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Among the chronic lesions of adult life met with in the general practise of medicine, peptic ulceration ranks high, being exceeded as to frequency only by the cardio-vascular and rheumatic groups of diseases. It is true that malignancy in all its forms is more often seen, but such lesions of the gastro-intestinal track have been in my experience one quarter, while those of the stomach alone but one tenth as frequent as simple ulceration. Gall-bladder disease and appendicitis in sub-acute and chronic form would each appear to be less than half as common. Other chronic gastro-intestinal lesions are rarely found.

In submitting this study of a small series of cases of gastric and duodenal ulceration arising and followed up during the years 1928-1947, it must first be pointed out that the district has some very distinct characteristics.

(1) The population is stable and so suited for a long term survey.

(2) The great bulk of the adult population is engaged in manual labour; the women in the cotton, light engineering, garment and slipper making industries, while the men are similarly employed in the more arduous tasks associated with these trades, and in addition those of coal-mining, building, and transport.

(3) The dietary habits of the people are peculiar. A cereal breakfast usually of bread, a mid-day dinner of sandwiches or such dishes as fish and chips or potato pie from the "cook-shop" or canteen, a high tea at the end of the day's work, and a supper of cake, biscuit, or bread before bedtime, comprise the daily meals of fully 80% of the adult population. Meat, even before these days of austerity, was consumed almost entirely at weekend. Tea is the favourite beverage, and large quantities are used to wash down all meals. Such alcohol as is drunk is in the form of beer or stout.

(4) Because of the heavy Annual rainfall and clay subsoil the atmosphere is for the most part damp and chilly. In consequence, the incidence of nasal and upper respiratory infections is high.

(5) The standard of oral hygiene, until very recently, was low. Even now among the males it is not good.

It was surprising therefore, to find that just over 50 cases of peptic ulceration could be traced in a group of adults averaging throughout a twenty year period 2,200 - 1,220 males, 980 females.

The series consists of 53 patients (44 male, 9 female), in all of whom ulcers were diagnosed clinically and confirmed by radiology or on surgical intervention. The salient features are set out below with the aid of tables and diagrams. For obvious reasons of convenience the usual contractions D.U. and G.U. are used throughout to indicate duodenal and gastric ulceration respectively.

AETIOLOGICAL FACTORS:

Relative Frequency.

D.U. occurred in 34 males and 4 females,
G.U. occurred in 13 males and 6 females,
giving a total of 57 ulcers in 53 individuals,
3 males and 1 female having radiological or other evidence of both types of ulcer at some period.
From these figures the relative frequency of each type, for the total and each sex, was calculated and is shown in table (1).

Type of Ulcer.	Both Sexes.	Males Only.	Females Only.
D.U.	2	2.6	0.66
G.U.	1	1	1

Table (1) Relative Frequency.

Sex Ratio.

Table (2) shows the sex ratio. Adjustment has been made for the larger number of males by multiplying the number of female cases by the factor 1.2.

Sex.	Both types of Ulcer.	D.U. Only.	G.U. Only.
Males	4	7	1.7
Females	1	1	1

Table (2) Sex Ratios.

Age of Onset.

In this respect the two sexes did not differ significantly in either type of ulcer. All are therefore included in table (3), and the diagrams A and B used to illustrate this point.

Age Period in years.		10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80
No.of Cases arising.	D.U.	2	10	13	8	3	2	0
	G.U.	2	3	2	8	1	2	1

Table (3) Number of cases arising according to age Groups.

From these figures the diagram A and B have been constructed.

