The present annual intake of students is short of what we need if medicine is to continue to do all that is now expected of it. But we are in an unfortunate position in which we do not now possess enough doctors to be able to make a lot more very quickly. It is easy to say we must have many more medical schools. But medical education can no longer be completed by medical schools. The limiting factor now is the total training potential there is in the country.

We must mobilize our whole potential and provide the money that is needed. It does not necessarily follow, however, that we will then produce the number of doctors that we may guess we need in order to maintain the same pattern of medical care. If we cannot produce enough for that purpose we will have to use doctors only where medicine has something really effective to offer and free them from everything for which a doctor, even if desirable, is not truly necessary.

We are losing more doctors from emigration than we can spare. Many different factors will combine, however, to reduce this number. As other countries improve their organization, and as we improve our facilities, the drain should become substantially less.

There will always be some emigration. There always has been, and the overseas commitments which caused it have left us with obligations to other countries which the profession is not likely to ignore. Perhaps, however, the greatest contribution we can make to the world can be made here in Britain, by giving an example of how to adapt medical education and medical care to modern medicine. We are far better placed than any other country to do this, despite our shortage of numbers.

It will be an expensive task. Already medical education is more expensive than any other—justification enough for making sure we are doing it well. We are prepared to spend money to find out how to make a nuclear warship so that it will be effective in war but safe in peace. We have not so far put public money into research into medical education. The profession has started the Association for the Study of Medical Education and has built it up over the past seven years. We should not be left unaided to do this work.

The Cost

I have said nothing which is new. The changes in medical education I have advocated are not radical. They are no more than the application of old principles to meet a new context: the introduction of an old form of education for all medical students; the refurbishing under modern conditions of our old vocational training; and the restriction of required empirical knowledge to what is relevant to one branch of medicine.

Yet this adaptation calls for much money and effort. Are they justified? Part of the answer lies in the new powers of the doctor. If we want the benefits of modern medicine without the dangers we must be prepared to pay for them. But there is a further justification for giving to medicine a much bigger share of the national income than it has now. When one looks deep into the circumstances of our times it becomes apparent that we are engaged in a struggle more important than any now existing between nation and nation, or between one ideology and another. It is a struggle between man and the environment he is creating for himself. He has learned how to alter his environment, but does not yet know in what way or at what speed to change it to his best advantage. Medicine is in the forefront of those professions which can help him to find out. How well it will do so depends on the quality of to-morrow's doctors.

For two decades the turbulence of change has clouded the medical scene, but when in the fullness of time the mists clear it will be seen that the doctors of to-day have preserved all that was best in their heritage and have greatly raised the standard of British medicine. If those who follow are to maintain it, and raise it still higher, they must be given a preparation appropriate to their task.

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Carcinoma of the Stomach: a 10-year Survey of Results and of Factors Affecting Prognosis*

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In this review we discuss the results of treatment in relation to the clinical findings in a group of 5,441 cases of carcinoma of the stomach registered at the Birmingham Regional Cancer Registry in the 10-year period 1950–9. In the earlier years of the decennium the cases were drawn almost exclusively from the United Birmingham Hospitals, but as the scope of the Registry was extended increasing numbers from regional hospitals were included.

We begin with a discussion of some of the general epidemiological features of the disease. For this section we have included registrations for the years 1960 and 1961, when more than 90% of all cases of malignant disease in the region were reported to the Registry.

Table I shows the overall ratio of male to female cases to be about 3:2. We have also examined the trend in mean age at diagnosis by sex during this time (Figs. 1 and 2). To provide

a standard of comparison we have included also the mean age at diagnosis for all sites of malignant disease. For each sex patients with stomach carcinoma are older on average than those of all sites together, and all four means have shown steady increases over the period. In males, however, the two curves run nearly parallel, but in females the rise in the mean age of stomach cases is much more pronounced.

* This paper is part of a survey of malignant disease of the alimentary tract prepared for the Annual Cancer Report of the Board of Governors of the United Birmingham Hospitals. It is based on statistics submitted to the Birmingham Regional Cancer Registry by the United Birmingham Hospitals and hospitals of the Birmingham Regional Hospital Board. We would like to express our thanks to all the members of the staffs of those hospitals who have made information available to the Registry.

