Deaths	42	38	3	12	71	71	12	83
Deaths %	3·8	2·3	6·5	2·2	3·1	3·3	1·9	3·0
All treatments	3,016	4,294	170	1,284	6,196	5,344	2,136	7,480
Deaths	79	70	8	18	139	124	33	157
Deaths %	2·6	1·6	4·7	1·4	2·2	2·3	1·5	2·1
Proportions under-going gastrectomy	36%	38%	27%	42%	36%	41%	29%	37%

TABLE V

DISTRIBUTION OF PATIENTS WITHOUT MENTION OF HAEMORRHAGE OR PERFORATION

	0−	5−	15−	25−	35−	45−	55−	65−	75+	Totals
Gastric ulcer										
Male	1	3	52 (1)	139	292 (2)	542 (8)	526 (16)	275 (22)	88 (8)	1,918 (57)
Proportion	0·1	0·4	7	19	39	72	70	37	9	256
Female	0	6	33	55	148 (1)	234 (3)	264 (2)	236 (8)	122 (8)	1,098 (22)
Proportion	0	0·7	4	7	20	31	35	32	16	147
Duodenal ulcer										
Male	3	13	180	501	701 (5)	879 (10)	606 (16)	300 (19)	104 (11)	3,287 (61)
Proportion	0·4	2	24	67	94	117	81	40	14	439
Female	0	0·7	57 (1)	124	202 (2)	278	161	117 (1)	61 (5)	1,007 (9)
Proportion	0	0·9	8	17	27	37	22	16	8	135
Gastrojejunal ulcer										
Male	0	0	2	12	17	34 (1)	46 (3)	24 (2)	4	139 (6)
Proportion	0	0	0·3	2	2	5	6	3	0·5	19
Female	1	0	1	2	4 (1)	9 (1)	7	6	1	31 (2)
Proportion	0·1	0	0·1	0·3	0·5	1	0·9	C·8	0·1	4

Proportion = each group expressed as a proportion per thousand of the whole category
Figures in parentheses = deaths

TABLE VI

WAITING-LIST PARTIAL GASTRECTOMIES WITH MORTALITIES

	0−	5−	15−	25−	35−	45−	55−	65−	75+	Totals
All gastirc ulcers	—	—	4	26	122	218 (5)	191 (2)	93 (9)	19	673 (16)
Deaths %			Under 45	0			1·7		8·0	2·4
All duodenal ulcers	1	2	31 (1)	177	275 (2)	397 (6)	205 (7)	58 (4)	7 (1)	1,153 (21)
Deaths %			Under 45	0·6			2·2		7·7	1·8
All male	1	2	28	176	315 (2)	486 (9)	307 (8)	99 (11)	13	1,427 (30)
Deaths %			Under 45	0·4			2·1		9·8	2·1
All female	—	—	7 (1)	27	82	129 (2)	89 (1)	52 (2)	13 (1)	399 (7)
Deaths %			Under 45	1·0			1·4		4·6	1·8
Gastrojejunal ulcers	—	—	—	2	5 (1)	9 (1)	8	6 (1)	1	31 (3)
Total duodenal and gastric ulcers	1	2	35 (1)	203	397 (2)	615 (11)	396 (9)	151 (13)	26 (1)	1,826 (37)
Deaths %			Under 35	0·4	0·5	1·8	2·3		8·4	2·0

Figures in parentheses = deaths

transfers are omitted, 1,826 waiting-list patients with gastric or duodenal ulcers are left who underwent partial gastrectomy, and among these the death rate was only 2% for all hospitals, all ages, and all types of ulcer together (Fig. 1 and Table VI), while the same group at teaching hospitals carried a mortality of 1·3% (Table XI). Category A patients are summarized in Table IV, their distribution in age groups is shown in Table V, and waiting-list partial gastrectomies are analysed in Table VI.

Of the gastrectomies, 54 were described as total, which naturally raises the suspicion that some of the patients may have been admitted on a diagnosis of gastric ulcer but been found at operation to have malignant lesions, the diagnosis having not then been changed in the records. However, there is another and perhaps more likely explanation. This is that a lesion thought to be malignant at operation and totally resected was later shown to be benign on microscopical examination, the patient being subsequently discharged with the correct diagnosis. The fact that there was only one death among the 54 patients who underwent total gastrectomy lends weight to this hypothesis. Two of the patients who had total resections were recorded as under 25 years of age, and of those who had elective partial gastrectomies, four were under 10 and one was under 1 year of age (errors in recording ages cannot be excluded).