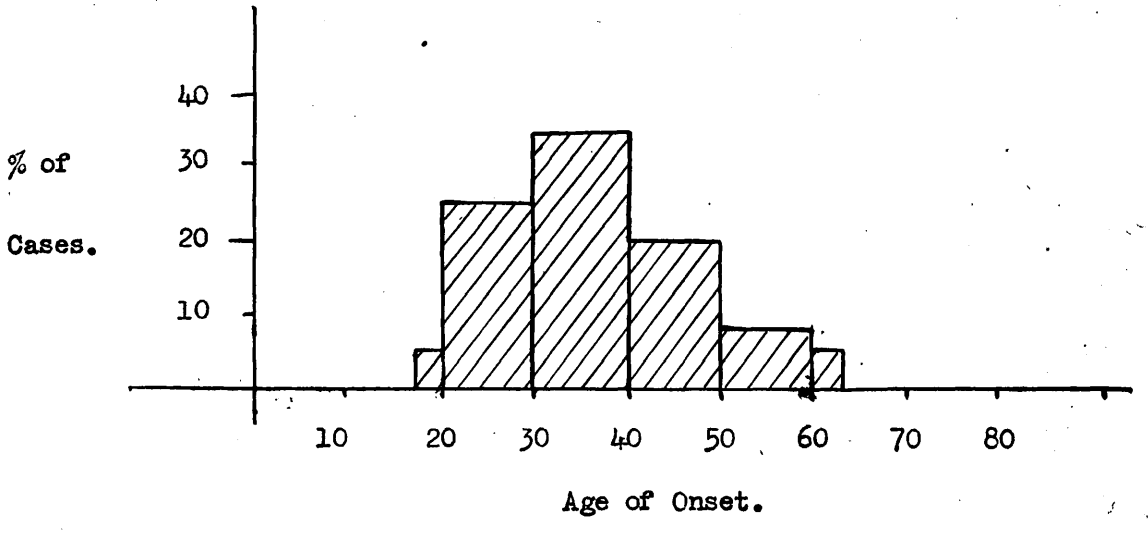

Diagram A - % of D.U.s arising according to age groups.

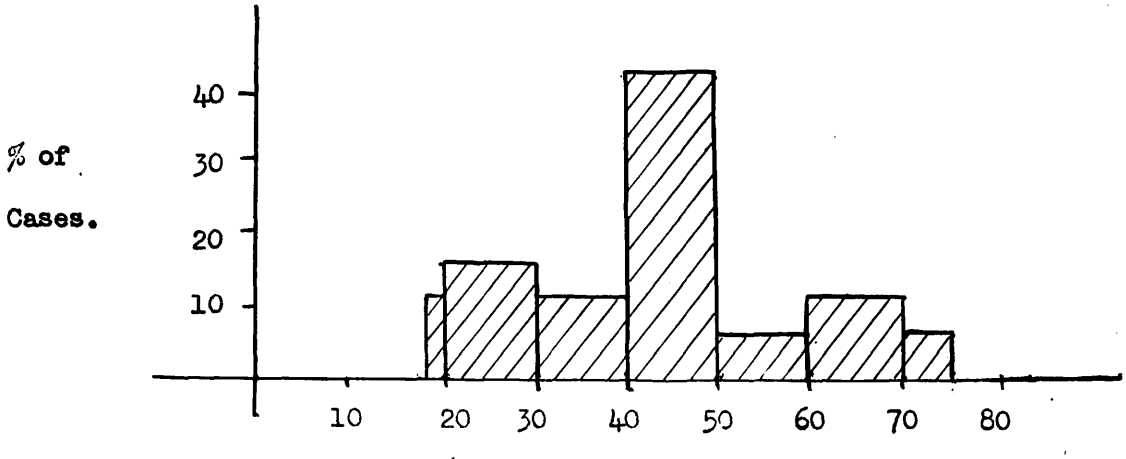

Diagram B - % of G.U.s arising according to age groups.

While in both D.U. and G.U. the middle period of life produces the greatest number of cases, it is noted that in general the peak period of the former tends to arise and decline at an earlier age.

Home Conditions.

An attempt has been made to assess this factor at the time the ulcer arose and a rough classification made as follows.

Good - Adequate income and happy home life - 60%.

Fair - Some degree of financial and/or domestic stress - 29%.

Bad - Definite hardship and/or much domestic strife - 11%.

For comparison an analysis of the home conditions of 150 male and 50 female non-ulcer cases was made. This did not differ in any significant way.

Psychological Type:

This is a most difficult factor to assess, as many, who may be considered neurotic, alter greatly after successful treatment. However, when due allowance was made for this reason, and from an intimate knowledge of the lives of all of the cases, the number of markedly unstable individuals was estimated at 16 (13 male, 3 female), giving an average of 30%.

Using the control group mentioned above the neurotic factor was found to be under 6%.