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The rise in mean age is attributable to several factors. Deficiencies in registration are more likely in the older age groups, so that improvements will be reflected as a rise in mean age. With advances in treatment techniques a larger number of older patients are now referred for diagnosis at hospital. Furthermore, the ageing of the population—the increasing number in the upper age groups—will also contribute to a rising mean age. The magnitude of this effect can be gauged by graphing the mean age at death for carcinoma of stomach over the same period. This has been done in Fig. 3. In each sex the rise in mean age at death amounts to about one year

in ten years. None of these factors, however, is likely to act differentially between the sexes to the extent shown in Figs. 1 and 2.

The mortality rates by age for each sex are shown in Figs. 4 and 5. Rates for 1950 and 1960 are shown for comparison. In both sexes the rates show a diminution over the 10 years, which is greater in females than in males. Case (1956), in his cohort analysis of cancer mortality, drew attention to a decline in mortality from stomach carcinoma in successive cohorts which is more pronounced in women than in men. In Figs. 4 and 5 the broken lines drawn to cross obliquely the mortality curves as the rungs of a ladder are in fact sectors of cohort lines. As Case points out, one effect of a declining incidence in successive cohorts is an apparent shift in the curve of age incidence. Thus if the cohort born in 1900 has a risk of mortality at each age less than that of the cohort born in 1890, and less again than that of the cohort born in 1880, then the mortality rate for age 70 in 1960 (the 1890 cohort) will be less than the mortality rate for age 70 in 1950 (the 1880 cohort), and correspondingly for other ages and calendar years.

Further supporting evidence is shown in Fig. 6, where the Registrar-General's standardized mortality ratio is graphed for each sex over the same period of time. The standardized mortality ratio, which is standardized for changes in the age

TABLE I.—Registration by Sex

Year	Total	Male	Female	
			No.	% Total
1950	164	109	55	33.5
1951	316	197	119	37.7
1952	368	219	149	40.5
1953	405	257	148	36.5
1954	406	253	153	37.7
1955	450	277	173	38.4
1956	446	260	186	41.7
1957	729	437	292	40.0
1958	990	598	392	39.6
1959	1,167	699	468	40.1
1950-9	5,441	3,306	2,135	39.2

FIG. 1.—Mean age at diagnosis, carcinoma of stomach and carcinoma of all sites: Birmingham Region, 1950-61. Males. FIG. 2.—Mean age at diagnosis, carcinoma of stomach and carcinoma of all sites: Birmingham Region, 1950-61. Females. FIG. 3.—Mean age at death, carcinoma of stomach, England and Wales, 1950-62.

FIG. 4.—Mortality rates, carcinoma of stomach, England and Wales, 1950 and 1960, showing also cohort lines. Males. FIG. 5.—Mortality rates, carcinoma of stomach, England and Wales, 1950 and 1960, showing also cohort lines. Females. FIG. 6.—Standardized mortality ratio, carcinoma of stomach, by sex, England and Wales, 1950-62. (The average of the three years 1950-2 is taken as 100 and each year plotted separately.)

distribution, shows a decline in each sex, but it is nearly twice as great in women as in men.

We have here used indifferently both mortality rates and incidence rates when considering relationships with age and sex. The justification for this action rests of course on the relatively short lapse of time in the majority of cases between diagnosis and death. We shall show later that the survival time after treatment does not appear to have improved over the last 20 to 30 years, so that the inclusion of treated cases is not likely to lead to bias in the consideration of secular trends.

The fall in mortality rates, shown perhaps most clearly in Fig. 6, can thus be legitimately interpreted as a fall in the incidence of the disease. We can therefore conclude that the disease is diminishing in its incidence in both sexes, having fallen in the dozen years shown in Fig. 6—15% in men and 25% in women.

