Peptic Ulcer: A Profile

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"There is no disease of which a fuller or additional description does not remain to be written."

(John Ryle, 1931.)

When I entered general practice 20 years ago my knowledge and experience of peptic ulcer were based entirely on the teaching I had received at Guy's Hospital from deities such as Sir Arthur Hurst and Professor John Ryle. I assumed that it was a serious disorder requiring long periods of bed-rest, absence from work, and dietetic care for the remainder of the victim's life.

After a short time in general practice I realized that the peptic ulcers I was encountering were quite different from those I had treated in hospital. I got the impression that peptic ulcers had a characteristic natural history with a marked tendency towards natural remissions which were really uninfluenced by my efforts at medical treatment. Reports by Malmros and Hiertonn (1949), Martin and Lewis (1949), Rae and Allison (1953), and Doll, Friedlander, and Pygott (1956) tended to support my views. I set out to record the course and natural history of peptic ulcer in my practice, and this paper presents the findings over the past 15 years (1948-63).

Special Features of General Practice

Some note is necessary of the special features and opportunities that make such a long-term study particularly suitable in general practice.

Under the British N.H.S. the general practitioner works in a relatively static community, and over the years he is able to get to know well the personal, family, social, and environmental features of his patients. In this same static community he is in the front-line of medical care, and the conditions presented to him are quite unselected. He is able, therefore, to study the whole spectrum of disease and to include the less severe as well as the more severe types of illness that are usually seen in hospital practice. Long-term care and follow-up present few problems, because the doctor is living and working among his patients and is very likely to see the majority (some three-quarters) of them or members of their families at least once a year.

For these reasons the study of the course and outcome of peptic ulcers was relatively easily carried out in my practice.

The Study

Population at Risk

The practice is sited in a south-east London suburb some 10 miles from the centre of London. The social classification is very much middle-class, with social classes II, III, and IV (Registrar-General's classification) predominating. The occupations of the patients are chiefly clerical and administrative in London or local offices or in local light industries.

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The mean size and age-sex distribution of the practice during the period of the study was as shown in Table I.

TABLE I.—Mean Age and Sex Distribution of the Population at Risk

	Age :	0-	10-	20-	30-	40-	50-	60-	70+	Total
Males	..	474	498	351	503	482	410	250	111	3,079
Females	..	470	480	432	545	440	441	308	190	3,306
Total ..										6,385

Material

The report is based on all the cases of peptic ulcer in the practice that were diagnosed during the 10-year period 1948-57. The diagnosis of peptic ulcer was made when there was positive radiological evidence from a barium-meal examination. (There are full facilities for direct G.P. referral at the local hospital.)

Treatment was made as simple as possible and was based initially on advice on diet—that is, frequent bland meals, alkalis for pain, and rest from work when the symptoms were severe enough.

Annual Prevalence of Peptic Ulcer

In order to obtain some indication of the activity of peptic ulcers during this period of study the numbers of patients attending each year for treatment were recorded and the rates per 1,000 of the population at risk calculated (Table II).

TABLE II.—Annual Prevalence Rates of Peptic Ulcers Per 1,000 of Population at Risk

	Age (years) :	10-	20-	30-	40-	50-	60-	70+	Totals
Duodenal ulcer	{M	2.0	11.4	10.0	24.0	24.4	36.0	27.3	21.5
	{F	—	2.3	3.7	4.6	6.8	6.3	—	3.6
Gastric ulcer	{M	—	—	2.0	8.0	7.3	8.3	27.3	4.1
	{F	—	—	3.7	4.6	5.0	6.3	10.5	2.8
All peptic ulcers	{M	1.7	9.1	11.7	29.9	31.3	38.0	36.3	25.6
	{F	—	1.9	5.2	7.9	8.1	7.6	8.7	6.4

These rates represent only those whose symptoms were severe enough to require medical attention and the *total annual prevalence rate* was 16 per 1,000. In an average-sized practice, on the basis of this rate, the doctor might expect to see some 40 patients with peptic ulcers each year.