COMPLICATIONS

Of all patients admitted, 17% were described as having bled and 13% as having perforated (Table I). It is almost certain that many patients with melaena failed to be reported as having bled in the survey returns. Moreover, mild haemorrhage will have been considered worthy of mention in some hospitals and not in others, and no standardized criterion was possible. All the figures in this analysis refer to patients reported to have bled, and the number must be assumed to err on the small side. Percentages of this total such as mortality will therefore be higher than they might have been if every case of haemorrhage, however minor, had been included.

About the same proportion of patients with gastric as with duodenal ulcers were recorded as having had one or other of these complications, but whereas with duodenal ulcers more were perforated than bleeding, with gastric ulcers haemorrhage was mentioned twice as often as perforation. As about equal numbers of patients with gastric as with duodenal ulcers were treated for haemorrhage, and since duodenal ulcer is far the commoner lesion in the community, it follows that patients with gastric ulcers are much more apt than those with duodenal ulcers to bleed badly enough to require hospital admission.

The fact that nearly half as many perforated gastric ulcers as perforated duodenal ones were reported is of little significance. Perforations are relatively uncommon anywhere but close to the pylorus, and precisely which side of the pyloric line they lie is often hard to tell. Uncomplicated gastric ulcers are not nearly so common a reason for admission to hospital in males before 45 years of age as after (Table V), yet 35 to 44 is nearly as likely a decade as any for a man to be reported to have a perforated gastric ulcer (Table X). The death rate among patients admitted with either complication is almost the same, 11% (Tables VII and IX), and when the two are compared by age group the similarity remains (Tables VIII and X).

TABLE VII

DISTRIBUTION OF HAEMORRHAGE BY SITE OF ULCER, BY TYPE OF HOSPITAL, AND BY SEX, WITH OVERALL MORTALITIES AND DEATH RATES PER CENT

	All Hospitals			All Ulcers		All Hospitals	All Ulcers	Totals
	Gastric Ulcer	Duodenal Ulcer	Gastro-jejunal Ulcer	Teaching Hospital	Regional Board Hospital	Male	Female	
All treatments	869	893	39	227	1,574	1,221	580	1,801
Deaths	121	79	5	22	183	137	68	205
Deaths %	13·9	8·8	12·8	9·7	11·6	11·2	11·7	11·4
No gastrectomy	725	731	28	183	1,301	982	502	1,484
Deaths	93	58	4	16	139	98	57	155
Deaths %	12·8	7·9	14·3	8·7	10·7	10·0	11·4	10·4
With gastrectomy	144	162	11	44	273	239	78	317
Deaths	28	21	1	6	44	39	11	50
Deaths %	19·4	13·0	—	13·6	16·1	16·3	14·1	15·8
Proportions having gastrectomy	16·6%	18·1%	28·2%	19·4%	17·3%	19·6%	13·4%	17·6%