Incidence by Age and Sex

We have examined in Fig. 7 the age incidence of carcinoma of the stomach in the Birmingham Region for the years 1960–1 when the efficiency of registration was known to be well over 90% (probably 95%). This graph is similar to that reported by Payne (1964) from the South Metropolitan Cancer Registry for the year 1961, when allowance is made for the difference in overall registration efficiency (around 80% for the S.M.C.R.). When the female rate is divided into single and married (including widowed or divorced) the incidence by age (Fig. 8) again compares well with Payne's, subject to the same qualifications. The rates in fact diminish progressively at each age from men to married women to single women. The shapes of the curves, however, are very similar when drawn to a logarithmic scale (Fig. 9), suggesting that the relationship with age is similar in kind but different only in degree.

FIG. 7

FIG. 8

FIG. 9

FIG. 7.—Age incidence per 10,000, carcinoma of stomach, Birmingham Region, 1960–1. FIG. 8.—Age incidence per 10,000, carcinoma of stomach: females according to marital status. Birmingham Region, 1960–1. FIG. 9.—Age incidence per 10,000, carcinoma of stomach, by sex and, for females, marital status. Birmingham Region, 1960–1. (Logarithmic scale.)

TABLE II.—Site and Duration of Symptoms

Site	Total	Duration in Months										Quartiles		
		N.K.	None	–1	–2	–3	–6	–12	–24	–36	36+	Q ₁	Median	Q ₃
Cardia	275	38	0.4	11.8	20.7	16.5	23.2	14.3	7.2	2.1	3.8	1.6	3.1	7.1
Body	331	40	0.3	15.5	16.5	15.1	23.0	17.9	7.2	1.4	3.1	1.6	3.4	7.6
Pyloric antrum	1,312	164	0.4	17.2	19.3	12.2	18.2	14.6	7.1	2.7	8.3	1.4	3.2	9.2
Lesser curvature	487	79	0.2	15.9	16.7	10.8	19.6	13.2	9.3	3.7	10.5	1.5	4.0	11.4
Greater curvature	132	23	1.8	17.4	15.6	10.1	21.1	13.8	8.3	2.7	9.2	1.4	3.8	9.9
Anterior wall	25	3	—	22.8	9.1	13.6	18.2	9.1	13.6	0	13.6	1.3	3.3	15.8
Posterior wall	79	11	—	14.7	10.3	26.4	10.3	11.8	11.8	1.5	10.3	1.7	4.2	11.1
Site unspecified	2,800	596	0.2	19.9	17.6	13.0	21.7	14.8	5.9	1.5	5.4	1.3	2.9	7.1
Total	5,441	954		18.0	17.9	12.8	20.8	14.7	6.8	2.1	6.6	1.4	3.1	8.1

Note: Percentages are calculated for known duration only.

Geographical Distribution

The incidence of carcinoma of the stomach was found to be greater in urban than in rural areas of the Birmingham Region. Here again we used the more complete registrations of the years 1960 and 1961 combined. Taking all county boroughs together the incidence was about 15% above the regional average, a little higher in Birmingham (17%), and highest in Stoke-on-Trent at 44% above. In Birmingham, as in all county boroughs taken together, the increase was higher among women than among men, but in Stoke the increase in males was greater.

Site of Growth and Duration of Symptoms

The site of the growth in the stomach was recorded in only about half the cases, and in others the description was rather indefinite—for example, “body”—which probably meant that it was too extensive to give an accurate location of the site of origin. Even so, in a significantly large number of cases the growth originated in the pyloric antrum (50% of the specified sites) (Table II).

In about three-quarters of the cases in which the duration of symptoms prior to the diagnosis was known the length of history was less than six months, and in one-fifteenth of the cases the history was longer than three years.

Site of growth did not appear statistically to influence the length of duration of symptoms, and this is demonstrated in Fig. 10. Here the duration of symptoms has been plotted on a logarithmic scale in order to comprehend better the longer durations. Not only is the precision of recall less accurate for the longer intervals—and possibly follows a logarithmic relationship—but the differences, which are in themselves trivial, can sometimes appear otherwise when presented on an arithmetic time scale.

Influence of Site on Type of Treatment

Treatment was divided into four groups: radical operation, palliative operation, exploration only, and no treatment. This classification is based on the surgeon's opinion at the operation. Radical operation indicates that the surgeon left behind no visible growth. Palliative operation in some cases, of course, meant only a short circuit, but in other cases could have involved a partial gastrectomy, but where visible growth was left behind. It should also be pointed out that the term "radical operation" does not by any means indicate that a total gastrectomy was carried out, and in fact the operation in most cases was partial gastrectomy.