Onset

The exact moment of onset of a chronic condition such as peptic ulcer is not easily definable, but it was possible from the time of first diagnosis to arrive at the period at which the dyspeptic symptoms were first noted by the patient. Table III shows the proportions of patients (in rates per 1,000 of all persons who were in these age-groups during 1948-57) at which peptic ulcers first began to present symptoms.

TABLE III.—Age at Onset of Peptic Ulcer in Rates Per 1,000 (Including All Persons in Age-groups During 1948-57)

Ages :		10	20	30	40	50	60	70+	Totals
Duodenal ulcer	M	4.4	36.2	61.1	54.5	40.1	5.0	8.0	33.8
	F	1.1	7.1	10.0	13.3	3.3	5.0	5.0	6.7
Gastric ulcer	M	—	—	4.4	6.4	14.1	8.4	4.0	5.4
	F	—	—	5.0	7.8	2.2	11.6	10.0	4.6

The ages at which duodenal and gastric ulcers first started were different. Duodenal ulcers began earlier in the 20s and reached their peak, in males, in the 30-39 decade; gastric ulcers, in males, reached their peak some twenty years later in the 50-59 decade. Similar differences were noted in females.

The same trends have been reported by Doll, Jones, and Buckatzsch (1951) and Pulvertaft (1959).

Course and Outcome

One of the most fascinating opportunities offered to the general practitioner is that of following up and observing the course of disease over long periods of time. It enables him to see what happens to the patients. How many continue to suffer, how many die, and how many get better? It was to answer these questions that this study was undertaken.

The technique used involved annual functional assessment. Table IV shows the results of such gradings for all persons

TABLE IV.—Functional Gradings of All (265) Patients With Duodenal and Gastric Ulcers at Various Periods of Follow-up

* Grades :	1	2	3	4	Totals
Duodenal Ulcers					
At onset ..	5 (3%)	100 (58%)	61 (33%)	10 (6%)	176
At 5 years	3 (2%)	36 (22%)	55 (33%)	70 (43%)	164
At 10 years	70 (60%)	40 (35%)	4 (3%)	2 (2%)	116
At 15 years	35 (76%)	10 (22%)	1 (2%)	—	46
Gastric Ulcers					
At onset ..	1 (4%)	9 (32%)	11 (39%)	7 (25%)	28
At 5 years	1 (4%)	4 (15%)	5 (19%)	16 (62%)	26
At 10 years	10 (63%)	4 (25%)	1 (6%)	1 (6%)	16
At 15 years	3 (75%)	1 (25%)	—	—	4

* Grades.—1, no symptoms; 2, some medication required; 3, medical advice in past year; 4, symptoms severe enough to require absence from normal duties over past 12 months.

with peptic ulcers irrespective of treatment. Three five-year periods were taken and the proportions of patients in each grade and at each period of follow-up are shown. The numbers of persons who were followed up for the longer periods of time were smaller than those followed for shorter periods, but both in duodenal and in gastric ulcers there were definite trends for the conditions to remit during the period of observation.

In the largest group, that of males with duodenal ulcers, the proportions who were severely disabled (grades 3 and 4) ranged from 39% at onset to 76% after 5 years, 5% at 10 years, and only 2% at 15 years. Similar trends were apparent in females with duodenal ulcers and in both sexes with gastric ulcers.

Clinical Course

Study of the clinical course of peptic ulcer, taken as a composite group, showed that once symptoms began to be experienced they would cause increasing disability for between 5 and 10 years and that, following a "peak," the condition tended to "burn itself out" with a steady and progressive remission of symptoms.

The "Peak"

It was possible because of the annual gradings to calculate the mean periods at which the peaks of severity were reached in both duodenal and gastric ulcers.

Thus in *duodenal ulcer*, in males, the peak occurred at 8.1 years from onset, and in females it was 7.1 years.

In *gastric ulcer* the peaks were reached earlier than in duodenal ulcer, being 6.5 years in males and 6.8 years in females.