TABLE VIII

AGE, SITE, AND SEX OF ULCER PATIENTS PRESENTING WITH HAEMORRHAGE DIVIDED BY TREATMENTS WITH PERCENTAGE MORTALITIES

	0–	5–	15–	25–	35–	45–	55–	65–	75+	Totals
All treatments										
Gastric ulcer										
Male	—	3 (1)	10	33 (1)	64 (1)	115 (6)	124 (18)	111 (26)	57 (21)	517 (74)
Deaths %			Under 45	2·7		10		28		14
Female	—	1	4	15	24	70 (4)	69 (5)	98 (16)	71 (22)	352 (47)
Deaths %						6		22		13
Duodenal ulcer										
Male	2	6	22	66	93	144 (8)	146 (14)	125 (19)	67 (18)	671 (59)
Deaths %			Under 45	0		8		19		8·8
Female	—	2	5	10	31	45 (2)	47	49 (6)	33 (12)	222 (20)
Deaths %						2		22		9
Gastrojejunal ulcer	—	—	—	1	2	5 (1)	16	9 (2)	6 (2)	39 (5)
All male	2	9 (1)	32	100 (1)	159 (1)	263 (15)	283 (32)	244 (46)	129 (41)	1,221 (137)
Deaths %						5·7	11	19	32	11
All female	—	3	9	25	55	116 (6)	119 (5)	147 (22)	106 (35)	580 (68)
Deaths %						5·2	4·2	15	33	12
Gastric ulcer										
No gastrectomy	—	4 (1)	13	42 (1)	77 (1)	158 (7)	154 (18)	164 (29)	113 (36)	725 (93)
Gastrectomy	—	—	1	6	11	27 (3)	39 (5)	45 (13)	15 (7)	144 (28)
Total	—	4 (1)	14	48 (1)	88 (1)	185 (10)	193 (23)	209 (42)	128 (43)	869 (121)
Deaths %			Under 45	2		5·4	12	20	34	13·9
Duodenal ulcer										
No gastrectomy	2	6	22	64	99	151 (4)	154 (10)	141 (18)	92 (26)	731 (58)
Gastrectomy	—	2	5	12	25	38 (6)	39 (4)	33 (7)	8 (4)	162 (21)
Total	2	8	27	76	124	189 (10)	193 (14)	174 (25)	100 (30)	893 (79)
Deaths %			Under 45	0		5·3	7·3	14	30	8·8
All without gastrectomy	2	10 (1)	35	107 (1)	177 (1)	310 (11)	320 (28)	312 (48)	210 (65)	1,484 (155)
Deaths %			Under 45	0·9		6·2		22		10·4
All gastrectomies	—	2	6	18	36	69 (10)	82 (9)	80 (20)	24 (11)	317 (50)
Deaths %			Under 45	0		13		30		15·8
Total	2	12 (1)	41	125 (1)	214 (1)	379 (21)	402 (37)	392 (68)	234 (76)	1,801 (205)
Deaths %			Under 45	0·8		5·5	9·2	17	32	11·4

Figures in parentheses = deaths

TABLE IX

DISTRIBUTION OF PATIENTS WITH PERFORATIONS AS BETWEEN SITES OF ULCER, TYPES OF HOSPITALS, AND SEX, WITH DEATHS AND PERCENTAGE DEATH RATES

	All Hospitals			All Ulcers		All Hospitals	All Ulcers	Totals
	Gastric Ulcer	Duodenal Ulcer	Gastro-jejunal Ulcer	Teaching Hospital	Regional Board Hospital	Male	Female	
Perforations								
All treatments	407	954	18	195	1,184	1,187	192	1,379
Deaths	59	90	1	11	139	114	36	150
Deaths %	14·5	9·4		5·6	11·7	9·6	18·7	10·9
With gastrectomy	36	80	—	26	90	100	16	116
Deaths	4	7	—	3	8	9	2	11
Deaths %	—	—	—	—	—	—	—	9·5
Both perforation and haemorrhage								
All treatments	15	14	—	4	25	24	5	29
Deaths	5	6	—	0	11	11	0	11
With gastrectomy	1	4	—	2	3	5	0	5
Deaths	0	1	—	0	1	1	0	1

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TABLE X

CASES OF PERFORATION DIVIDED BY SITE OF LESION, BY SEX, AND BY AGE GROUPS, WITH MORTALITIES

	0—	5—	15—	25—	35—	45—	55—	65—	75—	Totals
Gastric ulcer	—	1	16	34 (2)	76 (2)	77 (5)	87 (11)	79 (27)	37 (12)	407 (59)
Deaths %			Under 45	3·1		9·8		34		14·5
Duodenal ulcer	—	2	60 (2)	116	155 (2)	231 (10)	197 (20)	132 (34)	61 (22)	954 (90)
Deaths %			Under 45	1·2		7·0		29		9·4
Gastrojejunal ulcer	—	—	1	—	2	8	5	1	1 (1)	18 (1)
Male	—	2	72 (2)	136 (2)	203 (3)	276 (11)	255 (25)	171 (47)	72 (24)	1,187 (114)
Deaths %			Under 45	1·7		6·8		29		9·6
Female	—	1	5	14	30 (1)	40 (4)	34 (6)	41 (14)	27 (11)	192 (36)
Deaths %			Under 45	2·0		14		37		18·7
Gastric ulcer										
Males	—	1	15	28 (2)	67 (1)	66 (4)	70 (7)	67 (17)	21 (7)	329 (38)
Deaths %										12
Female	—	—	1	6	9 (1)	11 (1)	17 (4)	18 ⸴10)	16 (5)	78 (21)
Deaths %										27
Duodenal ulcer										
Male	—	1	56	108	134 (2)	202 (7)	180 (18)	109 (30)	50 (16)	840 (75)
Deaths %										8·9
Female	—	1	4	8	21	29 (3)	17 (1)	23 (4)	11 (6)	114 (15)
Deaths %										13
Total	—	3	77 (2)	150 (2)	233 (4)	316 (15)	289 (31)	212 (61)	99 (35)	1,379 (150)
Deaths %			Under 35 1·7		1·7	4·7	11	29	35	10·9
Gastrectomy	—	—	3	12 (1)	22	35	21 (3)	18 (6)	5 (1)	116 (11) 9·5

Figures in parentheses = deaths

However, a third as many lives again are lost in hospital from haemorrhage as from perforation because, particularly in older people, it is the commoner lesion. On the other hand, many patients admitted with and recorded as having haemorrhage, only suffer small bleeds, whereas there is no comparable state of mildness among perforations.