Table III shows the relationship between the site of the growth and the type of treatment possible. While in the group overall in only 26.5% of the cases was radical surgery possible, in those cases where the growth was localized about 40% were resectable, and this was irrespective of site. In 36.5% of the cases no surgical treatment, even exploration, was carried out.

Influence of Histology on Type of Treatment

The pathologists' classification of the various histological types, and the numbers in each group, is given in Table IV together with its relationship to the type of treatment. Little

FIG. 10.—Duration of symptoms by site: carcinoma of stomach, Birmingham Region, 1950–9.

TABLE III.—Site and Type of Treatment

Site	Total	% Specified Sites	Type of Treatment			
			Radical (% Distribution)	Palliative (% Distribution)	Exploratory (% Distribution)	None (% Distribution)
Cardia	283	10.4	38.2	19.4	19.8	22.6
Body	340	12.5	25.6	13.5	28.2	32.7
Pyloric antrum ..	1,360	49.8	41.4	29.4	10.6	18.6
Lesser curvature ..	502	18.4	40.4	11.8	23.7	24.1
Greater curvature ..	138	5.1	37.7	6.5	15.9	39.9
Anterior wall ..	25	0.9	44.0	16.0	16.0	24.0
Posterior wall ..	80	2.9	40.0	10.0	37.5	12.5
Site unspecified ..	2,713		14.3	10.5	25.0	50.2
Total	5,441		26.5	15.9	21.1	36.5

TABLE VI.—Histology and Duration of Symptoms

Histology	Total	Duration in Months										Median (Months)
		N.K.	None	-1	-2	-3	-6	-12	-24	-36	36+	
Carcinoma arising in peptic ulcer	50	12	0.0	10.5	7.9	2.6	10.5	21.1	15.8	10.5	21.1	11.0
Linitis plastica ..	136	16	0.0	4.2	16.7	12.5	23.3	21.7	9.2	1.7	10.8	5.1
Mucoid carcinoma ..	121	9	0.0	14.3	15.2	14.3	18.7	16.1	8.0	0.9	12.5	4.1
Adenocarcinoma ..	1,406	182	0.2	15.4	16.6	12.0	22.5	16.2	7.4	2.4	7.3	3.8
Anaplastic carcinoma ..	426	57	1.1	16.8	16.0	10.3	20.0	18.1	6.8	4.1	6.8	3.9
Other or unspecified ..	506	73	0.2	17.3	17.8	12.7	22.2	12.5	6.9	3.2	7.2	3.3
No histology	2,796	605	0.2	20.9	19.4	13.8	19.9	13.1	6.2	1.3	5.2	2.7
Total	5,441	954	0.3	18.0	17.9	12.8	20.8	14.7	6.8	2.1	6.6	3.0

Percentages are calculated for known duration only.

TABLE IV.—Histology and Type of Treatment

Histology	Total	Type of Treatment			
		Radical (% Distribution)	Palliative (% Distribution)	Exploratory (% Distribution)	None (% Distribution)
Carcinoma arising in peptic ulcer	50	86.0	4.0	0.0	10.0
Linitis plastica ..	136	67.6	18.4	6.6	7.4
Mucoid carcinoma ..	121	55.4	23.2	10.7	10.7
Adenocarcinoma ..	1,406	66.1	18.1	5.3	10.5
Anaplastic carcinoma ..	426	54.4	16.9	12.9	15.7
Other or unspecified ..	506	8.3	17.4	56.1	18.2
No histology	2,796	1.3	14.2	25.5	59.0
Total	5,441	26.5	15.9	21.1	36.5

can be concluded from this except perhaps that it confirms the high resectability rate of linitis plastica, 67.6% of this type being capable of radical operation.

In only 50 (1.9%) of the 2,645 cases which were examined histologically was there evidence that the carcinoma was associated with a peptic ulcer. Of these 50 cases, 43 were in the group treated by radical surgery and represent only 3% of that group (further observations about this are made later).