In other words, it was found that, in general, men with duodenal ulcers continued to suffer repeated bouts of clinical exacerbations for eight years and then, after this, attacks began to become less frequent and less severe. Of course there were exceptions. In some the peak was reached much earlier and was followed by improvement, and a small number of patients continued to experience disability after 10 or even 15 years of observation.

Mean Grades

Another way of expressing this trend towards remission and improvement is by the calculation of mean grades for all those followed at the various periods of follow-up. This has been done and the findings are shown in Table V.

TABLE V.—Mean Rating of Grades of Severity (1-4) of Duodenal and Gastric Ulcers at Various Periods of Follow-up

		Duodenal Ulcer		Gastric Ulcer	
		Males	Females	Males	Females
Onset ..	..	2.4	2.4	2.9	2.7
5 years ..	..	3.2	3.3	3.4	3.7
10 years ..	..	1.5	1.9	1.6	1.4
15 years ..	..	1.3	1.3	1.3	1.3

It is evident that the most severe grades of disability ("4" being the most severe grade that could be recorded and "1" the least severe) were encountered at five years of follow-up and that after this there is a progressive improvement. It is interesting to note that those with gastric ulcers were more severely affected at their peaks than those with duodenal ulcers, but that at 15 years of follow-up in both types the grades of disability were the same.

Medical and Surgical Treatment

In discussing the course and outcome of peptic ulcers no attention has yet been paid to the possible influences of treatment. For while it is very likely that the "medical treatment" had no bearing on the final outcome, surgical treatment most certainly interfered with the natural course.

Surgical treatment was reserved for those who experienced such severe symptoms that their lives were completely disorganized. In all, out of 265 patients with peptic ulcers, 43 (16%) had elective surgery. Of these, in 41 it was a partial gastrectomy and in 2 a gastrojejunostomy.

The numbers who were treated surgically in each variety were as follows:—*Duodenal ulcer*: males 28 (16%), females 5 (14%). *Gastric ulcer*: males 5 (18%), females 5 (20%). The course of duodenal and gastric ulcers in those treated medically or surgically is shown by the five-year functional gradings in Tables VI and VII.

The course and outcome were similar in males and females and in duodenal and gastric ulcers, and the form of treatment, either medical or surgical, did not appear to influence a final satisfactory outcome.

If the percentages of those most severely disabled (grades 3 and 4) are compared as in Table VIII it is evident that in 10- and 15-year assessments very few persons are still disabled.

As a further illustration of the course of the conditions Table IX gives the mean ratings of the grades in those treated

TABLE VI.—Functional Gradings of Duodenal and Gastric Ulcer Patients Who Were Treated Medically

Grades :		1	2	3	4	Totals
<i>Duodenal Ulcer</i>						
At onset	Males	5 (3%)	91 (62%)	46 (31%)	6 (4%)	148
	Females	1 (3%)	21 (59%)	12 (33%)	2 (5%)	36
At 5 years	Males	3 (2%)	36 (26%)	54 (40%)	43 (32%)	136
	Females	—	4 (14%)	16 (55%)	9 (31%)	29
At 10 years	Males	56 (59%)	35 (37%)	2 (2%)	2 (2%)	95
	Females	9 (53%)	7 (41%)	1 (6%)	—	17
At 15 years	Males	30 (75%)	9 (23%)	1 (2%)	—	40
	Females	3 (75%)	1 (25%)	—	—	4
<i>Gastric Ulcer</i>						
At onset	Males	—	7 (30%)	9 (40%)	7 (30%)	23
	Females	1 (5%)	7 (35%)	8 (40%)	4 (20%)	20
At 5 years	Males	1 (4%)	4 (18%)	5 (24%)	11 (54%)	21
	Females	—	1 (6%)	4 (22%)	13 (72%)	18
At 10 years	Males	8 (63%)	3 (23%)	1 (7%)	1 (7%)	13
	Females	7 (64%)	3 (27%)	1 (9%)	—	11
At 15 years	Males	1 (50%)	1 (50%)	—	—	2
	Females	1 (50%)	1 (50%)	—	—	2