Physical Type:

In general the males were of the "lean and hungry" type. The females had no characteristic appearance.

Occupation:

Seven out of the forty four males were employed in the motor transport industry, a proportion considerably higher than the estimated district average. Otherwise the occupations did not differ in any way from those of the non-ulcer population.

Dietary Habits:

These followed the peculiarities of the district.

Smoking:

All the females, and eleven of the males were non-smokers.

Alcohol:

Apart from three males who drank beer heavily, all could be considered temperate.

Constitutional Tendency:

Three cases occurred in one family, father, son, and daughter (two perforations and one severe haematemesis arose in this group). A father and his only son are also included in the series.

SYMPTOMATOLOGY (including Complications).

Only a brief summary of the main features will be given.

Pain.

In all except two cases in which perforation and haematemesis respectively, was the first and only manifestation of the lesion, recurrent high epigastric pain was by far the most outstanding feature. No relationship between the time of onset of pain and site of ulcer could be distinguished.

Vomiting.

As a prominent feature vomiting occurred in 9 oases of D.U. = 23%, and 9 cases of G.U. = 47%.

Haematemesis.

This complication arose in 14 cases, (5 in the acute, 9 in the chronic type of ulcer), both sexes being involved roughly in proportion to their numbers. Details are given in Table (4).

Type of Ulcer.	No. of Cases.	%
D.U.	11	29
G.U.	3	16
Total:	14	27

Table (4) Haematemesis.

Perforation.

There were 9 perforations, all males. 8 of these arose in ulcers of long standing.

Table (5) is drawn to illustrate the relative frequency of each type.

Type of Ulcer.	No. of Cases.	% of males.	% of all Cases.
D.U.	6	17	15.8
G.U.	3	23	15.8
Total:	9	19	15.8

Table (5) Perforations.

Pyloric Obstruction:

In varying degree this complication arose in 5 cases of D.U.

Malignant Change:

2ndy. carcinoma occurred in 2 cases of chronic G.U., which had been confirmed radiologically some years before.

Seasonal Variations of Symptoms and Common Complications:

There is a marked seasonal fluctuation in the number of cases arising, relapsing, or suffering serious complication. The Winter Quarter is definitely most dangerous and Autumn probably the least in this respect. Diagram C and tables (6) and (7) bring out these points:

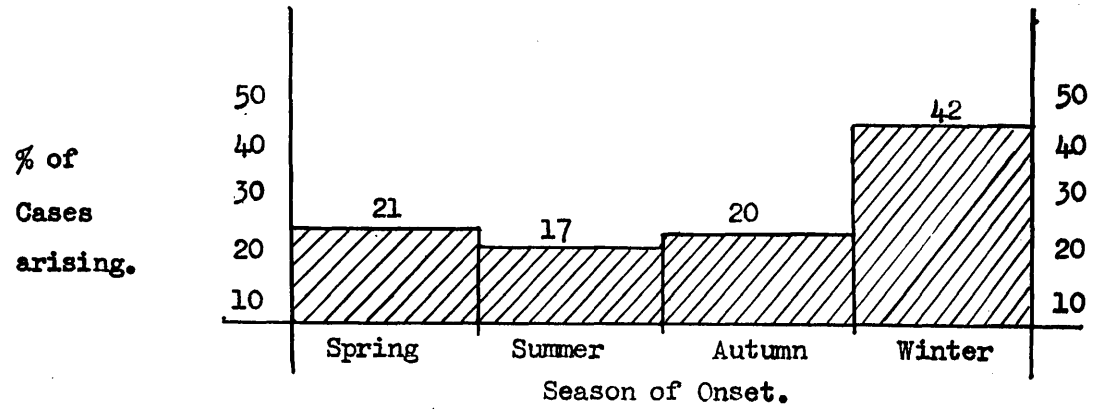

Diagram C. Relationship of season to Onset or Relapse.

Type of Ulcer.	No. of Cases of Haematemesis.			
	Spring	Summer	Autumn.	Winter.
D.U.	2	3	0	6
G.U.	1	1	0	1
Total:	3	4	0	7

Table (6) Relationship of Season to Haematemesis.