Duration of Symptoms and Type of Treatment

A significant feature in this review is the relationship between the length of history of symptoms and the type of treatment possible (Table V). The longer the history the greater seems to be the possibility of radical treatment. This is shown in the gradual decline in the median duration of symptoms from those cases undergoing radical surgery (4.3 months) to those in which no treatment was possible (2.5 months). Although the difference in these figures may appear small, the steady decline through the less favourable types of treatment possible is inescapable, and the figures are statistically significant.

TABLE V.—Type of Treatment and Duration of Symptoms

Treatment	Total	Duration in Months								Median (Mths.)
		N.K.	None %	-3	-12	-24	-36	36+		
Radical	1,444	183	0.0	40.2	38.8	9.0	2.9	9.0		4.3
Palliative	866	87	0.0	48.1	35.7	5.9	3.6	6.7		3.3
Exploratory ..	1,148	127	0.3	49.2	36.7	6.8	1.5	5.6		3.1
No treatment ..	1,983	557	0.7	56.2	31.6	5.5	0.9	5.0		2.5
Total	5,441	954	0.3	48.7	35.5	6.8	2.1	6.6		3.1

Percentages are calculated for known duration only.

Table V shows the increasing proportion of cases with a short history for durations mainly below the median and increasing proportions above in progressing from radical treatment to no treatment. It shows also that the relationship is most pronounced in the radically treated groups as compared with the remainder.

Histology and Duration of Symptoms

Table VI, giving figures for all cases during the period covered (1950–9), shows that histology appears to have no effect on duration of symptoms prior to treatment. A more

detailed breakdown of similar figures for the 730 cases undergoing radical surgery during the years 1950–6 confirmed this. Here the median duration of symptoms for the total (730 cases) was 4.5 months, while that for the individual histology types varied from only 3.9 to 4.7 months, except in the group specified "Carcinoma arising in peptic ulcer," where the figure was 10.5 months. This group, however, consisted of only 25 cases, and is too small to be of statistical significance.

Survival

A five-year follow-up has been possible on the cases registered in the first nine years of the period—that is, 1950–8 inclusive. The actual figures of the survival percentage for all cases, irrespective of type of treatment, is given in Table VII. Of more interest is the five-year survival time for those cases treated by radical operation, and of the 1,214 so treated in the years 1950–8 (Table VIII), the crude survival rate is 15.6%, a figure which rises to 18.4% when corrected for age and sex (Table I). Table VIII also gives the survival rates for each age group. When these are expressed in graph form (Fig. 11), the 35–44

TABLE VII.—Survival Rates for All Cases

Years	Total	Survival Rate at (Years)									
		1	2	3	4	5	6	7	8	9	10
1950–1	480	18.3	8.5	6.3	5.0	4.2	4.0	3.1	2.7	2.7	2.5
1950–8	4,274	19.5	10.4	7.5	5.7	4.9					

TABLE VIII.—Survival Rates for Cases Treated by Radical Surgery

Years	Total Treated	Survival Rate at (Years)									
		1	2	3	4	5	6	7	8	9	10
1950–1	121	49.6	30.6	22.3	17.4	15.7	14.9	11.6	9.9	9.9	9.1
1950–8	1,214	51.2	31.8	23.2	18.0	15.6					

TABLE IX.—Cases Treated by Radical Surgery. Survival Rates by Age

Age	Total Treated	Five-Year Survival Rates (%)	
		Crude	Corrected
20–24	1	0	—
25–34	12	16.7	16.8
35–44	86	23.3	23.6
45–54	274	21.5	22.6
55–64	398	14.1	15.7
65–74	344	12.2	16.3
75–84	92	10.9	21.8
85+	6	0	—
All ages	1,213	15.6	18.4

In one case the age was unknown.

age group appears to give the most favourable results, with a steady decline thereafter.

The survival rates were examined against the year of operation, and appeared to show that there is no trend towards any improvement in the treatment of the condition. The overall rates are shown in (Fig. 12).