TABLE VII.—Functional Gradings of Duodenal and Gastric Ulcer Patients Who Were Treated Surgically

Grades :		1	2	3	4	Totals
<i>Duodenal Ulcer</i>						
At onset	Males	—	9 (32%)	15 (54%)	4 (14%)	28
	Females	—	2 (40%)	1 (20%)	—	5
At 5 years	Males	—	—	1 (3%)	27 (97%)	28
	Females	—	—	—	5 (100%)	5
At 10 years	Males	14 (67%)	5 (24%)	2 (9%)	—	21
	Females	1 (33%)	2 (67%)	—	—	3
At 15 years	Males	5 (83%)	1 (17%)	—	—	6
	Females	1 (100%)	—	—	—	1
<i>Gastric Ulcer</i>						
At onset	Males	1 (20%)	2 (40%)	2 (40%)	—	5
	Females	—	3 (60%)	2 (40%)	—	5
At 5 years	Males	—	—	—	5 (100%)	5
	Females	—	—	1 (20%)	4 (80%)	5
At 10 years	Males	2 (67%)	1 (33%)	—	—	3
	Females	2 (67%)	1 (33%)	—	—	3
At 15 years	Males	2 (100%)	—	—	—	2
	Females	1 (100%)	—	—	—	1

TABLE VIII.—Percentages of Severely Disabled (Grades 3 and 4) Patients With Duodenal and Gastric Ulcers Who Were Treated Medically or Surgically

		Medically Treated		Surgically Treated	
		Males	Females	Males	Females
<i>Duodenal Ulcer</i>					
At onset	.. ..	35%	38%	68%	60%
At 5 years	.. ..	72%	86%	100%	100%
At 10 years	.. ..	4%	6%	9%	0%
At 15 years	.. ..	2%	0%	0%	0%
<i>Gastric Ulcer</i>					
At onset	.. ..	70%	60%	40%	40%
At 5 years	.. ..	78%	94%	100%	100%
At 10 years	.. ..	14%	9%	0%	0%
At 15 years	.. ..	0%	0%	0%	0%

medically and surgically. It appears that those who eventually required elective surgery were more severely disabled both at onset and at the five-year assessment; it was after this time that most were operated upon. The final assessments at 15 years show that those treated surgically were better than those who were medically treated.

What has not been shown in these sets of figures is that, while the control of dyspeptic symptoms was excellent, no less than one-third (15 persons) of those who had had a gastrectomy developed anaemia 5–10 years later. All but one of these cases were of the iron-deficiency type, the one exception being a megaloblastic anaemia requiring vitamin B₁₂ and folic acid for control.

Complications

During the period of observation 23 males and 4 females died, but in only one male of 70, who died from cardiac

TABLE IX.—Mean Ratings of Grades of Severity of Patients With Duodenal and Gastric Ulcers Treated Surgically and Medically

		Surgically Treated		Medically Treated	
		Males	Females	Males	Females
<i>Duodenal Ulcer</i>					
At onset	.. ..	2.8	2.8	2.4	2.8
At 5 years	.. ..	3.9	4.0	3.0	3.2
At 10 years	.. ..	1.4	1.7	1.5	1.5
At 15 years	.. ..	1.1	1.0	1.3	1.2
<i>Gastric Ulcer</i>					
At onset	.. ..	3.2	2.4	2.7	2.8
At 5 years	.. ..	4.0	3.8	3.2	3.7
At 10 years	.. ..	1.3	1.3	1.6	1.5
At 15 years	.. ..	1.0	1.0	1.5	1.5

failure following a melaena from a duodenal ulcer, was the cause of death related to the peptic ulcer.

