Collective Investigation

INTO

THE AFTER-HISTORY OF GASTRO-ENTEROSTOMY.

Report by

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The results of the operation for duodenal ulcers have been published in Part I (*British Medical Journal*, December 7th, 1929); the results for pyloric ulcers have been published in Part II, and for perforated duodenal and pyloric ulcers in Part III (*British Medical Journal*, December 14th, 1929). The present report deals similarly with the gastric ulcers. There were 645 reports of the results of operations for gastric ulcer. They consisted of 538 cases of ordinary gastric ulceration, 65 cases of hour-glass constriction, and 42 cases of perforated gastric ulcers. As it is somewhat unusual to have the records of 65 cases of hour-glass constriction it was considered advisable to prepare a separate report on those cases, and also on the cases of perforation.

PART IV.—GASTRIC ULCERS.

The answers to the various questions in connexion with the 538 cases of ordinary gastric ulceration have been carefully collated, and the results are embodied in the following tables.

TABLE I.—*Sex Incidence.*

Number of cases	538
Males (percentage)	66.2
Females (percentage)	33.8

This table shows that twice as many cases occur among males as among females.

TABLE II.—*Age Incidence (at Time of Operation).*

Age.	Percentage.
19-30 years	9.0
30-40 „	27.3
40-50 „	38.0
50-60 „	20.3
60-70 „	5.4

This table shows that the majority of patients with gastric ulceration were operated on between 30 and 50 years of age. Of the patients operated on between 19 and 30 years, two only were 19 years of age.

TABLE III.—*Position or Site of Ulcer.*

(Information on this point was given in 523 cases, including the hour-glass cases.)

Position or Site.	No. of Cases.	Percentage.
Lesser curvature	377	72.2
Near pylorus	56	10.7
Posterior wall	55	10.5
Anterior wall	16	3.0
Cardiac end	14	2.6
Greater curvature	5	1.0

TABLE IV.—*Ulcer Adherent or Non-adherent.*

(Information on these points was given in 167 cases, including the hour-glass cases.)

	No. of Cases.	Percentage.
Adherent	159	95.2
Non-adherent	8	4.8

TABLE V.—*Type of Operation.*

Type of Operation.	No. of Cases.	Percentage.
Posterior gastro-enterostomy	263	48.9
Posterior gastro-enterostomy and excision of ulcer	111	20.6
Partial gastrectomy with anastomosis to jejunum	101	18.8
Anterior gastro-enterostomy	22	4.1
Posterior gastro-enterostomy and cauterization of ulcer	13	2.4
Anterior gastro-enterostomy and jejuno-jejunostomy	11	2.0
Anterior gastro-enterostomy and excision of ulcer	5	3.2
Posterior gastro-enterostomy and embedding of ulcer	5	
Sleeve resection and posterior gastro-enterostomy	4	
Sleeve resection	2	
Anterior gastro-enterostomy and cauterization of ulcer	1	

In addition, appendicectomy was performed in 9.8 per cent., and cholecystotomy in 0.7 per cent. of the cases. In some of the cases the reasons given for performing anterior gastro-enterostomy were that the stomach was either too fixed or that there was insufficient room for performing the posterior operation.

The reasons for operating were given in 417 cases. They are recorded in the following table.

TABLE VI.—*Reasons for Operating.*

Symptoms.	No. of Cases.	Percentage.
Pain	411	98.6
Vomiting	285	68.3
Haematemesis	94	22.5
Haematemesis and melaena	9	2.0
Melaena	7	1.7
Loss of weight	35	8.4

Vomiting and haematemesis were both much more frequent in the gastric ulcer cases than in the duodenal and pyloric, but melaena was much more frequent in the duodenal cases than in the gastric and pyloric.

The direct results of operation in the 538 cases were as follows.

TABLE VII.—*Results of Operation.*

Result.	No. of Cases.	Percentage.
Good recovery	437	90.5
Delayed recovery	3	0.6
Death	48	8.9

The post-operative mortality is considerably higher than the 5.0 per cent. mortality among duodenal ulcers and the 2.6 per cent. mortality among pyloric ulcers.

The results in 299 cases submitted to x-ray examination prior to operation are shown in the following table.

