Remarks

ON

THE OPERATIVE TREATMENT OF ULCER OF THE STOMACH AND ITS CHIEF COMPLICATIONS,

WITH INDICATIONS, LIMITATIONS, AND ULTIMATE RESULTS.*

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AN experience of nearly 600 operations on the stomach for various diseases, together with observations on a large number of cases in which no operation was performed, has naturally given me much material for study, on which I have, rightly or wrongly, based certain definite opinions, and the only difficulty I now find is how to condense into a short paper the points most appropriate for a useful discussion; for it is manifestly impossible in one, or even in two or three meetings to fully consider and discuss the indications, limitations, and ultimate results of operations for all the non-malignant diseases that may call for surgical treatment, as this would involve a consideration of acute and chronic ulcers, with their complications—perforation, haemorrhage, hour-glass contraction, cicatricial stenosis, and dilatation of the stomach, perigastritis with adhesions, perigastric abscess, inflammatory tumours, fistula, etc.—as well as the subjects of gastroparesis, acute and atonic dilatation, gastric tetany, pyloric and cardiac spasm, congenital hypertrophic stenosis, and other important diseases.

I propose, therefore, to limit my remarks to the question of the indications, limitations, and ultimate results of operation in ulcer of the stomach, and two or three of its chief complications.

I feel sure that gastric ulcer is a much more serious disease than it is ordinarily thought to be, and that the profession has generally considered it more amenable to medical treatment than the facts really warrant.

The accuracy of the observations of Leube, who states that one-half or three-fourths of all cases of ulcer will be cured by four or five weeks of treatment, but if not cured in that time they will not be cured by medical treatment alone, has been more than borne out by the careful investigations undertaken by Dr. Bulstrode, at the instigation of Mr. Mansell Moullin, in 500 cases of ulcer occurring in the London Hospital from 1897 to 1902. He showed that 18 per cent. died while under medical treatment, and these cases did not include any of those patients admitted suffering from the serious complications of ulcer, such as pyloric stenosis, hour-glass contraction, gastric dilatation, etc.

Of the 82 per cent. discharged as cured, Dr. Bulstrode calculated that in at least two-fifths relapse would occur, for out of the 500 cases no less than 211 had suffered and been under treatment for ulcer from one to four or more times previously.

The more recent observations made by Mr. Paterson and Dr. Rhodes at the London Temperance Hospital on 158 consecutive cases under the care of Dr. Soltan Fenwick and Dr. Parkinson, are still more striking, showing that the proportion of real cures in cases of gastric ulcer, even after prolonged treatment by diet and rest in hospital, is under 25 per cent.

Private patients, amid more favourable surroundings, who can rest longer and are more willing to bear restrictions of diet over a lengthened period, suffer less from relapses, though probably not less from the dangers of the serious complications, haemorrhage and perforation, occurring in acute ulcer.

We may thus on ample evidence accept the fact that at least one-third of all cases of ulcer of the stomach treated medically ultimately succumb to the disease or to one of its many complications, and that one-half or two-thirds of the cases that recover relapse.

How does surgical treatment compare with this? As surgeons we only see the worst cases that have failed to yield to medical treatment, or cases suffering from relapsing or chronic ulcer, or from one or other of the

serious complications; yet, arguing from my own experience alone in over 400 operations of various kinds, such as pylorotomy, excision of the ulcerated area, gastro-enterostomy, ligature of bleeding gastric vessels, pyloroplasty, gastrotomy, etc., undertaken for ulcer or its complications (excluding perforative peritonitis), usually in patients at the time very seriously ill, the total mortality has been only a little over 3 per cent.; but, as I shall show later, the actual risk of posterior gastro-enterostomy in my private practice, the most frequent operation in this class of cases, has only been 1.7 per cent., and the patients completely relieved have been over 90 per cent.

CLASSIFICATION.

From the point of view of treatment, ulcers may be conveniently divided into two classes, acute and chronic.