In Table X the five-year survival rates for the 1,214 cases treated by radical surgery during the years 1950–8 are compared with their pre-operative duration of symptoms. There appears to be a close relation, the percentage survival rate rising the longer the duration of symptoms prior to treatment (Fig. 13). Similar figures for all the cases, however treated, in the same period (1950–8) show the same trend, and these are abbreviated in Table XI.

TABLE X.—Cases Treated by Radical Surgery. Duration of Symptoms and Survival

Duration of Symptoms	Total Treated	Five-Year Survival (%)
–3 months	433	11.1
–6 "	252	12.5
–12 "	165	15.2
–24 "	98	18.4
–36 "	33	21.2
>36 "	96	28.1
Not known	137	22.6
Total	1,214	15.6

TABLE XI.—Treatment, Duration of Symptoms, and Survival

Treatment	Total	Median Duration of Symptoms (Months)	5-year Survival Rate (%)
Radical	1,214	4.3	15.6
Palliative	721	3.5	1.4
Exploratory	930	3.3	0.4
Not treated	1,409	2.5	0.2
Total	4,274	3.3	4.9

The favourable effect of a long history of symptoms on the type of surgery possible has already been mentioned, and is here underlined by the favourable effect on survival afterwards. The prognostic importance of a long history of symptoms has previously been reported by Balfour (1937), Walters, Gray, and Priestley (1942), and Swinnerton and Truelove (1952). The explanation of the facts may be that there is a variation in the growth rate of the tumours, as suggested by Park and Lees (1951), with particular reference to carcinoma of the breast, or that some individuals have a greater resistance to the disease. It might be pointed out here that these facts do not imply that surgical treatment is not worth while, or that early diagnosis is

FIG. 11

FIG. 12

FIG. 13

FIG. 11.—Crude and standardized survival rates by age, for cases of carcinoma of stomach treated by radical surgery, 1950–8. FIG. 12.—Survival rates for radical surgery alone, and for all types of treatment (1950–1 compared with 1950–8). FIG. 13.—Five-year survival rates for cases of carcinoma of stomach treated by radical surgery (1950–8) according to pre-operative duration of symptoms.

not essential, or that a delay is excusable. In many patients it is the complications of the disease—for example, obstruction in the stomach, bleeding or anaemia, the effect of an ulcerating lesion on the appetite, etc.—which may lead to the patient's death before the malignant process itself would have done so. Elimination of these factors might enable the patient to survive a reasonable period, especially in those whom the disease runs a more protracted course.

Effect of Site of Growth on Survival Time

The median survival time of the 1,214 cases treated by radical surgery in 1950–8 was 12.5 months. Lesions arising at the cardia had the less favourable prognosis, with a median survival time of 10.5 months (five-year survival rate of 9.2%). The more distal was the site of the lesion the more favourable became the prognosis—for example, lesser curvature had a median survival time of 12.7 months. Those in the pyloric region were the most favourable, and here the median survival time was 15.5 months (five-year survival rate of 16.1%).

Relationship of Carcinoma of Stomach to Peptic Ulcer

Of the 2,645 cases for which histological reports were available only 50 (1.9%) were specified by the pathologist as having arisen in association with peptic ulcer. As peptic ulcer is a frequent pre-operative diagnosis, it was decided to investigate the possible association further.

Among the 1,460 cases of the United Birmingham Hospitals series, 49 (3.4%) had a history of symptoms for three years or more before treatment by radical surgery. Cases with a long history were selected because previous investigations and diagnoses were more likely to have been made, and the fact that a radical operation had been carried out would presumably have enabled a full histological examination to be made. Of the 49 cases sufficiently full and comparable details were available from 41, and the following points emerged.

1. The pre-operative clinical diagnosis was:

Peptic ulcer	...	...	...	29
Carcinoma of stomach	...	...	...	9
? Peptic ulcer, ? carcinoma	...	...	...	2
Cholecystitis	...	...	...	1

2. The pre-operative diagnosis after radiological investigation was:

Peptic ulcer	...	...	...	19*
Carcinoma of stomach	...	...	...	9
? Peptic ulcer, ? carcinoma	...	...	...	2
Cholecystitis	...	...	...	1
Barium meal negative	...	...	...	2
No x-ray examination (e.g., clinical evidence of pyloric stenosis, abdominal mass, etc.)	...	...	...	8

* One of these was diagnosed as gastric polyp.