Type of Ulcer.	No. of Cases of Perforation.			
	Spring	Summer	Autumn	Winter
D.U.	1	1	1	3
G.U.	1	1	0	1
Total:	2	2	1	4

Table (7) Relationship of Season to Perforation.

TREATMENT.

Except for one immediate operation for suspected carcinoma, and the acute perforation, all cases were first treated medically. Surgery was reserved therefore for the more resistant type of ulcer or for acute emergencies. Details of medical treatment followed the prevailing fashion of the day based on the three R's - rest, reassurance, and regulation of diet and mode of life. It is not proposed to stress this point further but pass quickly to the more important one - result of treatment. In particular the failures of treatment will be studied.

Results of Treatment: MEDICAL.

Here some classification must be made. The following standards therefore have been chosen.

Good - Where there has been no complaint for at least five years.

Fair - Where there has been one or two very mild relapses within five years.

Poor - Where there has been little or no improvement, or a complication has arisen.

(Note: All the cases arising in the past five years have been placed in Categories Fair or Poor).

Table (8) shows the results of treatment in the 51 medically treated cases.

Both types of Ulcer.	Result of Treatment (Medical).		
	Good	Fair	Poor.
No. of Cases	23	3	25
%	45	6	49

Table (8) Medical Treatment Results.

The causes of failure under Medical Treatment have been analysed as shown in Table (9).

Reason for Poor Result.	No. of Cases.	% of total failures.
Inadequate Treatment	4	16
Varying degrees of Pyloric Obstruction	5	20
Recurrent Haemorrhage	4	16
Perforation	8	32
Adhesion to Pancreas	1	4
Malignant Change	2	8
Neurosis	1	4

Table (9) Cause of Medical Failures.

It is obvious that, even after the exclusion of the cases that may respond to further medical treatment, a high % of failures must remain.

Results of TREATMENT, SURGICAL.

The same standards - Good, Fair, Poor have been used in studying the results of surgical treatment, which are analysed in Table 10 below.

Type of Operative Procedure.	No. of Cases.	Result of Operation.		
		Good	Fair	Poor
Simple closure of Perforation	7	3	2	2
Gastro enterostomy	11	3	3	5
Partial Gastrectomy	3	0	2	1
Pyloroplasty	1	0	1	0
Total:	22	6	8	8
% of Total:	100	28	36	36

Table (10) Results of Surgical Treatment.

The causes of surgical failure according to type of operation are analysed in Table (11).

Type of Operation	No. of Failures	Cause of Failure.	No.
Simple Closure	2	Pyloric Obstruction	2
Gastro-enterostomy	5	Anastomotic Ulcer Jejunitis Colitis & Haemorrhage	3 1 1
Partial Gastrectomy	1	Fatal Post Operative Haemorrhage	1

Table (11) Causes of surgical failure.

Results of Combined Treatment.

After combining the results of both forms of treatment, the final result shows considerable improvement but still only approximately 55% of GOOD response, Table (12).

All Ulcers.	Result of Combined Treatment.		
	Good	Fair.	Poor.
No.	29	11	13
%	55	21	24

Table (12) Results of Combined Treatment.

Relationship of Type of Ulcer to failure.

In an effort to further elucidate the factors in the treatment results, each type of ulcer was investigated as to failure. It was found that 13 cases (38%) of D.U. failed to respond to medical treatment. Under the same regime 10 cases (66%) of G.U. and 2 cases of D.U. + G.U. (50%) also gave POOR results. Subsequent surgical treatment in 10 cases of D.U., 7 of G.U., and both of the multiple ulcer patients, reduced these figures to 6 (17.5%): 2 (13%): and nil respectively. This would seem to suggest that G.U. failures respond on the whole better to surgical procedures.

Other Factors Investigated.

Home Conditions.

These appear to have no influence on the ultimate result of all forms of treatment - failures were roughly proportionate to the numbers in each group.

Psychological Type:

6 (37%) of the 16 unstable individuals failed to respond to any form of treatment. In the normal group of 37 patients the figure was 7 (19%).

Mortality:

There were three deaths, two from 2ndy. carcinoma, the other (aged 76) from post-operative haemorrhage.