Cases of haemorrhage are summarized in Table VII and distributions by site of lesion, sex, and age, with mortalities in haemorrhage cases, and also divided by mode of treatment, are given in Table VIII. The proportions of patients with haemorrhage who

FIG. 2. *Mortality in patients with perforation by age groups.*

underwent gastrectomy are shown in Table XIII. In Tables IX and X similar details are given for perforation, and the figures for patients undergoing gastrectomy for perforation. There was no separate category for conservative treatment and it may be assumed that most of those who did not undergo gastrectomy had simple surgical repair of the perforation.

TREATMENT IN TEACHING AND NON-TEACHING HOSPITALS

Of all the patients treated for peptic ulcer in N.H.S. hospitals in 1956 and 1957 it is estimated that 16% were cared for in teaching hospitals and 84% in regional board hospitals (Table II).

A slightly higher proportion of definitive treatment was given in teaching hospitals and rather more emergency work done at the others (Table II). Regional board hospitals dealt with a greater proportion of patients with gastric ulcers and a smaller one of patients with duodenal ulcers but teaching hospitals received twice the proportion of patients with gastrojejunal ulcers (Table XI). A larger percentage of old people were admitted to regional board hospitals and a slightly larger proportion of women to teaching hospitals (Table XII). All these differences invalidate comparison between the two groups of hospitals except
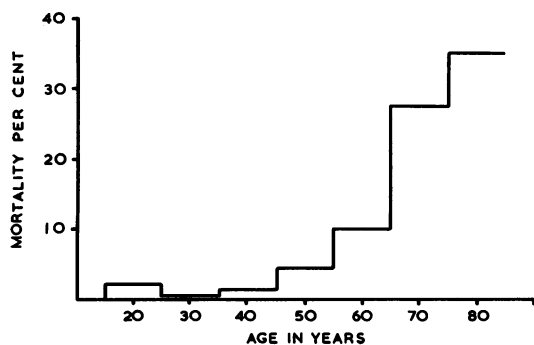
TABLE XI

COMPARISON OF AGE, SITE, AND MORTALITY FROM UNCOMPLICATED ULCER (CATEGORY A)
AND WITH HAEMORRHAGE OR PERFORATION IN TEACHING AND REGIONAL BOARD HOSPITALS