The two most usual complications of peptic ulcer were haemorrhage and perforation. In this series haemorrhage occurred in 37 (14%) of all peptic ulcers and the ulcer perforated in 16 (6%). The rates are shown in Table X. Among

TABLE X.—Complications in Peptic Ulcer

		Haemorrhage		Perforation	Others	Totals
		Haemat- emesis	Melaena			
Duodenal ulcer	Males	11 (6.3%)	18 (10.2%)	14 (8.0%)	1 (0.6%)	176
	Females	1 (2.8%)	2 (5.7%)	1 (2.8%)	1 (2.8%)	36
Gastric ulcer	Males	—	1 (3.6%)	1 (3.6%)	1 (3.6%)	28
	Females	2 (8.0%)	2 (8.0%)	—	—	25

“others” were pyloric stenosis in the duodenal ulcers, and one man with a previously apparently benign gastric ulcer eventually died from a gastric cancer.

For comparison with these rates of 14% for haemorrhage and 6% for perforation we give the figures reported by other observers (all from hospital practices): Malmros and Hiortonn (1949) 24% and 5% respectively; Ryle (1932) 25% and 5%; Martin and Lewis (1949) 32% and 25%. Baker (1947) found haemorrhage occurring in 20% of his series from Guy's Hospital.

Associated Diseases

It was possible from clinical and other records in the practice to calculate and compare the age-standardized observed rates of certain diseases in patients with duodenal ulcers with those that occurred in the rest of the practice population.

These observed/expected ratios are shown in Table XI.

TABLE XI.—Observed/Expected Ratios of Associated Diseases in Patients With Duodenal Ulcers—Standardized for Age

		Males	Females
Coronary heart disease	.. ..	1.8	2.0
Chronic bronchitis	.. ..	2.0	2.4
Pulmonary tuberculosis	.. ..	5.1	4.0
Cancer	.. ..	0.75	1.1
Neuroses	.. ..	2.8	3.0

These diseases—that is, coronary heart disease, chronic bronchitis, pulmonary tuberculosis, cancer, and neuroses—were selected specially for comparison because when the histories were being reviewed it became apparent that they featured prominently and repeatedly.

Coronary heart disease and chronic bronchitis occurred twice as frequently and pulmonary tuberculosis and neuroses were five and three times as frequent respectively in males with duodenal ulcers as in the rest of the practice. Associations with coronary heart disease and chronic bronchitis are mentioned by Watkinson (1961) but not those with tuberculosis and neuroses.

Discussion

In presenting this "profile" of peptic ulcers as seen in my general practice I have been concerned with estimating the "load" that the conditions present to the general practitioner and also to give some indications of their probable course and outcome.

All methods of estimating the frequency of peptic ulcer have serious limitations because of the variety of techniques used. Mortality, clinical, and necropsy statistics are collected within highly selected hospital populations, and the varying standards of examination and diagnostic criteria reduce their value. Population surveys are much more reliable, but they are time-consuming and expensive, but even they are limited by their diagnostic criteria.

The opportunities for study of peptic ulcer in general practice have been neglected. This is a pity because of the special features of this field. So far the only epidemiological studies in this connexion have been by Lipetz, Sklaroff, and Stein (1955), Finer and Fry (1955), Sklaroff (1962), and Kuenssberg (1962).

The frequency of peptic ulcer varies in different areas, but it seems that the cumulative prevalence rate for adults (Sklaroff, 1962) is around 5%. Thus in my own series the rate was 5.3% for all peptic ulcers in both sexes. Doll *et al.* (1951) had a rate of 5.8% in their London study. Romcke in Norway (quoted by Watkinson, 1961) reported a rate of 2.5%.

For men with duodenal ulcers, the largest group, the comparative rates were 6.8% in my own practice, 8% (approximately) in Edinburgh (Sklaroff, 1962), 6.5% by Doll *et al.* (1951), 7.5% from Guy's Hospital (Hurst and Stewart, 1929), and 5.5% by Knutsen and Selvag (1947) from a small Norwegian town.