TABLE VIII.—*Results of X-Ray Examination.*

Result.	Percentage.
Positive	54.9
Negative	18.0
Delay in emptying	27.1

In 105 cases test meals were employed prior to operation. The results are shown in the following table.

TABLE IX.—*Results of Test Meals.*

Result.	Percentage.
Hyperchlorhydria	40.0
Low acidity	52.4
No free hydrochloric acid	7.6

AFTER-HISTORIES OF THE OPERATION CASES.

The 538 cases dealt with in Tables I, II, V, and VII include 392 cases in which the after-histories were given, 26 cases in which the after-histories consisted only of statements that the patients were in good health at some specified time after operation, and 120 cases in which no after-history was given. For the preparation of the after-history statistics the 392 cases only are employed. In the majority of these cases the questions relating to the after-history were all answered, but as in a certain number of cases some of the questions were left unanswered, the statistics in the following tables have been worked out as percentages of the numbers of the answers to the respective questions.

The after-history inquiries were directed to the elucidation of the same points as in connexion with the duodenal ulcers (see Part I, *British Medical Journal*, December 7th, 1929, p. 1075).

TABLE X.—*Pain or Other Discomfort After Food.*
(Information on these points was given in 325 cases.)

	No. of Cases.	Percentage.
No pain or discomfort	250	74.5
Occasional slight pain or discomfort ...	50	15.0
Temporary pain or discomfort (in most cases soon after operation) ...	23	7.0
Severe pain or discomfort	12	3.5

TABLE XI.—*Diarrhoea.*
(Diarrhoea occurred in 18 cases out of the 392.)

Diarrhoea.	No. of Cases.	Percentage.
Slight	16	4.1
Severe	2	0.5

TABLE XII.—*Constipation.*
(Constipation occurred in 54 cases out of the 392.)

Constipation.	No. of Cases.	Percentage.
Slight	46	11.7
Severe	8	2.0

TABLE XIII.—*Food Able to be Taken.*
(Information as to diet was given in 330 cases.)

	No. of Cases.	Percentage.
Full diet	242	73.3
Certain articles of diet avoided	88	26.7

Among the 88 cases in which some modification of the diet was necessary, 45 avoided some form or forms of protein food (beef, mutton, veal, pork, bacon, cheese, eggs), 31 avoided some form or forms of carbohydrate food (vegetables, pastry, fats, fruits), and 12 avoided some form or forms of both protein and carbohydrate foods. Therefore, of those on a modified diet, 51 per cent. were obliged to avoid some form of protein, 35 per cent. some form of carbohydrate, and 14 per cent. some form of both protein and carbohydrate.

Information as to the time of return to work after operation was given in 280 cases. In a certain number of other cases it was stated that the individuals were either of the leisured classes doing no work, or were past the age for work. The particulars are given in the following table.

TABLE XIV.—*Time of Return to Work After Operation.*

Time of Return to Work.	No. of Cases.	Percentage.
1 to 2 months	59	21.1
2 to 3 "	152	54.3
3 to 4 "	34	12.1
4 to 6 "	23	8.2
Over 6 "	12	4.3

This table shows that 75.4 per cent. returned to work within three months from the date of the operation. With regard to those that did not return to work till after three months, the reasons given in many of the cases were that there was no immediate necessity for return, or that work was not available at the time.

TABLE XV.—*Work Capacity.*
(Information on this point was given in 310 cases.)

Work Capacity.	No. of Cases.	Percentage.
Full work	285	92.0
Light work	21	6.7
Unable to work	4	1.3

TABLE XVI.—*Weight After Operation.*
(Information on this point was given in 327 cases.)

Weight.	No. of Cases.	Percentage.
Gained	245	74.9
Constant	61	18.7
Lost	21	6.4

TABLE XVII.—*Condition of Health and Well-being After Operation.*
(Information on this point was given in 332 cases.)

Health.	No. of Cases.	Percentage.
General improvement of health	298	89.8
Fair improvement of health	11	3.3
Slight improvement of health	13	3.9
No improvement of health	10	3.0

Subsequent Medical Treatment Required.

A few cases required laxatives, astringents, and occasional bismuth and sodium bicarbonate. Several cases had subsequent medical treatment, but the nature of it was not specified.