	0—	5—	15—	25—	35—	45—	55—	65—	75+	*Totals*
A cases No gastrectomy										
Teaching hospital	—	3	43	102	136	180 (1)	159 (1)	94 (1)	30 (2)	747 (6)
Deaths %			Under 45	0		0·6	0·6	1·1	6·7	0·8
Regional board hospitals	4	21	233 (1)	454	662 (6)	914 (2)	795 (13)	563 (19)	293 (21)	3,939 (68)
Deaths %			Under 45	0·5		0·2	1·6	3·4	7·2	1·7
A cases With gastrectomy										
Teaching hospital	—	—	7	51	108	171 (4)	127 (3)	65 (5)	8	537 (12)
Deaths %			Under 45	0		2·3	2·4	6·8		2·2
Regional board hospitals	1	5	42 (1)	226	457 (5)	711 (16)	528 (19)	238 (27)	49 (3)	2,257 (71)
Deaths %			Under 45	0·8		2·2	3·6	10·5		3·1
Waiting list A cases with gastrectomy										
Teaching hospital	—	—	5	38	86	138 (3)	86 (1)	30 (1)	6	389 (5)
Deaths %			Under 55	1·1			1·6			1·3
Regional board hospitals	1	2	30 (1)	165	311 (2)	477 (8)	317 (6)	114 (12)	20 (1)	1,437 (32)
Deaths %			Under 55	1·1				4·2		2·2
Haemorrhage No gastrectomy										
Teaching hospital	—	3	4	10	26	46	35 (5)	38 (6)	21 (5)	183 (16)
Deaths %			Under 45	0		0		17		8·7
Regional board hospitals	2	7 (1)	31	97 (1)	151 (1)	265 (11)	285 (23)	273 (42)	190 (60)	1,301 (139)
Deaths %			Under 45	1·0		4·2		17		10·7
Gastrectomy										
Teaching hospital	—	—	—	2	8	8 (2)	16 (1)	8 (1)	2 (2)	44 (6)
Deaths %										13·6
Regional board hospitals	—	2	6	16	29	60 (8)	66 (8)	72 (19)	22 (9)	273 (44)
Deaths %										16·1
All haemorrhage										
Teaching hospital	—	3	4	12	34	54 (2)	51 (6)	46 (7)	23 (7)	227 (22)
Deaths %			Under 45	0			7·6		20	9·7
Regional board hospitals	2	9 (1)	37	113 (1)	180 (1)	325 (9)	351 (31)	345 (61)	212 (68)	1,574 (183)
Deaths %			Under 45	0·9			5·9		23	11·6
Perforation All treatments										
Teaching hospital	—	—	14	29 (1)	35 (1)	55 (1)	35 (1)	21 (6)	6 (1)	195 (11)
Deaths %			Under 55	2·3				12·9		5·6
Regional board hospitals	—	3	63 (2)	121 (1)	198 (3)	261 (14)	254 (30)	191 (55)	93 (34)	1,184 (139)
Deaths %			Under 55	3·1				22		11·7
All gastric ulcers										
Teaching hospital	—	2	14	40 (1)	89	155 (3)	169 (6)	113 (7)	34 (6)	626 (23)
Deaths %			Under 45	0·7		1·9	3·6	6·2	18	3·7
Regional board hospitals	1	12 (1)	102 (1)	237 (3)	515 (6)	875 (23)	901 (46)	691 (93)	347 (68)	3,681 (241)
Deaths %			Under 45	1·3		2·6	5·1	13	20	6·5
All duodenal ulcers										
Teaching hospital	—	4	54	151	213 (1)	281 (4)	190 (5)	102 (11)	33 (3)	1,028 (24)
Deaths %			Under 45	0·2		1·4	2·6	11	9	2·3
Regional board hospitals	5	26	270 (3)	666	966 (8)	1,296 (26)	872 (47)	627 (71)	299 (66)	5,127 (221)
Deaths %			Under 45	0·6		2·0	5·4	11	22	4·3

The number of cases of gastrojejunal ulcer were insufficient for analysis
Figures in parentheses = deaths

after breaking down the data for age, sex, ulcer site, and presence or absence of complications. When this is done the results at the teaching hospitals are seen to be the better (Table XI). However, the differences are not so large as might have been expected when it is borne in mind that it is the averages among the more numerous regional board hospitals which are likely to have suffered from the inclusion of a few black spots rather than those for the teaching hospitals. Moreover, though it is to the teaching hospitals that some of the more desperate and complicated problems of definitive surgery are particularly apt to find their way, it may well be the other way about in the case of emergencies.

One or two differences in practice emerge: for example, resort to surgery seems to be more frequent in teaching hospitals, both for uncomplicated cases (Table IV) and for those with haemorrhage (Table VII), and there was also a larger proportion of cases of perforation selected for gastrectomy (Table IX).

In Table XI are shown comparative data for teaching and non-teaching hospitals for A, H, and P categories.

SITE OF LESION

In each age group patients in hospital with gastric ulcers and those with duodenal ulcers had approximately equal chances of succumbing (Table III), though overall the proportion of those with gastric ulcers who died was half as high again. This is because of the difference in age distribution, and particularly because more of the elderly patients with

bleeding ulcers had gastric ones (Table VIII). When patients with duodenal and gastric ulcers with either acute complication are compared by age groups, both haemorrhage and perforation are shown to be more dangerous related to gastric ulcers than to duodenal ulcers (Tables VIII and X). There is no significant difference in death rates from gastrectomy for ulcers at different sites (Table VI). Only gastrojejunal ulcers seem to cost proportionately more lives on the basis of the small number available for analysis.

