THE RESULTS OF SURGICAL TREATMENT OF GASTRIC AND DUODENAL ULCER.

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AN accurate estimation of the comparative values of the different methods of treatment of gastric and duodenal ulceration is fraught with considerable difficulty, and this chiefly owing to the fact that a search is being made for an impossible formula giving the mathematical results of a handicraft. Surgeons make the grave error of comparing the results of a method as executed by one surgeon with those of another performed by a second surgeon, forgetful of the fact that the cases may be in no way comparable, and that the results are entirely dependent upon the extent to which an individual surgeon has perfected his own method. Physicians fall into an equal or a greater error, in that they estimate the results of surgical treatment from the failures that fall into their hands, when they are ignorant of the technique of the operation that was carried out, and have no knowledge of what percentage these failures represent of the total number of operations. The multitudinous statistics that have been published are also in no way comparable. In some published lists the after-results have been traced for only one year, or short after-results have been combined with the figures of cases traced for a longer period. In some the percentage of good results is computed from the total cases; in others, only from those that have been traced. In a recent paper, for instance, the author publishes a table giving 90 per cent. of satisfactory results after partial gastrectomy, but his figures do not include those patients who died, 9.2 per cent. For these reasons the beginner is hopelessly confused, and finds it almost impossible to determine which operation he ought to undertake and practise for the different lesions. The method adopted by the British Medical Association in their combined investigation does much to overcome this latter difficulty, for the only cases which are investigated are those which were operated upon in the years 1920-24 inclusive, and when published these figures should be so arranged that all cases are included and the percentages of good and bad results computed on the total number. It is to be hoped that large numbers of cases will be collected, so that they will form a basis for comparison with the results of other methods of treatment. Such a statistical investigation is specially required of the late results of medical treatment, for until recently very little had been published in this respect. The figures of Dr. David Smith of the end-results of 214 cases treated medically from 1913 to 1922¹ do much to fill this want, and form a useful basis with which the results of surgical treatment may be compared. The immediate results showed 67 per cent. of males and 76 per cent. of females cured, with an immediate mortality of 2 and 5 per cent. respectively. It was, however, interesting to note that if the symptoms had persisted for more than ten years only 25 per cent. of each sex were cured by medical treatment. The important figures, moreover, were those of the end-results of cases treated for five to fifteen years. These showed in the males 29 per cent. cured, 15 per cent. improved, 31 per cent. failures, and 19 per cent. of deaths; in the females 40 per cent. cured, 20 per cent. improved, 25 per cent. of failures, and 15 per cent. of deaths. It is also necessary to note that in this period 5 of the cases developed carcinoma. The importance of these figures lies in the fact that the cases have been traced for a considerable period, for in so many of the reports of the results of medical treatment the cases have been followed only for a short period, often, indeed, for no longer than the periods of intermission which are normally seen in the symptoms of untreated patients with gastric or duodenal ulceration.

In presenting the figures of the end-results of my own cases treated in these years (1920-24) attention must be directed to the fact that they only represent the results of the operation as performed by an individual surgeon; for

just as one carpenter carries out the greater part of his work with a saw, while another obtains better results with the use of a chisel, so is it possible that for certain ulcers one surgeon will obtain the best immediate and end-results by the use of gastro-enterostomy, and another by the performance of a partial gastrectomy. To this fact insufficient attention has been paid in the many papers that have been written attempting to prove that one or other method is the best form of treatment. Since, however, statistical papers of this sort should be published with the idea of helping beginners in their choice of technique, it will be useful to indicate the reasons why it is considered that the selected operation is likely to give the best results in the hands of the majority of surgeons who have not assiduously practised and become exceptionally skilled in the use of any one method; for there is no doubt that to-day many surgeons are publishing remarkably good results which are due, not to the use of the method they advocate, but to the fact that they themselves have become skilled to an unusual degree in the use of that method.

PYLORIC AND DUODENAL ULCERS.