TABLE XVIII.—*Number of Years After Operation during which Patients were under Observation, or during which Reliable Information was Obtained.*

(Definite information on this point was given in 331 cases.)

Years under Observation.	No. of Cases.	Percentage.
2-3 years	9	2.7
3-4 "	41	12.4
4-5 "	87	26.2
5-6 "	76	23.0
6-7 "	56	16.9
7-8 "	41	12.4
8-9 "	21	6.4

This table shows that 85 per cent. of the patients were under reliable observation for periods ranging from four to nine years.

Classification of Results.

The classification adopted is the same as that used in connexion with duodenal ulcers (see Part I, *British Medical Journal*, December 7th, 1929, p. 1076).

TABLE XIX.—*Classification of Results.*
(The results returned enabled this classification to be made in 334 cases.)

Classification.	No. of Cases.	Percentage.
Very good	248	74.3
Good	54	16.1
Fair	18	5.4
Poor	14	4.2

These are the late results of the various operations enumerated in Table V, and were obtained from the cases in which after-histories were given. As the main merits

of the various operations are represented by the percentage of "very good" results, in that they show the number of patients restored to full health, able to eat anything over periods of some years, and able to resume full work, it was considered advisable to compare the "very good" results in the three principal operations performed, together with the respective post-operative mortality. The three operations which constitute 92 per cent. of all the operations that were performed are: (1) posterior gastro-enterostomy combined with excision, cauterization, or infolding of the ulcer; (2) partial gastrectomy with anastomosis to jejunum; and (3) posterior gastro-enterostomy without interference with the ulcer. These statistics have been worked out, and are embodied in the following table.

TABLE XX.

Operation.	Very good results (percentage of the cases, with after-histories).	Post-operative Mortality (percentage of all cases).
Posterior gastro-enterostomy combined with excision, cauterization or infolding of ulcer	91.7	4.6
Partial gastrectomy with anastomosis to jejunum	63.6	6.0
Posterior gastro-enterostomy without interference with the ulcer	50.9	11.4

This table shows that the operation of posterior gastro-enterostomy, combined with removal or infolding of the ulcer, gives the best results and the lowest mortality in the operative treatment of gastric ulceration, whereas the operation of posterior gastro-enterostomy without interference with the ulcer gives poor results and a very high mortality. As to the position of the operation of partial gastrectomy in this table it is only right to mention that the results in connexion with that operation are based on 101 cases only. For explanation of the post-operative mortality column in this table reference should be made to Table XXVI in this report.

Occupation.

The occupations were given in 525 cases of gastric ulceration, including the cases of hour-glass constriction and perforation, and have been classified as follows.

TABLE XXI.—Occupational Incidence.

Occupation.	No. of Cases.	Percentage.
Domestic workers	163	31.0
Mechanics and skilled artisans	81	15.4
Labourers	80	15.3
Shop workers... ..	42	8.0
Factory workers	40	7.6
Clerks	21	4.0
Farmers and land workers	20	3.8
Professional and leisure classes	9	1.7
Miners	3	0.6
Various occupations	66	12.6

Domestic workers (female) were responsible for 15 per cent. of the duodenal and pyloric ulcers, whereas it will be seen from the above table that the same class is responsible for 31 per cent. of the gastric ulcers. The total number of females in the gastric ulcer group is 192, of which 163—that is, 85 per cent.—were domestic workers. The great majority of the returns received in this investigation are of hospital patients, so that the above figures give no indication as to the occurrence of the disease among the bulk of the middle and upper classes.

Secondary Gastro-jejunal Ulcers.

Number.—Three ulcers of this type—that is, 0.8 per cent.—occurred among the 392 cases in which after-histories were given.

Sex.—Two males and one female.

Age.—Two between 40 and 50 years of age, and one between 50 and 60.

Symptoms.—Pain in all three cases, vomiting in one case, and haematemesis in one case.

Periods after Original Operation at which Symptoms occurred necessitating Operation for Gastro-jejunal Ulceration.—The periods in the three cases were respectively one year, one year and nine months, and one year and ten months.

Operation.—Partial gastrectomy with good recovery in the three cases.

Second Operations required for Intercurrent Lesions after the Original Operation for Gastric Ulceration.