Doll and Avery Jones in their well-known survey (1951) came across no gastric ulcers in subjects under 25 years of age, and it is interesting to observe that in this series a few were entered in every age group down to and including 0 to 1 year. In fact, 3 % of the patients recorded as having gastric ulcers which were neither bleeding nor perforated were under 25 years of age. The proportions of ulcers in this series in each age group by sites with and

TABLE XII

PERCENTAGES OF PATIENTS IN EACH AGE GROUP FOR A, H, AND P CATEGORIES IN TEACHING AND REGIONAL HOSPITALS

		0—	*5—*	*15—*	*25—*	*35—*	*45—*	*55—*	*65—*	*75+*	*Totals*
Teaching hospitals											
A		—	0·2	4	12	19	27	22	12	3	100
H		—	1	2	5	15	24	22	20	10	100
P		—	—	7	15	18	28	18	11	3	100
Total		—	0·3	4	11	18	27	22	13	4	100
Regional board hospitals											
A		0·1	0·4	4	11	18	26	21	13	6	100
H		0·1	0·6	2	7	11	21	22	22	13	100
P		—	0·3	5	10	17	22	21	16	8	100
Total		0·1	0·4	4	10	17	25	22	15	7	100

A = neither haemorrhage nor perforation reported
H = haemorrhage reported
P = perforation reported

TABLE XIII

COMPLICATIONS RELATED TO AGE

		0 —	*15 —*	*25 —*	*35 —*	*45 —*	*55 —*	*65 —*	*75 +*	*Totals*
Percentages of admissions in each age group										
Gastric ulcer	A	0·3	3	6	15	26	26	17	7	100
	H	0·5	2	6	10	21	22	24	15	100
	P	0·2	4	8	19	19	21	19	9	100
Duodenal ulcer	A	0·6	6	15	21	27	18	10	4	100
	H	1	3	9	14	21	22	19	11	100
	P	0·2	6	12	16	24	21	14	6	100
Percentages undergoing gastrectomy by age groups										
Gastric ulcer	A	(2/10)[1]	6	22	42	43	42	34	19	36
	H	—	(1/14)	12	12	15	20	22	12	17
Duodenal ulcer	A	(4/25)	18	37	41	42	41	59	11	38
	H	(2/10)	(5/27)	16	20	20	20	19	8	18

[1]Figures in parentheses represent all the cases instead of percentages, *i.e.*, 2/10 = 2 cases out of a total of 10.
A = neither haemorrhage nor perforation reported
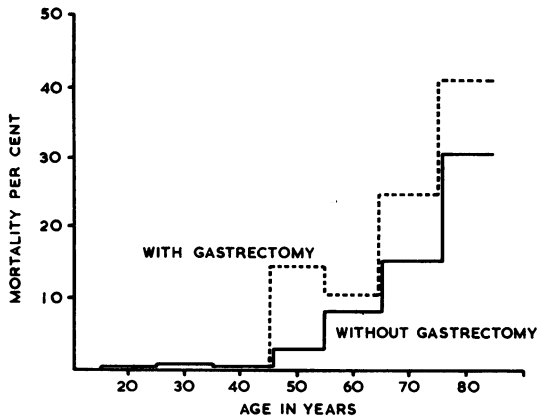H = haemorrhage reported
P = perforation reported

FIG. 3. *Mortality in patients with haemorrhage from peptic ulcers, by age groups, with and without gastrectomy. Note that the curves are roughly parallel.*
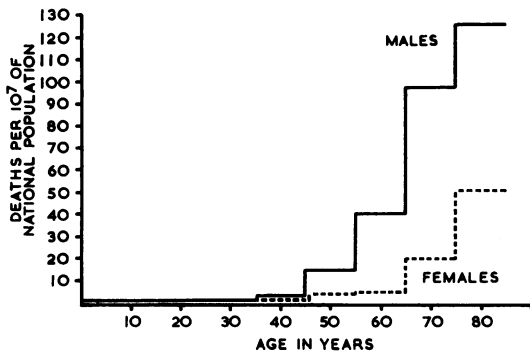

FIG. 4. *Deaths per year from peptic ulcer expressed as proportions of national populations of the same sex and age group.*

without complications are shown in Table XII, and the proportions undergoing gastrectomy in Table XIII.

THE EFFECTS OF SEX AND AGE

In males admitted to hospital duodenal ulcers are nearly twice as common as gastric ulcers (Table I), though the difference is small when the ulcer is bleeding and much larger when it is perforated. In women gastric and duodenal ulcers occur with almost equal frequency (Table I) but bleeding gastric ulcers are much more plentiful than bleeding duodenal ulcers.

A smaller proportion of women than of men admitted to hospital with peptic ulcers died (Table I). The death rate from haemorrhage by age groups was much the same for both sexes (Table VIII) but perforation was twice as lethal

for women as for men (Table X). Women appear to tolerate gastrectomy better than men (Table VI), though this may have been because more of the men had advanced lesions giving rise to greater difficulties and dangers at operation.