Of the three more commonly performed operations for this type of lesion—(1) gastro-duodenostomy with or without excision, (2) gastro-enterostomy with or without embedding the ulcer, (3) partial gastrectomy—I have always selected as the routine operation gastro-enterostomy with embedding the ulcer. The latter step is performed by so widely embedding the ulcer with a running mattress suture of silk that the pylorus or first part of the duodenum is completely occluded. Later investigations with x rays after an opaque meal show that it becomes patent again in six to eight weeks. A full discussion of the relative values of these different operative procedures is beyond the scope of this article, but it is sufficient to say that the chief objection which has been raised by others to the routine use of gastro-enterostomy is the alleged frequency of the later development of gastro-jejunal ulceration. Von Haberer and others believe that this complication is specially likely to occur if the pylorus be occluded. This danger has been, in my experience, as I think my figures will show, considerably exaggerated, possibly because I only make use of a temporary occlusion. In my own hands this operation has shown a low immediate mortality and a very high percentage of late cures. Partial gastrectomy in my hands, and I believe also in the hands of all who have not practised it in a large number of cases, gives a higher immediate mortality. I have therefore reserved its use for those cases where there was doubt, however slight, of the presence of carcinoma, and as a later measure for the few cases that have developed gastro-jejunal ulceration. The actual figures of my ulcers obtained in this group are shown in Table I, A.

Of the total of 172 cases only 25 were females.

Mortality.—In this relatively early series there were 4 deaths—that is, 2.3 per cent. This can and should be considerably reduced. In my later cases there have now been 180 consecutive operations of this nature for uncomplicated pyloric and duodenal ulcers without a death.

Gastro-jejunal Ulceration.—This complication occurred in 6 cases (3.4 per cent.), and the figures stress the point, to which attention has often been drawn, that it is a complication almost wholly limited to pyloric and duodenal ulceration, there being only one unusual example among the lesser curve ulcers. Thus, of the total number of 280 cases in this series there were 7 of gastro-jejunal ulcers (2.5 per cent.). Even this is somewhat higher than is seen in larger series. In the total cases operated upon up to February, 1927—that is, eighteen months ago—there were 931 chronic ulcers, 15 of which showed gastro-jejunal ulceration; a total incidence of 1.6 per cent.

Carcinoma.—It is of interest to note that in no case has carcinoma developed as a late complication, so that the claim that partial gastrectomy should be performed to prevent this lesion is unsubstantiated for this group of cases.

Recurrent Ulcers.—In one case an ulcer developed on the lesser curve after a pyloric lesion had been cured by gastro-enterostomy.

Satisfactory Results.—Many figures that have been published from time to time claim to prove that the end-results of this method of treatment are unsatisfactory, but this series shows 86.5 per cent. satisfactory results for the pyloric ulcers, and 84.9 per cent. of the total number. If the 3 cases of pyloric ulcer and the 4 cases of duodenal ulcer which could not be traced are eliminated from the series, the percentage figures become 90.6 per cent. and 88.4 per cent. respectively. The standard of recovery is high, these patients being free from symptoms, able to take a full diet, and capable of performing the usual duties of life, which in many cases were of a most arduous and exacting nature.

Analysis of Late Results (1928) of Cases Operated upon 1920-24 (Inclusive).