Seven of these operations—that is, 1.8 per cent.—were required among the 392 cases in which after-histories were given. One was between 20 and 30 years of age, one between 30 and 40, four between 40 and 50, and one between 50 and 60. Particulars of the individual cases are given.

1. Persistent vomiting for eight weeks after first operation. Stoma resected; death five days later from peritonitis due to a leak.

2. Pain, vomiting, and haematemesis three months after first operation from formation of a second gastric ulcer. Partial gastrectomy done; fair recovery.

3. Pain and vomiting one year after first operation from persistent lesser curve ulcer. Partial gastrectomy done; good recovery.

4. Pain and vomiting two years after first operation from persistent lesser curve ulcer. Partial gastrectomy done; good recovery.

5. Pain two and a half years after first operation from duodenal dilatation. Duodeno-jejunostomy done; good recovery.

6. Recurrence of symptoms four and a half years after first operation from a fresh ulcer. Excision done; good recovery.

7. Pain five years after first operation from adhesions involving transverse colon. Adhesions divided; good recovery.

Secondary Haemorrhage.

Number.—Four cases of secondary haemorrhage—that is, 1.0 per cent.—occurred among the 392 cases in which after-histories were given.

Sex.—Three males and one female.

Age.—One between 20 and 30 years of age, and three between 30 and 40.

Nature of Haemorrhage.—Haematemesis in three cases, and melaena in one.

Periods at which Haemorrhage started after Operation.—One at ten days; one at nine months; one at four years; one had three attacks at one and a half years, five years, and six years.

Treatment.—Three had medical treatment, and one had rest only; good recovery in all cases.

Analysis of the Post-operative Mortality.

Among the 538 cases of gastric ulceration 7 deaths occurred from another lesion some years after the operation and quite unconnected with it. As these 7 cases up to the time of death were free from all symptoms connected with the ulceration, these deaths are not included among the post-operative deaths.

The number of post-operative deaths out of the 538 cases was 48—that is, 8.9 per cent. These are the deaths that occurred as a direct result of the operations for gastric ulcers, and do not include the one death from an intercurrent lesion previously referred to.

Sex.—Of the 48 deaths, 66.7 per cent. occurred amongst males, and 33.3 per cent. amongst females—a ratio which is the same as that of the sex incidence of the disease.

TABLE XXII.—Age Incidence of Deaths.

Age.	Percentage of Deaths.
30-40 years	16.7
40-50 "	37.5
50-60 "	37.5
60-70 "	8.3

TABLE XXIII.—Time of Occurrence of Death After Operation.

Time.	Percentage of Deaths.
1-6 days	57
7-14 „	21
2-3 weeks	10
3-4 „	10
4-5 „	2

Among the 43 cases haemorrhage occurred as a symptom prior to operation in 23 per cent. of the cases. It therefore appears, as in the cases of the duodenal and pyloric ulcers, that the risk of a fatal post-operative result is not increased by the occurrence of haemorrhage prior to the operation.

TABLE XXIV.—Cause of Death.

Cause of Death.	No. of Cases.
Shock	19
Pneumonia	6
Haematemesis	5
Cardiac failure (atty heart)	3
Bronchitis	1
Empyema	1
Tetany	1
Septic infection	1
Embolism of pulmonary artery	1
Hemiplegia	1
Cause not stated	9

Comparison of the Post-operative Mortality in Relation to the Site of the Gastric Ulcer.

If a comparison is made of the post-operative mortality occurring amongst ulcers according to their special positions or sites in the stomach, it appears that the mortality is much lower for lesser curvature ulcers and is much higher for ulcers on the posterior wall than the average post-operative mortality. This is shown in the following table.

TABLE XXV.

Position or Site of Ulcer.	No. of Cases.	No. of Deaths.	Percentage of Deaths.
Lesser curvature	377	19	5.0
Anterior wall	16	1	6.2
Near pylorus	56	6	10.7
Cardiac end	14	2	14.3
Posterior wall	55	13	23.6

Comparison of the Post-operative Mortality of the Three Principal Operations.