Discussion:

In a comprehensive article Hunt (1938) has stated that evidence of chronic peptic ulceration is found in 5% - 15% of all necropsies. From this it is reasonable to assume that for 2,200 adults observed for 20 years the total number of cases of Gastric and Duodenal ulceration - 53 in the series - is unusually low. A figure in the region of 100 was expected, even allowing for the possibility that a proportion of ulcers could be comparatively symptomless. Self-medication without seeking medical advise is not, in my experience, common in the general population of the district. The prevalence of nasal upper respiratory, and oral infection, believed by Boyd (1931) and others to be a factor in the origin and maintenance of the chronic ulcer, should have tended to give a higher figure. Again the district was a "black area" in the slump of 1928-1937 and unemployment, with its attendant worries and cheap feeding, was widespread. Despite this the number of cases arising in this ten year period was less than half the total.

Is then the cause of the low incidence to be found in the dietary habits?

Before proceeding to discuss this possibility, it must be mentioned that despite the conclusions of Ryle and Bennett (1937) that hyperchlorhydria bears no relationship to the frequency of ulcer production, the fact remains that ulceration only occurs where the acid secretion of the stomach can act. Davies (1936) in his Bradshaw Lecture, and many others, are supporters of the high acid theory as a cause, and believe that ulcer with hypochlorhydria is rare, and with achlorhydria almost unknown. It can be accepted therefore, that the degree of gastric acidity is a major factor in the production and maintenance of chronic ulceration.

Best and Taylor (1945) stress the well-known fact that the secretion of gastric juice varies with the type of food, and that carbohydrate, and in particular, bread, encourages secretion of medium volume, low in acid. Fat also is a depressant of total secretion.

It is possible therefore that the preponderant carbohydrate and fat type of diet, by depressing acid production, is an important factor in the low incidence found in this survey. That many patients suffer from short term attacks of flatulent dyspepsia, and that anaemia with hypo - or achlorhydria is relatively common, lend some support to this theory.

In turning to the aetiological factors it is noted that the sex ratios and age of onset of both gastric and duodenal ulcer differ little from that found by most observers. The relative frequency of the two forms in the male however, is notably different from that found by Tidy (1945) in a review of admissions to St. Thomas's Hospital, London, for the period 1922-1937, duodenal ulcers being five times as common in this series. A probable explanation is that many such ulcers are relatively benign and do not receive inpatient treatment.

Home conditions and habits seem to exert little influence as causes of ulcer, but the constitutional factor is important. Here it is pointed out, that the five ulcers occurring in two families all arose after the families had dispersed, and the children had formed their own homes. Again the unstable individual would appear to run much the greater risk of becoming the victim of chronic ulceration.

That irregular meal hours may be an important factor is indicated by the number of males in the series engaged in the motor transport industry, but regular shift work, including night shift, would seem to play little part in the production of ulcer. In the period 1938-1947 much shift working has not caused a noticeable increase in new cases. Just over half the total occurred during these years.

There is a marked seasonal fluctuation in the number of cases arising, relapsing, or suffering from acute complications. Jamieson (1947) in a survey of a large series of perforated peptic ulcer has shown that the incidence of this complication is lowest in Autumn and reaches a peak in December and January. Even in this small series this finding is confirmed. In addition, the frequency of onset, relapse, or haematemesis, is shown to be strikingly raised in the Winter quarter. It is difficult to give satisfactory reasons for these findings. This season, however, is the coldest, and the one most lacking in fresh fruit and vegetables. Ascorbic acid in the diet, as pointed out in the British Medical Journal (1947), is therefore at its lowest during these months. Two factors accordingly, may be at work; (1) Constant body chill causing a histamine action on the gastric mucosa with resulting increased acid secretion and (2) lack of Vitamin C, making the surface epithelium more prone to erosion.

In considering the results of treatment it has to be admitted that these are far from satisfactory. This is particularly true of the cases treated medically, and, as these figures are in accord with the experience of most others, it would appear that, in the present state of our knowledge, a high percentage of failures must be regarded as normal. In this series chronic gastric ulcer has proved the most refractory in this respect. The question then arises as to the best procedure to be adopted. Is it better to leave the trouble smouldering in the hope that Nature will ultimately assert herself and affect a cure? Or should surgical treatment be advised?