3. Operative diagnosis was:

Peptic ulcer	...	...	...	13
Carcinoma of stomach	...	...	...	25
Doubtful (? ulcer, ? carcinoma)	...	...	...	3

Of the 41 cases, all of which were proved by histological examination to be carcinoma of the stomach, 21 had been diagnosed and treated as peptic ulcer at some time prior to the present investigation and/or treatment. A further two cases had been investigated as ? peptic ulcer, but x-ray examination had been negative.

In 11 of the 13 cases diagnosed at operation as "peptic ulcer" no mention of this condition is made in the histological report. (Note: whole lesion was available because of gastrectomy, and report was not on biopsy only.)

Of the 41 cases examined histologically, only in six did the report mention previous ulceration as being associated with the carcinoma.

These facts indicate the difficulty in differentiating, clinically, radiologically, and at operation, between peptic ulcer and carcinoma of the stomach. The point made previously that

carcinoma of the stomach may have a long history also increases the possibility of confusion. Table II shows that the mean duration of symptoms for lesions on the lesser curve and posterior wall is greater than elsewhere, and it is in these sites that gastric ulcer is also most common. Lampert, Waugh, and Dockerty (1950) reported that of the patients operated on for gastric ulcer in the male clinic in the years 1938–42 inclusive, 13% actually had carcinoma of the stomach.

Comparison of Present Series with a Previous Series

In 1953 the figures for carcinoma of the stomach for the 15-year period 1936–49—that is, the period immediately prior to the present series—were published in the First Annual Cancer Report of the United Birmingham Hospitals. A brief summary of that series is given for comparison with the present cases.

In that 15-year period 1,802 cases were registered. Of the 1,471 who did not have the growth removed, all but 29 (1.9%) died within two years, and only one survived more than five years, dying at eight years. Of the 331 (18% of the total) in which the growth was removed (including palliative and radical operations), 166 (50%) died within one year, 61 (18%) died in the second year, and 57 (17%) survived five years or more. This latter figure compares closely to the five-year crude survival figure in the present series (15.6%). Of the cases undergoing resection in the earlier series 37 (11%) survived 10 years or more. The 18% resection rate in the earlier series varied from 12% in 1936 to 35% in 1949, and this included palliative and radical resections, while in the latter series the radical resection rate was 26.5% for the 10-year period as a whole. This is not a significant improvement in view of the great advance made in surgical technique, anaesthetics, diagnostic facilities, etc., over the last quarter of a century. Finally, of the 1,802 patients in the original series, 37 survived 10 years or more and all the rest died of carcinoma of the stomach, except 13 who died of causes unrelated to their original disease.

Summary

An analysis is made of 5,441 cases of carcinoma of the stomach registered at the Birmingham Regional Cancer Registry in the years 1950–9, and the 1,802 cases registered in the years 1936–49 are mentioned for comparison.

In just over 25% of cases radical surgery was possible, and the five-year corrected survival rate of these was 18.4%. Eventually, however, practically all the patients who died did so of the original disease.

There was some evidence to suggest that the condition had a greater incidence than was expected in urban areas, and a lower one than expected in rural areas.

The most significant prognostic feature was the length of duration of pre-operative symptoms. Patients with the longer history had a higher operability rate and survived the longer. The site of the growth affected the prognosis less, lesions nearer the pylorus being more favourable than those near the cardia. Histological variations did not appear to affect the prognosis, the operability, or the duration of symptoms, except for cases of linitis plastica, which were favourable.

The mean age of onset of the disease seemed to be rising in both sexes, but more so in women than in men. On the other hand, the mortality rate for the disease showed a slow fall over 10 years. It can be argued from these two factors that the incidence of the condition is slowly falling.

The figures over 25 years did not seem to show any improvement in the results of treatment.

There is no evidence to suggest that peptic ulcer is a significant cause of carcinoma of the stomach or that the two conditions have a significant association. On the other hand,

there is difficulty in differentiating between these two conditions clinically, radiologically, and at operation.