The 8.9 per cent. mortality represents the death rate after the performance of the 538 operations detailed in Table V. Of these operations, 129 were posterior gastro-enterostomy, combined with excision, cauterization, or infolding of the ulcer; 101 were partial gastrectomy with anastomosis to jejunum; 263 were posterior gastro-enterostomy without any interference with the ulcer; and 45 were other operations (mainly anterior gastro-enterostomy). The comparison of the post-operative mortality of the three principal operations, as shown in the following table, has already been referred to in Table XX.

TABLE XXVI.

Type of Operation.	No. of Cases.	No. of Deaths.	Percentage of Deaths.
Posterior gastro-enterostomy combined with excision, cauterization, or infolding of ulcer	129	6	4.6
Partial gastrectomy with anastomosis to jejunum	101	6	6.0
Posterior gastro-enterostomy without interference with the ulcer	263	30	11.4
Other operations (mainly anterior gastro-enterostomy)	45	6	13.3

If these death percentages are proportionately averaged the 8.9 per cent. post-operative mortality for the whole of the cases is obtained. These figures show, so far as any useful deductions can be drawn from groups of 129 and 101 cases, that the operation of posterior gastro-enterostomy, combined with removal or infolding of the ulcer, has the lowest mortality, while that of posterior gastro-enterostomy alone has a very high mortality.

Carcinoma Developing at the Site of Ulcers.

No authenticated case was reported in the whole series. In one case the patient, aged 69 at the time of death, developed gastric pain nearly four years after the operation for gastric ulcer. A laparotomy was done and a hard non-removable mass was felt at the site of the old ulcer. Death occurred on the following day from shock. In answer to a special letter sent to the surgeon who had charge of the case, he replied that he could give no opinion as to the nature of the mass.

In a second case the patient, aged 36 years at the time of operation, developed symptoms five years after operation, and a diagnosis was made by x-ray examination of inoperable carcinoma of the stomach. The patient continued to lose weight, and the mass was easily palpable. Death occurred one year after the commencement of the fresh symptoms, but no post-mortem examination was held.

BRIEF SUMMARY OF RESULTS.

Gastric ulceration is twice as common in males as in females.

The liability to gastric ulceration rapidly diminishes after 50 years of age, as is also the case with both duodenal and pyloric ulceration.

Posterior gastro-enterostomy, with or without removal or infolding of the ulcer, was performed in 73 per cent. of the cases, and partial gastrectomy with anastomosis to jejunum in 19 per cent.

Vomiting (with or without haemorrhage) was a symptom in 93 per cent. of the cases, as compared with 53 per cent. amongst the duodenal ulcers, and 64 per cent. amongst the pyloric ulcers.

A low acidity of the gastric juice was present in 60 per cent. of the cases submitted to test meals.

Neither diarrhoea nor constipation is a marked result of operation, but, as in the cases of duodenal and pyloric ulcers, constipation of a mild character is more frequent than diarrhoea.

About one-quarter of the patients operated on made some modification in diet. Of these, 51 per cent. avoided some form of protein, 35 per cent. some form of carbohydrate, and 14 per cent. some form of both protein and carbohydrate.

Three-fourths of the patients returned to full work within three months of the date of the operation.

General improvement of health and well-being occurred in 90 per cent. of the cases with after-histories.

The operation of posterior gastro-enterostomy, combined with removal or infolding of the ulcer, gives the best results and the lowest mortality.

Secondary gastro-jejunal ulcers occurred in 0.8 per cent. of the cases, as compared with 2.8 per cent. for duodenal ulcers and 0.9 per cent. for pyloric ulcers.

Secondary haemorrhage occurred in 1.0 per cent. of the cases, as compared with 2.4 per cent. for duodenal ulcers and 1.2 per cent. for pyloric ulcers.

The post-operative mortality for all operations was 8.9 per cent., the mortality being highest in patients from 40 to 60 years of age. The operation of posterior gastro-enterostomy, combined with removal or infolding of the ulcer, had a post-operative mortality of 4.6 per cent.; partial gastrectomy with anastomosis to jejunum had a post-operative mortality of 6.0 per cent.; posterior gastro-enterostomy alone had a post-operative mortality of 11.4 per cent.

No authenticated case of carcinoma developing at the site of an ulcer was reported in the whole series.

PART V.—HOUR-GLASS CONSTRICTION.

As previously mentioned, it was considered advisable to prepare a separate report on these cases. The results may be of use for future reference, but as the number of the cases is comparatively small very few comments on the results are made.