The peak age for admissions for gastric ulcer (neither bleeding nor perforated) was in the 55 to 64 period in men and in the 65 to 74 period for women. Uncomplicated duodenal ulcer admissions reached a peak in the 45 to 54 age group in both sexes (Table XIV), the peak in the duodenal ulcer curve being a little more evident among women than men. After 55 years of age gastric ulcer is nearly as common a cause of admission of a male to hospital as duodenal ulcer.

Using the proportions of all admissions as the basis for comparison, it seems that women with peptic ulcers are a little more apt to bleed than men, but men are more than twice as likely to perforate (Table I). It is evident that men of all ages with gastroduodenal haemorrhage are more likely to be reported to have duodenal than gastric ulcers, though I have pointed out (Johnson, 1955) that many patients with duodenal ulcers who have haemorrhages actually bleed from an associated gastric ulcer. In women over 45 years of age a gastric ulcer is more likely to be the source of a haemorrhage than a duodenal one, though under 45 there is little difference (Table VIII).

The most striking effect of advancing years is the enormous increase in risk to life when complications occur (Figs. 3 and 4). Not only does older age greatly increase the fatal risks which go with peptic ulcer and its complications, but also it is believed to be associated with a marked increase in incidence of these complications. This would seem to be the most likely explanation for the difference in trends seen between the A columns and the H and P columns in Table XIV.

SELECTION OF THE AGE FOR DEFINITIVE SURGERY

The graphs for mortality by age groups in proportion to living population emphasize the rapid increase of risk to life which goes with continued conservative management of chronic peptic ulcer after 50 years of age or so. Deaths following gastrectomy also become more frequent in old age, though the risks are always well below those which are incurred when a patient is admitted to hospital with an urgent complication. A clinician who advises against surgery on grounds of risk to life cannot be supported statistically. Indeed if a patient is ready to undergo surgery, and would benefit from it symptomatically, to deter him is to accept a heavy responsibility. It is suggested that the clinician should regard 50 years

TABLE XIV

HOSPITAL ADMISSIONS IN PROPORTION TO NATIONAL POPULATIONS PER 10,000 BY AGE GROUPS

Age (years)	Population ÷ 10,000	Gastric Ulcer (A)	Gastric Ulcer (H)	Gastric Ulcer (P)	Duodenal Ulcer (A)	Duodenal Ulcer (H)	Duodenal Ulcer (P)
Males							
0-34	1,112	18	4	4	63	9	15
35 —	313	93	20	21	230	30	43
45 —	313	170	37	21	280	46	65
55 —	229	230	55	30	260	64	78
65 —	139	200	82	44	220	90	89
75 —	66	130	86	82	190	100	76
Females							
0-34	1,084	49	1·8	0·6	17	1·8	1·2
35 —	322	46	7	3	63	10	7
45 —	326	71	21	3	85	14	9
55 —	270	100	25	6	60	17	6
65 —	198	120	49	9	59	25	12
75 +	115	110	29	14	53	29	10

A = without mention of haemorrhage or perforation
H = with haemorrhage but without mention of perforation
P = with perforation

as the age after which procrastination is best avoided and at which, if doubt continues, surgery should be no longer delayed. It is not only because operation becomes more dangerous as age advances that this advice is given, for it would make sense if a patient were to prefer to take a risk of, say, 8% of death from operation should he still be alive to have it at 70 rather than one of 2% at 50, it is the increasing risk of death from a complication after 50 if operation is withheld which has to be borne in mind.

SURGERY AND HAEMORRHAGE

Attention is drawn to the similarity in shape between the curves for mortality from haemorrhage in those subjected to gastrectomy and those not so operated upon (Fig. 3). In recent years the advice has often been given that emergency operation should be resorted to if a patient over 45 with a chronic peptic ulcer continues to bleed or begins again to bleed after the institution of medical treatment in hospital. I have argued elsewhere (1959) against the too free adoption of this criterion on the grounds that it was held to have been based on incomplete evidence. The observation from which it arose was that whereas deaths among conservatively managed bleeding patients of less than 45 years of age are uncommon, after this age deaths occur with increasing frequency as age advances. I have pointed out that mortality from gastrectomy rises similarly with advancing years and operation for haemorrhage is likewise comparatively free from risk before 45. I have urged that a more important criterion is whether or not the patient would be considered to be 'ripe' for definitive gastrectomy, if assumed to

have recovered from the present incident. If he were to be considered so, then in my view he should undergo emergency operation whatever his age.