To this end it is of great moment that some reasonably accurate estimate of the prognosis in these cases should be attempted. It will be seen that in this group (Table 9), serious complications arose in 16 cases (64%) and emergency surgical treatment for perforation was necessary for half this total (32%). The reduction of the % of failures from 49 to 24 following surgical treatment is also worthy of note. It would appear therefore that the first questions must be answered in the negative.

Having considered the need for surgical aid, what form should it take?

The analysis of the cases so dealt with in the series, shows that, of such procedures, that of gastro-enterostomy is the least successful. Anastomotic ulcer, a frequent sequel of this operation, can be more troublesome than the original lesion, and much more difficult to treat. Even simple closure of perforation alone, shows a better average result.

Although only three partial gastrectomies are included in the series all were performed for large gastric ulcers. Two of these were of long duration and in neurotic individuals. In them, the apparently permanent relief of symptoms, and the steady improvement in general health were outstanding. As these operations have both been performed during the past five years, the results are included in the FAIR result group, but I feel that both will pass ultimately into the group marked GOOD. The third, done for suspected carcinoma in a female aged 76, was always a bad risk.

From the above observations there is much to be said for the suggestion put forward by Visick (1946) that prophylactic gastrectomy should be performed for medical failures at an early stage when the immediate mortality risk is low. Lake (1948) in a review of the aftermath of gastrectomy has estimated such risk to be in the region of 5% and to be steadily falling. The commonest complication after gastrectomy the "dumping stomach" with hypoglycaemia tends gradually to improve, and can be dealt with mainly by adjustment of diet, as indicated by Gilbert and Dunlop (1947).

Had this operation been done reasonably early in the medical failures of this series, possibly half the perforations and severe haematemeses, and both the deaths from secondary malignant change might have been avoided, not to mention the misery of the others with pyloric obstruction, who ultimately had to have surgical intervention.

The problem of the neurotic remains and here special care is needed in coming to a decision. Of the six failures in such individuals, three had gastro enterostomy done with disastrous results. Two have not worked for over ten years, while the third has done so, only very spasmodically. The three others treated medically have fared much better, but one ultimately died of secondary carcinoma. Although there can be no short "cut" to cure in such cases, it is suggested that even in them, the chronic gastric ulcer should not be left to burn itself out. Again partial gastrectomy would seem the operation of choice.

This series, though small, is of interest in that all the cases are known intimately. The survey is written from the point of view of the family doctor, who has tried very hard to keep an open mind throughout. If some of the conclusions may have been arrived at on somewhat slender evidence, it must be remembered that twenty years dealing with chronic ulcer patients leave impressions which cannot be explained by a process of reasoning.

One such impression is that the great majority of such patients are extremely suspicious of all forms of non-urgent surgical treatment. Perhaps lack of sufficient care in investigation, and subsequent choice of operation, has hitherto given ground for such suspicion. It is here, that the general practitioner who sees the disease, not as a series of symptoms and complications, but as progressive lesion can do much to help. From his knowledge of the make-up of the patient, constitutional, physical and psychological, he is in a unique position to advise wisely. He should be anxious, and prepared, to co-operate with the hospital staff, both medical and surgical, and be willing to give his views on any treatment that may be suggested. Only too often the fate of the patient depends on the hospital department which confirms the diagnosis of ulcer. The end results are felt not only by the sufferer, but by his family, and the community at large.

The true aetiology of the condition is as yet unknown and therefore, at present, the ideal of prevention is impossible. It is for this reason that this plea for closer co-operation in treatment is made. Only in this way, can any further process be made towards the solution of a widespread social and economic problem.

Summary.

53 cases of peptic ulceration arising in a stable population during the period 1928-1947 are reviewed. Some characteristics of the district and people are mentioned.

The salient features are presented. Attention is drawn to the low incidence and a reason suggested.

The constitutional factor in causation is touched on, and the neurotic element stressed.

The varying seasonal incidence is noted, and two possible factors in this are indicated.

In discussing treatment, the failures are studied in particular.

A plea is made for earlier surgical treatment of medical failures but caution is urged in advising surgery for the neurotic patient.

Partial gastrectomy is suggested as the operation of choice.

Some final remarks are made on co-operation between family doctor and hospital staff, so that each case may be treated on its merits.

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