TABLE I.—*Sex Incidence.*

Number of cases ...	65
Males (percentage) ...	15.4
Females (percentage) ...	84.6

TABLE II.—*Age Incidence (at Time of Operation).*

Age.	Percentage.
20-30 years ...	4.8
30-40 " ...	28.6
40-50 " ...	25.4
50-60 " ...	33.3
60-70 " ...	7.9

TABLE III.—*Type of Operation.*

Type of Operation.	No. of Cases.	Percentage.
Partial gastrectomy with anastomosis to jejunum	33	50.7
Posterior gastro-enterostomy ...	13	20.0
Anterior gastro-enterostomy ...	9	13.8
Posterior gastro-enterostomy and excision of ulcer	8	12.3
Hour-glass incised longitudinally and sewn transversely	1	1.6
Double gastro-jejunostomy ...	1	1.6

In addition, appendicectomy was performed in 3.1 per cent. of the cases, and cholecystotomy in 3.1 per cent.

The reasons for operating were given in 55 cases. They are recorded in the following table.

TABLE IV.—*Reasons for Operating.*

Symptoms.	No. of Cases.	Percentage.
Pain ...	53	96.3
Vomiting ...	46	83.6
Haematemesis ...	13	23.6
Haematemesis and melaena ...	2	3.6
Loss of weight ...	5	9.1

The direct results of operation in the 65 cases were as follows.

TABLE V.—*Results of Operation.*

Result.	No. of Cases.	Percentage.
Good recovery ...	55	84.6
Delayed recovery ...	2	3.1
Death ...	8	12.3

The results in 43 cases submitted to x-ray examination prior to operation are shown in the following table.

TABLE VI.—*Results of X-Ray Examinations.*

Result.	Percentage.
Positive ...	93.0
Negative ...	2.3
Delay in emptying ...	4.7

In 18 cases test meals were employed prior to operation. The results are shown in the following table.

TABLE VII.—*Results of Test Meals.*

Result.	Percentage.
Hyperchlorhydria ...	16.7
Low acidity ...	77.8
No free hydrochloric acid ...	5.5

AFTER-HISTORIES OF THE OPERATION CASES.

The 65 cases include 52 cases in which the after-histories were given, 4 cases in which the after-histories consisted only of statements that the patients were in good health at some specified times after operation, and 9 cases in which no after-history was given. For the preparation of the after-history statistics the 52 cases only are employed, and, as in the previous reports, the statistics have been worked out as percentages of the numbers of the answers to the respective questions.

TABLE VIII.—*Pain or Other Discomfort After Food.*

(Information on these points was given in 44 cases.)

	No. of Cases.	Percentage.
No pain or discomfort ...	38	86.3
Occasional slight pain or discomfort ...	4	9.1
Temporary pain or discomfort ...	1	2.3
Severe pain or discomfort ...	1	2.3

Diarrhoea.—Slight diarrhoea occurred in 2 cases out of the 52.

Constipation.—Slight constipation occurred in 7 cases out of the 52.

TABLE IX.—*Food Able to be Taken.*

(Information as to diet was given in 44 cases.)

	No. of Cases.	Percentage.
Full diet ...	37	84.1
Certain articles of diet avoided ...	7	15.9

TABLE X.—*Time of Return to Work After Operation.*

(Information was given in 42 cases.)

Time of Return to Work.	No. of Cases.	Percentage.
1 to 2 months ...	5	11.9
2 to 3 " ...	27	64.3
3 to 4 " ...	4	9.5
4 to 6 " ...	4	9.5
Over 6 " ...	2	4.8

This table shows that 76.2 per cent. returned to work within three months from the date of the operation.

TABLE XI.—*Work Capacity.*

(Information on this point was given in 43 cases.)

Work Capacity.	No. of Cases.	Percentage.
Full work ...	40	93.0
Light work ...	3	7.0

TABLE XII.—*Weight After Operation.*

(Information on this point was given in 43 cases.)

Weight.	No. of Cases.	Percentage.
Gained ...	37	86.0
Constant ...	4	9.3
Lost ...	2	4.7

TABLE XIII.—*Condition of Health and Well-being After Operation.*
(Information on this point was given in 43 cases.)