	Total.	M.	F.	Died.	Post-operative Haemor- rhage. Died.	Post-operative Haemor- rhage. Living.	Gastro- jejunal Ulcer.	Post-operative Obstruc- tion.	Carci- noma.	Recur- rent Ulcer.	Well—		Per- centage without Lost Cases.	Not Well.	Died Later.	Lost.
											No.	Per cent.				
TABLE I.																
PYLORIC AND DUODENAL ULCERS.																
A. <i>Posterior Gastro-enterostomy.</i>																
Pyloric without stenosis ...	30	22	8	1	1	1	1	—	—	1	24	86.5	90.6	1	1	1
Pyloric with stenosis ...	37	29	8	—	1	—	—	—	—	—	34	—	—	1	1	2
Duodenal ...	105	96	9	3	—	1	5	1	—	—	88	—	—	5	2	4
	172	147	25	4	1	3	6 (3.4%)	1	—	1	146	84.9	88.4	7	4	7
B. <i>Anterior Gastro-enterostomy.</i>																
Pyloric without stenosis ...	1	1	—	—	—	—	—	—	—	—	1	—	—	—	—	—
Pyloric with stenosis ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Duodenal ...	1	1	—	—	—	—	—	—	—	—	1	—	—	—	—	—
	2	2	—	—	—	—	—	—	—	—	2	—	—	—	—	—
C. <i>Partial Gastrectomy.</i>																
Pyloric without stenosis ...	1	1	—	—	—	—	—	—	—	—	1	—	—	—	—	—
Pyloric with stenosis ...	7	6	1	1	—	—	—	—	—	—	6	—	—	—	2	—
Duodenal ...	2	2	—	—	—	—	—	—	—	—	1	—	—	1	—	—
	10	9	1	1	—	—	—	—	—	—	8	—	—	1	2	—
TABLE II.																
ADHERENT AND NON-ADHERENT LESSER CURVE ULCERS.																
A. <i>Wedge Resection and Gastro-enterostomy.</i>																
Adherent ...	30	25	5	1	—	—	1	—	—	—	26	—	—	1	2	—
Non-adherent ...	37	26	11	1	—	—	—	—	—	1	33	—	—	2.1	1	—
	67	51	16	2	—	—	1	—	—	1	59	88	92.18	4	3	—
B. <i>Cautery Excision and Gastro-enterostomy.</i>																
Non-adherent ...	1	1	—	—	—	—	—	—	—	—	—	—	—	1	—	—
C. <i>Partial Gastrectomy.</i>																
Adherent ...	18	16	2	1	—	—	—	—	—	—	13	—	—	1	3.1	2
Non-adherent ...	19	14	5	3	—	—	—	—	—	—	13	—	—	3	1	—
	37	30	7	4	—	—	—	—	—	—	26	70.27	74.28	4	5	2
D. <i>Gastro-enterostomy.</i>																
Adherent ...	3	3	—	2	1	—	—	—	—	—	1	—	—	—	—	—
Non-adherent ...	5	4	1	—	—	—	—	—	—	1	3	—	—	—	—	—
	8	7	1	2	1	—	—	—	—	1	4	—	—	—	—	—
TABLE III.																
HOOR-GLASS STOMACH.																
Wedge Resection and Gastro-enterostomy ...	6	1	5	1	—	—	—	—	—	—	4	—	—	1	1	—
Partial Gastrectomy ...	14	—	14	1	1	—	—	—	—	—	12	—	—	1	—	—

Four of the patients died at a later period, all from some condition unconnected with the ulcer, and since at the time of their deaths they were quite free from all gastric symptoms, they have been included among those considered to be cured. The figures of the few cases in which anterior gastro-enterostomy or partial gastrectomy were performed are shown in Table I, B and C.

LESSER CURVE ULCERS.

In many of the reported series, this type of ulcer has not been differentiated from the pyloric. The issue is thereby considerably confused, for whereas many observers have obtained extremely good results with gastro-enterostomy for pyloro-duodenal ulcers, the majority have appreciated the fact that not only does this operation fail to cure lesser curve ulcers—especially if adherent—in some 50 to 60 per cent. of the cases, but sometimes a lesser curve ulcer actually develops after the gastro-enterostomy has been performed for the pyloric lesion. In my total cases up to February, 1927, this was seen in 8 patients, in 6 of whom the gastro-enterostomy had been performed by other surgeons, and in 2 cases by myself. One of these cases occurs in the 1920-24 series (see Table I, A). On the other hand, local removal of the ulcer alone has in the hands of nearly all surgeons given poor results, a local recurrence taking place in a high percentage of cases. Therefore the operations of choice to-day are: (1) some form of local excision by knife or cautey combined with gastro-enterostomy and perhaps with occlusion of the pylorus, (2) partial gastrectomy.