In any one year the general practitioner with an average practice may expect to have to diagnose and treat some 10 new cases of peptic ulcer, my own annual incidence rate being 4.2 per 1,000 and that of Pulvertaft (1959) around 3.5 per 1,000. However, since the annual prevalence rate—that is, the number of patients requiring treatment in any year—is around 16 per 1,000, this same G.P. will have to cope with some 40 patients with peptic ulcer each year, which is an appreciable number.

What Happened to Patients with Peptic Ulcers?

My initial impressions that the condition does tend to have a definite tendency towards remission and improvement seem to have been supported by the findings. The ulcers first began to cause symptoms at different times. Duodenal ulceration started earlier than gastric ulceration, and in both types the onset was about one decade earlier in males than in females. Symptoms having once started, it was found that in the majority of patients repeated attacks continued over many years before they reached a peak, then being followed by a tendency to diminution in frequency and severity. There appeared to be a very definite likelihood, in both duodenal and gastric ulcers, for the condition ultimately to "burn itself out" naturally and spontaneously. This tendency towards remission and final "cure" was almost certainly uninfluenced by medical treatment, and this supports the conclusions of Martin and Lewis (1949), Malmros and Hierton (1949), Rae and Allison (1953), and Doll *et al.* (1956).

A small proportion—16% in this series—experienced severe symptoms which required radical surgical treatment for their control, the results being very satisfactory. This proportion was lower than that found by Avery Jones (1957), who stated that "in approximately half the patients with gastric ulcer and a third with duodenal ulcer persistence of symptoms and failure of the ulcer to heal earn the patient surgical treatment." While surgical treatment by gastrectomy is excellent

for patients with severe and recurrent symptoms it does carry risks—its mortality is still around 4.5% (Johnson, 1962) and there is a high rate of anaemia many years later, in up to a third in the present series.

The warmth of clinical art rather than cold science is still required to manage the patient with a peptic ulcer.

Summary

Over a period of 15 years 265 persons with peptic ulcers have been followed up in a general practice of over 6,000 patients. Diagnosis was based on radiological confirmation. The functional status was assessed by classifying the condition in each case in one of four grades, from 1 to 4. These gradings were estimated at five-year periods.

These 265 persons consisted of 212 with duodenal ulcers, 176 males and 36 females (M : F = 4.9 : 1), and 53 with gastric ulcers, 28 males and 25 females (M : F = 1.1 : 1).

The cumulative prevalence rate in adults was 5.3%. The annual incidence rate for the practice as a whole was 4.2 per 1,000, and if this is representative there may be 250,000 new peptic ulcer cases occurring each year in the United Kingdom. The annual prevalence rate was 16 per 1,000, and this suggests that each general practitioner may have to manage at least 40 such patients each year.

The onset of symptoms differed in the two types of ulcer and in the two sexes. In *duodenal ulcer*, in males the first symptoms occurred most often at age 30–39 and in females at 40–49. In *gastric ulcer*, in males the most frequent period of onset was at age 50–59 and in females at 60–69.

During the 15-year period of observation there was a very definite tendency towards natural remission. The most usual course was that once symptoms began there followed a period of activity with frequent episodes of disabling pain, the severity of symptoms reaching a peak after 5–10 years, followed by a period of progressive remission and eventual complete control of disability. This "peak" was reached in 8.1 years in males with duodenal ulcer, in 7.1 years in females with duodenal ulcer, in 6.5 years in males with gastric ulcer, and in 6.8 years in females with gastric ulcer.

Surgical treatment was required in 16.2% of patients—16% in duodenal ulcers and 19% in gastric ulcers. The results were very satisfactory for control of ulcer-symptoms, but one-third of those who had a gastrectomy developed anaemia 5–10 years after the operation.

Complications of duodenal and gastric ulcers included haemorrhage in 16% and perforation of the ulcer in 6%.

Males with duodenal ulcers were five times more likely than expected to develop pulmonary tuberculosis, three times more likely to suffer neuroses, and twice as likely to develop coronary heart disease or chronic bronchitis.

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