In *acute ulcer* the treatment should at first be medical, and, above all things, it should be thorough; but, if after a month or six weeks in bed on milk diet, followed by a further similar period of from two to three months, in which only soft food, chiefly milk, is taken, the patient is not free from digestive troubles, or if after a period of freedom from symptoms relapse occurs, the question of surgical treatment should be seriously considered.

In *chronic* or relapsing ulcer, if medical treatment has not had a fair trial, a rigid course of diet and rest, as in acute ulcer, should be tried; but in case of non-relief or of relapse after temporary freedom from symptoms, surgical treatment ought to be urged.

SURGICAL TREATMENT.

Limitations.

Before surgical treatment is recommended, it must be ascertained as far as possible that the symptoms clearly and definitely point to ulcer, and to this end a chemical as well as a clinical investigation should be made, since operation is, as a rule, contraindicated in purely functional cases, and when carried out, not only gives no satisfaction but tends to bring discredit on operative treatment.

Surgical treatment may be direct or indirect. By direct treatment, excision of the ulcer or of the ulcer-bearing area is referred to. By indirect treatment is meant gastro-enterostomy, or one or other of the modifications of pyloroplasty—operations the aim of which is to relieve obstruction and to secure physiological rest to the stomach.

Direct Operation.

The *direct* operation has been practised since 1881, when Rydiger excised a large ulcer from the posterior wall of the stomach, but his results and the experience of other surgeons appear to show that the direct operation is more dangerous than gastro-enterostomy. Moreover, gastric ulcers are frequently multiple, and the excision of one ulcer will not cure the remaining ones; hence, as might be expected in practice, excision of ulcer has been frequently followed by relapse. My own experience has extended to 9 of these direct operations, and the fact that all the patients recovered shows that the dangers with modern technique need not deter us from excision if it be the better operation; but of the 9 cases, while 6 are well from three to eight years later, 2 have relapsed, and 1 cannot be traced. Other surgeons, including Mr. Mansell Moullin, Mr. Keetley, and Mr. Sinclair White, have also recorded cases that have relapsed and ultimately proved unsatisfactory.

In future, should I deem it wise to excise the ulcer or ulcer-bearing area in any exceptional case—as, for instance, in an indurated, bleeding, or a distinctly circumscribed ulcer—I should also, as I did in my last cases, perform at the same time a posterior gastro-enterostomy, in order to secure physiological rest for the cure of any other ulcers that might be present.

The operation of excising the ulcer-bearing area with the performance of an independent gastro-enterostomy will probably in the future be more frequently performed, for, as I tried to show in my Bradshaw Lecture at the Royal College of Surgeons, no less than 59.3 per cent. of cases of cancer of the stomach on which I had operated gave a history of chronic ulcer.

Dr. Graham states that a pre-cancerous history of ulcer was obtained in 36 per cent. of cases of cancer operated on in the Rochester clinic, and a clear evidence of cancer development on ulcer in 30 per cent. of the last 40 partial gastrectomies. This affords the most potent argument for the radical operation.

* Paper opening discussion at the Royal Medical and Chirurgical Society, November 13th, 1906.

Indirect Operations: Pyloroplasty and Gastro-jejunostomy.

Pyloroplasty, invented by Heinecke in 1886, and improved by Mikulicz in 1887, although excellent in principle and safe and simple in practice, has been followed in a large proportion of cases by relapse. Although the symptoms may be relieved for months, or possibly years, the tying up of the pylorus by adhesions or the subsequent contraction of the cicatrix, ultimately, in about a quarter of all the cases in which operation has been done, has led to relapse and the necessity of a further operation. I have personally performed 28 pyloroplasties, with immediate success in all except one, that died a fortnight later from perforation, but of the 27 that recovered and remained well for various periods, in only 16 have the results been perfect, the patients being well from four to eleven years later; 8 have required a subsequent operation; 1 was quite well for nine months, relapsed, and died of acute tetany some time later; and 2 are said to have developed cancer after six years and eighteen months respectively of good health.