It is for this type of lesion especially that the majority of Continental surgeons advocate partial gastrectomy, but there is considerable divergence of opinion as to which

method should be chosen. Schoemaker, by the use of his special technique, removes a large portion of the lesser curve and a smaller portion of the greater curve; others use the Polya or Balfour method, while of late some have abandoned the Polya and returned to the Billroth I method, von Haberer stating that in his experience the Polya operation was unsatisfactory owing to the large number of gastro-jejunal ulcers which followed its use. It is in the choice of these various technical steps that the question should be so largely personal, the figures of the advocates of the different methods not being comparable; for the surgeon who performs gastrectomy for all, including simple cases, will have a low mortality, and he who uses it only for large adherent ulcers will have a high mortality. My preference has always been for local excision with the knife followed by temporary pyloric occlusion and transverse gastro-enterostomy, the latter opening running parallel with and close to the greater curvature; for in my experience this method has given a lower mortality and is remarkably free from ill after-results. The risk of gastro-jejunal ulceration at a later date is almost negligible. In my total series of 278 lesser curve ulcers analysed up to February, 1927, gastro-jejunal ulcer occurred only in one exceptional case, which fell into this 1920-24 series. Although partial gastrectomy has up to date been found to give exceptionally good results, the removal of three-quarters or more of the viscus for an ulcer, often only 1 cm. in diameter, seems an unnecessarily severe and deforming operation. Though no examples have fallen to my experience, Hurst warns us of the danger of pernicious anaemia following the more extensive gastrectomies. For these reasons it has been my routine to excise the ulcers

locally, but wherever there is the slightest possibility of carcinoma, as suggested by the symptoms, by the test meal, or by the *x* rays, a partial gastrectomy has been performed. With certain large adherent ulcers not only is the danger of carcinoma greater, but a partial gastrectomy becomes the easier operation, and thus has been chosen as throwing a less severe strain upon a patient often enfeebled by prolonged and severe symptoms. The end-results of wedge resection with gastro-enterostomy and temporary occlusion of the pylorus is seen in Table II, A.

Of the total of 67 cases 51 were males and 16 females, a point of interest, as many observers have found this type of ulcer to be more common in females.

Mortality.—Two of the patients died as the direct result of the operation, giving a mortality of 2.9 per cent.

Gastro-jejunal Ulcer.—In only one unusual case did a gastro-jejunal ulcer develop. This patient, a male, had a high pre-operative acidity of 0.23 per cent., but there was no concomitant ulceration of the pylorus or duodenum. There was also one recurrence at the site of excision, a complication for which no explanation could be found. No silk suture was used, and there had been no post-operative haematemesis.

Carcinoma.—In no case in this series did carcinoma follow the operation, and therefore the statement that a wedge resection is unsatisfactory, in that an insufficient amount is removed to prevent the possibility of the after-development of carcinoma, is unsubstantiated.

Satisfactory Results.—Fifty-nine of the patients have remained well, being able to eat any food and to live a normal life. They form 88 per cent. of the total, or, if we exclude entirely from the series 3 cases that have not been traced, there are 92.18 per cent. of cures.

These figures and those for pyloric and duodenal ulcer compare very favourably with the results of medical treatment as published by Dr. Smith. Included with the 59 cases are 3 of the 4 deaths which occurred late after

operation, the death in these cases being due to an entirely separate lesion and the patients being quite free from all gastric symptoms at the time of their demise. It will be seen from Table II, B, that only one case in this series was treated by cautery excision, and the results are not satisfactory, the patient still suffering from some gastric symptoms. The results obtained by partial gastrectomy or gastro-enterostomy alone are shown in Table II, C and D.

HOURL-GLASS STOMACH.