Health.	No. of Cases.	Percentage.
General improvement of health	39	90.7
Fair improvement of health	2	4.7
Slight improvement of health	1	2.3
No improvement of health	1	2.3

TABLE XIV.—*Number of Years After Operation during which Patients were under Observation, or during which Reliable Information was Obtained.*
(Definite information was given in 41 cases.)

Years under Observation.	No. of Cases.	Percentage.
1-2 years	1	2.4
2-3 "	1	2.4
3-4 "	2	4.9
4-5 "	14	34.1
5-6 "	9	22.0
6-7 "	5	12.2
7-8 "	3	7.3
8-9 "	6	14.7

TABLE XV.—*Classification of Results.*
(The results returned enabled this classification to be made in 43 cases.)

Classification.	No. of Cases.	Percentage.
Very good	36	83.7
Good	3	7.0
Fair	3	7.0
Poor	1	2.3

The same comparison follows as was made in Part IV of the "very good" results and the respective post-operative mortality of the various operations performed.

TABLE XVI.

Operation.	Very good results (percentage of the cases with after-histories).	Post-operative mortality (percentage of all cases).
Posterior gastro-enterostomy combined with excision of ulcer	87.5	12.5
Partial gastrectomy with anastomosis to jejunum	57.6	15.1
Posterior gastro-enterostomy ...	46.1	7.7
Anterior gastro-enterostomy ...	44.4	11.1

Analysis of the Post-operative Mortality.

The number of post-operative deaths out of the 65 cases was 8—that is, 12.3 per cent.

Sex.—Of the 8 deaths, 3 occurred amongst males and 5 amongst females.

Age Incidence of Deaths.—Half occurred between 40 and 50 years of age, and half between 50 and 61 years of age.

Time of Occurrence of Death after Operation.—Seven deaths occurred between one and seven days, and one death occurred from broncho-pneumonia twenty-five days after operation.

Comparison of the Post-operative Mortality of the Various Operations Performed.

Type of Operation.	No. of Cases.	No. of Deaths.	Percentage of Deaths.
Posterior gastro-enterostomy	13	1	7.7
Anterior gastro-enterostomy	9	1	11.1
Posterior gastro-enterostomy combined with excision of ulcer	8	1	12.5
Partial gastrectomy with anastomosis to jejunum	33	5	15.1
Other operations	2	Nil	—

If these death percentages are proportionately averaged the 12.3 per cent. post-operative mortality for the whole of the cases is obtained.

Carcinoma Developing at the Site of Ulcer.—No case was reported in the whole series.

Brief Summary of Results.

Hour-glass constriction is much more common in females. The liability to hour-glass constriction is fairly constant from 30 to 60 years of age.

A low acidity of the gastric juice was present in a large majority of the cases tested.

76.2 per cent. of the cases returned to full work within three months of the date of the operation.

General improvement of health and well-being occurred in 90 per cent. of the cases with after-histories.

The post-operative mortality was 12.3 per cent.

No case of carcinoma developing at the site of an ulcer was reported in the whole series.

PART VI.—PERFORATED GASTRIC ULCERS.

There were 42 reports of the results of operations for perforated gastric ulcers. These results may be of use for future reference, but as the number of the cases is small the only comments on the results are given in the summary at the end.

TABLE I.—*Sex Incidence.*

Number of cases	42
Males (percentage)	73.8
Females (percentage)	26.2

TABLE II.—*Age Incidence (at Time of Operation).*

Age.	Percentage.
20-30 years	10.0
30-40 "	35.0
40-50 "	32.5
50-60 "	20.0
60-70 "	2.5

TABLE III.—*Position on Site of Ulcer.*
(Information on this point was given in 26 cases.)

Position on Site.	Percentage.
Lesser curvature	46.2
Anterior wall	34.6
Near pylorus	15.4
Posterior wall	3.8

TABLE IV.—*Type of Operation.*

Type of Operation.	Percentage.
Closure of perforation and posterior gastro-enterostomy	90.5
Closure of perforation and anterior gastro-enterostomy	7.1
Partial gastrectomy and posterior gastro-enterostomy ...	2.4

TABLE V.—*Reasons for Operating.*

Symptoms.	Percentage.
Pain	100.0
Vomiting	26.2
Haematemesis	4.7
Melaena	2.4

TABLE VI.—*Results of Operation.*

Result.	Percentage.
Good recovery	71.4
Death	28.6

AFTER-HISTORIES OF THE OPERATION CASES.