Dr. W. J. Mayo, out of 21 cases, had 7 that required a secondary operation, and Mr. Rutherford Morison had 4 relapses out of 28 cases.

The modification of pyloroplasty invented by Dr. Finney, and improved by Dr. Gould of Boston, which gives a very wide opening from the stomach into the duodenum, is still on its trial; it is a severe operation when the pylorus and duodenum have to be extensively freed from adhesions. Out of 58 cases operated on by Drs. W. J. and C. Mayo, the mortality was 7 per cent., and of 112 cases collected by Dr. Finney it was 9 per cent.

I have no personal experience of Finney's operation, as I prefer to perform gastro-enterostomy, but Dr. Munro of Boston says that the operation has not given him good results, and he has abandoned it; and Dr. W. J. Mayo thinks it only available in certain selected cases.

Gastro-enterostomy, first performed by Wolfier at the suggestion of Nicoladini in 1881, in a case of obstruction of the pylorus due to cancer, was first employed for the treatment of ulcer by Doyen in 1893, and in the same year by Talma, who independently came to the conclusion that spasmodic stenosis of the pylorus was the chief factor in maintaining the hyperacidity and unrest which prevent the healing of gastric ulcers. It acts by affording a free outlet from the stomach, thus overcoming stasis, relieving hyperchlorhydria, securing rest, and preventing the tension induced by spasm of the pylorus.

The after-results of the operation in ulcer of the stomach and duodenum are usually really remarkable. The pain vanishes, food can be readily taken and retained, vomiting ceases, in a little time the anaemia improves, and, as a rule, the patient rapidly puts on weight.

The ill-effects said to follow the operation can probably all be avoided by correct technique. I well remember in the early cases of gastro-enterostomy the fear that was entertained of regurgitant vomiting—the so-called vicious circle—a complication that I have not experienced in my work since adopting the posterior operation without a loop; neither have I seen a case of closure of the anastomotic opening, nor any of the forms of internal hernia, either through a loop or through a slit in the mesocolon, after any of my operations.

Death from asthenia, which at one time was to be feared after stomach operations, when starvation for some days was adopted in already enfeebled patients, is no longer a danger, as feeding can be begun immediately after operation.

The danger of primary haemorrhage is entirely avoided by continuous sutures embracing the margins of the opening between the two viscera, though it is not always possible to avoid the dangers of secondary haemorrhage from pre-existing ulcers.

The only complication that perhaps is unavoidable is extremely rare, peptic ulcer of the jejunum, which apparently arises from an excessively acid gastric juice passing directly into the jejunum, just as not infrequently occurs in the duodenum, leading to duodenal ulcer. The fact that I have not had a case of peptic jejunal ulcer in over 200 posterior gastro-enterostomies shows that this danger is a very remote one.

I have operated on three cases of jejunal ulcer, although in only one of the three did it occur after I had myself operated, and in that case the original operation, performed three years and four months previously, had been an anterior

gastro-enterostomy with a long jejunal loop; of the other two cases, in which the original operation was performed by friends or colleagues, one was after an anterior and one after a posterior operation.

I think the condition will in the future be avoided by making the opening sufficiently large, so that there can be no possibility of stasis, and by taking pains to carefully diet and treat the patient medically for some time after gastro-enterostomy, so as to thoroughly cure the hyperchlorhydria.

It has been clearly proved that this complication occurs more frequently after the anterior operation, where there has been a long jejunal loop, but whether occurring after the anterior or posterior operation it is very serious, as perforation is very liable to occur.