The number of cases of hour-glass stomach treated in the short period 1920-24 are too small to lead in themselves to any accurate conclusion. It is generally realized, however, that all the older methods which aim simply at overcoming the deformity are unsatisfactory, as they leave untouched the active ulcer on the lesser curve. Treatment must always be aimed at curing this active ulcer, which is associated with the scarring and often with a second stenosing ulcer at the pylorus. Just as with a simple lesser curve ulcer, it has been my practice, wherever possible, to treat these cases by wedge resection, the wedge being made with a very wide base, so that when the opening is sutured the constriction is overcome. This is combined with gastro-enterostomy and temporary pyloric occlusion. In certain cases, however, where the isthmus is very narrow, this procedure is not possible, and a partial gastrectomy is then performed. The results of these procedures in the small groups falling into the time period are seen in Table III, there being 80 per cent. of satisfactory results.

REFERENCE.

¹ A Statistical Review of Gastric and Duodenal Ulcer, *British Medical Journal*, August 18th, 1928, p. 293.

GASTRIC AND DUODENAL ULCER:

AN ANALYSIS OF 200 CASES TREATED BY OPERATION.

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AROUND this subject a formidable literature is accumulating. Fortunately the acrimonious controversy which hitherto has raged is shifting from the barren grounds of invidious comparisons between surgical and medical treatment to a more stable statement of facts from both sides. Opinion is becoming more crystallized, and there is now a general agreement that immediate surgery, except for the complications of perforation and possibly haemorrhage, has no place in its treatment, and should only be resorted to after medical treatment has been given a fair but not too lasting trial. Surgery has an undisputed application to all those cases of mechanical defect from the contraction of ulcers, such as duodenal and pyloric stenosis and hour-glass deformity, and also to those cases of deep ulceration involving adherence or penetration of surrounding structures, and suspected early malignancy. In no less equivocal way should medical treatment be devoted to the cure of ulcer in its early stages. This unanimity of opinion, however, does not apply to a large number of cases, which fall into the following groups: (1) cases which have recurred after medical treatment; (2) cases in which there has been recurrent or dangerous haemorrhage after medical treatment. Finally, there is a group of cases in which treatment depends upon the habits and economic or social position of the patient. Some of these eschew operative intervention, others, who will not co-operate or find medical treatment irksome, demand it.

It would seem that any controversy on the subject should be concentrated on those unknown factors of this disease which inflict much suffering on, and severely handicap, a certain section of the community. So far there is a lack of finality on its etiology. Surgery has been foremost in placing our knowledge on its present foundations, chiefly because its results can be checked and analysed, and radio-

logy has earned no mean niche in the elucidation of the problem.

This paper represents an analysis of a series of some 200 cases, which have been treated in the ordinary routine way in the surgical wards of the Charing Cross Hospital. They include the results of a previous series published in this *Journal* in 1926 (vol. i, p. 936), and belong mainly to Mr. H. S. Clogg and myself. Statistics frequently have a doubtful value, especially if they have a definite case to establish, and vary in the manner of their compilation. They must, however, necessarily serve as the basis of a standard of comparison, and their intrinsic value belongs to the individual, in that they enable him to record his progress. Problems which present themselves in the daily routine of hospital work are apt to pass unnoticed, and can only be rectified and adjusted in their true perspective by the analysis of numerous cases. Unless a surgeon is content to review his work thus he is apt to sacrifice his sense of wider judgement.

There has been no selection of cases in this series; the patients have been operated upon and treated according to the facilities provided by a general hospital. The results do not quite reach the high standards which have been published by some authorities, but they do represent a fair estimate of hospital routine work. There is no doubt that they can be improved. Large draughty wards and the constant changing of assistants, sisters, and nurses—all necessary features of a teaching and training institution—do militate against that even flow of team work which is so necessary to the welfare of these patients.

ETIOLOGY.

The opinion has long been held that chronic infection is a direct cause of ulceration, and that it is necessary to eradicate any focal sepsis before attempting to deal with the ulcer, on the assumption that it provokes the periodic recrudescence of the symptoms which is so characteristic a feature of the clinical history. In some cases the infective agent reaches the stomach direct. It is therefore necessary to eliminate infective lesions of the gums, tonsils, and nasal accessory sinuses. Pannett considers, however, that ulceration is caused by some specific organism (not yet identified) which reaches the stomach by this route, and