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A New Haemoglobin in a Thai Family. A Case of Haemoglobin Siriraj- β Thalassaemia

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Haemoglobin Siriraj

In 1962 an 8-year-old Thai child was admitted to Siriraj Hospital, Bangkok, with severe anaemia and fever. The blood smear showed many nucleated red cells and target cells, and the osmotic fragility of the erythrocytes was reduced. The spleen was enlarged two fingerbreadths and the liver one fingerbreadth below the costal margin. There was no "thalassaemia-mongoloid" facies, and the x-ray picture of the bones was normal. Treatment of infection resulted in improvement, and the haemoglobin level rose gradually from 6 g. to 11.9 g./100 ml. (Table I). Two years later the spleen and liver were only just palpable. The blood picture, however, still showed numerous target cells, and the osmotic fragility was still reduced.

TABLE I.—Haematological Findings in the Propositus

	Hb g./100 ml.	R.B.C. 10 ⁶ /c.mm.	Reticulo- cytes %	Nucleated Red Cells per 100 W.B.C.	M.C.V. c. μ	Target Cells	Osmotic Fragility %NaCl
On first admission	6	2.5	6	12	66	++	0.10–0.35
Two years later	11.9	4.9	3	None	69	++	0.15–0.40

When the patient's haemoglobin was examined by paper electrophoresis (Tris buffer pH 8.9) it showed only one major fraction. It was not in the position of haemoglobin A, but was moving more slowly than A towards the anode. On comparison with known abnormal haemoglobins, this haemoglobin was found to differ from them all, and was therefore thought to be a new variant, which was named haemoglobin Siriraj. In addition to the major fraction, haemoglobin A₂ at a level above that normally seen and 4% haemoglobin F (Betke, Marti, and Schlicht, 1959) were also noted.

Family Investigation

The patient's family were examined. The father possessed 60% haemoglobin A and 40% haemoglobin Siriraj. The mother showed only haemoglobin A as the major fraction, but there was an increased haemoglobin A₂ and a trace of haemoglobin F (2.1%) which was just measurable (Table II). It was concluded that the father had the haemoglobin Siriraj trait and the mother β -thalassaemia minor, and that the haemato-

logical condition of the propositus was the outcome of interaction between the heterozygous states for haemoglobin Siriraj and for β -thalassaemia respectively, resulting in haemoglobin Siriraj- β -thalassaemia. Of three siblings, two also had the haemoglobin pattern of β -thalassaemia minor, and one had the haemoglobin Siriraj trait.

TABLE II.—Haematological Findings in the Thai Family Carrying the Genes for β -Thalassaemia and Haemoglobin Siriraj

	Hb g./100 ml.	Red Cells 10 ⁶ /c.mm.	P.C.V. %	M.C.V. c. μ	M.C.H.C. %	Target Cells	Osmotic Fragility	Serum Iron μ g./100 ml.	Hb F %	Hb Electro- phoresis
Father	15.6	5.5	45.5	83	35	None	0.32–0.45		None	A + Siriraj
Mother	10.8	4.8	33	69	32	Some	0.20–0.50	230	2.1	Hb A ₂ raised
Sibling I	12	5.8	37	64	33	Some	0.20–0.45	277	2.9	Hb A ₂ raised
Sibling II	13.4	5.2	39	75	34	None	0.30–0.50		None	Hb A + Siriraj
Sibling III	11.3	4.2	35	60	32	Some	0.28–0.50		3.3	Hb A ₂ raised
Propositus	11.9	4.9	34	69	34	++	0.15–0.40		4.0	Hb Siriraj + F Hb A ₂ raised

Haemoglobin Siriraj

On electrophoresis and chromatography with varying buffers and media the relative mobility of the new haemoglobin differed. On paper electrophoresis at pH 8.9 using Tris buffer

Fig. 1.—Paper electrophoresis—Tris buffer, pH 8.9. From left to right: haemoglobin C, haemoglobin S+F, the haemoglobin of the propositus: haemoglobin Siriraj. It moves faster than haemoglobin C and S, just behind haemoglobin F, in the position which would be occupied by haemoglobin Q.

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