There is not time to enter into minute details of the technique of gastro-jejunostomy, but I cannot help giving expression to my feeling that many details described as essential by various operators are by no means necessary to success. For instance, the oblique incision of the stomach wall is quite unnecessary, and I have never adopted it, the only essential, so far as the incision is concerned, being that it should be sufficiently large, not less than 2 in., and that it should be close to the lower border of the stomach. Nor is excision of the mucous membrane necessary, or to my mind desirable, as all that is essential is that the mucous membranes of the jejunum and stomach should be brought into contact by the marginal continuous suture, which must for haemostatic purposes take up all the coats. The use of the clamps, though not essential, has, I believe, contributed largely to the diminished mortality of the modern operation.

Though I personally prefer the posterior operation with the so-called no loop, which has given such satisfactory results, yet, as proved by the permanent success of many of the earlier cases, the anterior operation is quite capable also of yielding good results, but I think at a greater risk of complications from the necessarily long jejunal loop. Roux's operation and short-circuiting of the loop are, in my opinion, unnecessary procedures, except occasionally when the anterior operation is alone feasible.

Statistics.

The statistics of gastro-enterostomy for ulcer cannot be accurately estimated by merely collecting a large series of cases from the records of all the general hospitals, in which perhaps only a few operations are performed by each member of the staff, and with very varying results; but a true estimate may be obtained by a consideration of the results of individual operators who have accurately recorded and followed up the after-progress of their cases.

Nor do I think it desirable, in estimating the mortality of gastro-enterostomy in simple ulcer, to put the cases of ulcer complicated by haemorrhage or hour-glass contraction into separate lists, as it may open the way to misconception of the actual results if the simple uncomplicated cases are placed in a separate category.

The following statistics include the results of gastro-enterostomy for ulcer and its complications, haemorrhage, and hour-glass contraction (excluding perforative peritonitis), following the plan employed in the Report of St. Mary's Hospital, Rochester, Minnesota.

Dr. W. J. Mayo* reported having performed 307 gastro-jejunostomies for *non-malignant* disease, with a mortality of 6 per cent., but in the last 81 operations of the series there had been only one death; and in the report for 1905 of St. Mary's Hospital, Rochester, I notice that out of 100 gastro-jejunostomies for ulcer, or the results of ulcer of the stomach and duodenum, only one patient died.

At the British Medical Association meeting at Leicester, July, 1905, Mr. Moynihan gave the result of his experience up to date. The cases included 171 gastro-jejunostomies for chronic ulcer, with 2 deaths; 27 cases in which haemorrhage was a prominent symptom, with 4 deaths; and 8 cases of hour-glass stomach in which gastro-jejunostomy had been performed, with 3 deaths, thus making 206 cases of ulcer with its complications of haemorrhage and hour-glass contraction in which gastro-jejunostomy had been performed with 9 deaths, giving a

* *Annals of Surgery*, November, 1905. In a supplement to this paper published in the *Annals of Surgery*, April, 1906, Dr. W. J. Mayo stated that he had performed 136 gastro-jejunostomies in sixteen months with but one death.

mortality of 4.3 per cent.† The after-results of operations for chronic ulcer uncomplicated by acute perforation or severe haemorrhage yielded 82 per cent. cured and 14 per cent. relieved.

Hartmann reports his death-rate as 6 per cent. and his final results as 90 per cent. of cures. Von Eiselsberg gives his final results as 90 per cent. well two years after operation. Rotgans of Amsterdam gives his immediate risk as 5 per cent. and a permanent cure in 80 per cent. of cases.

The following is my own personal experience. It includes every instance, whether simple or malignant, in which I have performed the operation of posterior gastro-enterostomy, either in hospital or in private practice. There have been 210 cases, of which 202 recovered from operation, thus giving a mortality of 3.8 per cent.

As the after-histories are almost impossible to obtain with any degree of accuracy from the class of patients seen in hospital, I have based my observations on my private cases, in which the after-histories have been kindly furnished by the medical colleagues with whom I was associated.