The 42 cases dealt with in the above tables include 34 cases in which the after-histories were given, and 8 cases in which no after-history was given. For the preparation of the after-history statistics the 34 cases only are employed.

TABLE VII.—*Pain or Other Discomfort After Food.*
(Information on these points was given in 22 cases.)

	Percentage.
No pain or discomfort	54.6
Occasional or slight pain or discomfort	31.8
Temporary pain or discomfort (in most cases soon after operation)	13.6

Diarrhoea.—Slight diarrhoea occurred in 3.0 per cent. of the cases.

Constipation.—Slight constipation occurred in 11.8 per cent. of the cases.

TABLE VIII.—*Food Able to be Taken.*
(Information as to diet was given in 21 cases.)

	Percentage.
Full diet	71.4
Certain articles of diet avoided	28.6

TABLE IX.—*Time of Return to Work After Operation.*
(Information on this point was given in 21 cases.)

Time of Return to Work.	Percentage.
1-2 months	4.7
2-3 "	19.1
3-4 "	33.3
4-6 "	19.1
Over 6 "	23.8

TABLE X.—*Work Capacity.*
(Information on this point was given in 22 cases.)

Work Capacity.	Percentage.
Full work	86.4
Light work	13.6

TABLE XI.—*Weight After Operation.*
(Information on this point was given in 20 cases.)

Weight.	Percentage.
Gained	55.0
Constant	40.0
Lost	5.0

TABLE XII.—*Condition of Health and Well-being After Operation.*
(Information on this point was given in 22 cases.)

Health.	Percentage.
General improvement of health	77.3
Fair improvement of health	18.2
Slight improvement of health	4.5

TABLE XIII.—*Number of Years After Operation during which Patients were under Observation, or during which Reliable Information was Obtained.*
(Definite information on this point was given in 22 cases.)

Years under Observation.	Percentage.
3-4 years	31.8
4-5 "	18.2
5-6 "	13.6
6-7 "	18.2
7-8 "	13.6
8-9 "	4.6

TABLE XIV.—*Classification of Results.*
(The results returned enabled this classification to be made in 22 cases.)

Classification.	Percentage.
Very good	63.7
Good	13.6
Fair	18.2
Poor	4.5

No secondary gastro-jejunal ulcer occurred in the whole series.

No secondary haemorrhage occurred in the whole series.

Analysis of the Post-operative Mortality.

The number of post-operative deaths out of the 42 cases was 12—that is, 28.6 per cent.

Sex.—Nine of the deaths occurred among males, and 3 among females.

TABLE XV.—*Age Incidence of Deaths.*

Age.	Percentage of Deaths.
20-30 years	18.2
30-40 "	27.3
40-50 "	27.3
50-60 "	18.2
60-70 "	9.0

TABLE XVI.—*Time of Occurrence of Death After Operation.*

Time.	No. of Cases.
1-6 days	5
7-14 "	4
6-7 weeks	1
Not stated	2

TABLE XVII.—*Cause of Death.*

Cause of Death.	No. of Cases.
Shock	2
Pneumonia	1
Subphrenic abscess	1
Erosion into transverse meso-colon	1
Cause not stated	7

Carcinoma developing at the Site of Ulcer.—No case was reported in the whole series.

Brief Summary of Results.

Perforated gastric ulcer was three times as common in males as in females.

Rather more than two-thirds of the perforations occurred between 30 and 50 years of age.

About 24 per cent. of the cases returned to full work within three months of the date of the operation. About 65 per cent. of the cases of perforated duodenal and pyloric ulcers returned to full work in the same period of time.

The results of the operations were satisfactory in about 77 per cent. of the cases that survived, as compared with the corresponding figure of about 89 per cent. for the perforated duodenal and pyloric ulcers.

The post-operative mortality was 28.6 per cent., as compared with the post-operative mortality of 13.6 per cent. among the perforated duodenal and pyloric ulcers.

No case of carcinoma developing at the site of an ulcer was reported in the whole series.