In gastroduodenal haemorrhage the patient's age is held to be important only in those who are not considered yet to have 'earned' elective operation. If such a patient is under 45 operation rarely becomes necessary. After this age, however, gastrectomy may have to be resorted to as a life-saving measure, even though the ulcer had not previously merited surgical treatment.

Only about one in six of the patients admitted to hospital with bleeding peptic ulcers underwent gastrectomy, a much smaller proportion than had the operation among those not bleeding. This observation suggests that perhaps not enough consideration was given to the possibility that 'interval' surgery was indicated after recovery from a haemorrhage managed conservatively. The proportion of patients who die from haemorrhage who have previously survived another one conservatively managed is known to be high (Moore, Peete, Richardson, Erskine, Brooks, and Rogers, 1950). Only a quarter of the patients who died after haemorrhage had had gastric resections, three-quarters having succumbed without an attempt at salvage by gastrectomy. (Only relatively very few are likely to have had other surgical procedures.)

NATIONAL ESTIMATES AND COMPARISONS WITH THE REGISTRAR GENERAL'S ANNUAL REVIEW

The figures in Table XV of national estimates in hospital practice were arrived at by multiplying the survey figures by factors of 12·7 and 11·3 for

TABLE XV

ESTIMATES OF ANNUAL NATIONAL DISCHARGES AND DEATHS FOR 1956 AND 1957 DIVIDED
BY TYPE OF HOSPITAL AND ULCER SITE, WITH AND WITHOUT COMPLICATIONS

		Teaching Hospitals		Regional Board Hospitals		Totals	
		Discharges and Deaths	Deaths	Discharges and Deaths	Deaths	Discharges and Deaths	Deaths
A	Gastric ulcer	2,940	45	17,600	493	20,500	538
	Duodenal ulcer	4,850	51	24,300	417	29,150	468
	Gastrojejunal ulcer	304	18	858	34	1,160	52
Total A		8,100	114	42,700	944	50,800	1,060
H	Gastric ulcer	747	76	5,150	739	5,900	815
	Duodenal ulcer	653	55	5,440	486	6,090	541
	Gastrojejunal ulcer	19	6	243	29	262	35
Total H		1,420	137	10,800	1,250	12,300	1,400
P	Gastric ulcer	258	27	2,600	410	2,850	437
	Duodenal ulcer	957	42	5,650	626	6,610	668
	Gastrojejunal ulcer	25	—	98	7	123	7
Total P		1,240	69	8,300	1,040	9,580	1,110
Grand total		10,800	320	61,900	3,240	72,700	3,560

Numbers all to three significant digits
A = neither haemorrhage nor perforation reported
H = haemorrhage reported
P = perforation reported

teaching hospitals and of 15·0 and 12·3 for regional board hospitals respectively for the two years. A small addition for private beds was calculated by multiplying the survey figures by 0·61 for teaching hospitals and 0·222 for regional board hospitals. These figures were calculated from the bed coverage and the ratio of private to other discharges.

The estimate of deaths for all the N.H.S. beds in England and Wales (excluding beds for mental illness, etc.) was 3,600 per annum. Of these, 1,500 were due to haemorrhage, 1,100 to perforation, and 1,000 were among patients who were not reported to have either bled or perforated, 480 of the latter having followed elective gastrectomies. It is surprising to learn that elective gastrectomy is responsible for only one in seven of peptic ulcer deaths in hospital, and one in 11 of all the deaths assigned to peptic ulcer in the Registrar General's annual statistical reviews.

When the figure for estimated deaths in N.H.S. hospitals is compared with the figure for deaths attributed to peptic ulcer in the Registrar General's reports, it is found that there is a margin of no less than 1,600 per annum unaccounted for, and when deaths are compared by age groups it is found that the same proportion is 'missing' of each age except

the groups 15 to 24 and to a lesser extent 0 to 14, of which many more of those who died were in hospital. It is known that many cases of perforated peptic ulcer have been reported in the enquiry as peritonitis, without mention of peptic ulcer, and the national estimates for annual deaths due to perforations must certainly be too low. General practitioners have told me that they find it hard to believe that such a large number certified as dying from peptic ulcer have died outside hospital, but Camps (1960) has stated that a great many patients coming to necropsy in public mortuaries are found to have died from haemorrhage from, or perforation of, a peptic ulcer. In his view this could certainly account for most of the discrepancy in the figures.

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