Of the 112 posterior gastro-enterostomies that I have performed in my private practice for ulcer or its complications, including haemorrhage and hour-glass contraction, 110 have recovered, thus giving an operative mortality of 1.7 per cent. Out of the 110 recoveries :

96 are in good health now, at periods varying from within a year up to five years after operation.

2 were alive and well three years subsequent to operation, but no reply has been received as to their present condition.

2 were alive and well some time after operation, but no word has been received of them later.

1 lived in good health for two and a half years, and when travelling in Italy died of acute pneumonia.

1 remained in perfect health for three years, but has lately had some vomiting.

1 lived in good health for three and a half years after operation, and then developed cancer in the abdomen.

1 lived two and a quarter years and died of cancer of the stomach.

1 had perfect health for a year, when a tumour at the pylorus developed, but no further operation was permitted, and she died two months later.

1 had improved health for two and a half years, when she had haematemesis, and died shortly after an attack.

1 was well for two years, when she had recurrence of vomiting; a further operation was performed, but the old gastro-enterostomy opening was found to be perfectly patent, and though the patient is living her condition is not satisfactory.

1 has never been well since operation two years ago, and now has developed a tumour in the colon.

1 has since died of pernicious anaemia.

1 has been relieved, but still suffers at times from pain and flatulence after food.

Thus it will be seen that 101 out of 110 posterior gastro-enterostomies for ulcer or its complications performed in private practice apparently resulted in cure.

Excellent results have also been obtained by Ochsner, Murphy, Deaver, Kocher, Munro, Brewer, Littlewood, Monprofit, and others.

The only complications of ulcer of which I propose to discuss the operative treatment are perforation, haemorrhage, hour-glass contraction, dilatation due to pyloric stenosis, tetany, and perigastritis.

PERFORATION.

This complication, which is estimated by various authors to occur in from 12 to 28 per cent. of all cases of gastric ulcer, is fatal unless surgically treated in 95 per cent.; there can therefore be no room for any difference of opinion as to the wisdom of operation in this serious accident. As shown by the statistics drawn from a very large series of cases, every hour's delay adds to the danger, hence it is of the utmost importance that an early diagnosis and immediate operation should be insisted on.

In cases operated on within twelve hours of rupture the mortality has been 25 to 28 per cent., in from twelve to twenty-four hours 63 per cent., in from twenty-four to thirty-six hours 86 per cent., and after thirty-six hours the mortality has been so great—95 to 100 per cent.—that

† In a further paper communicated to the Royal Medical and Chirurgical Society and read May 22nd, 1906, Mr. Moynihan reported an additional number of cases of ulcer treated by gastro-jejunostomy, which, with the cases previously reported, brought the total number up to 251 (these included haemorrhagic and hour-glass contraction cases) with 9 deaths—equal to 3.5 per cent.

purely medical treatment would seem to give an equal chance of recovery.

The results of operation in late cases will probably always be unsatisfactory, but I believe that the cases seen within twelve hours of rupture should give much better results than those yet attained; my feeling is that the mortality should be brought down to from 5 to 10 per cent.; in fact, in a continuous series of 11 cases operated on within a few hours of rupture, and reported last year by Dr. T. Sinclair-Kirk, there was no mortality, showing that such a forecast is possible.

My experience is that excision of the ulcer is not necessary to success, and that a folding-in of the edges of the rupture, with the careful application of a continuous serous suture, and, if possible, an omental graft laid over it, gives the best results. I prefer to wash out the abdomen with a hot normal saline solution, and to drain above the pubes, with the patient well propped up in bed; but, as shown by a series of cases operated on by Mr. Littlewood, in which lavage was not adopted, washing out is not always necessary to success. My rule is, that where the effusion is general, lavage should be adopted, but where it is local a mere wiping out of the soiled area is only necessary.

The important point is the actual damage to the peritoneum, for if it has not lost its polish it is capable of absorbing any amount of effusion, but if the peritoneum has lost its polish it must be assisted by artificial drainage.

Seeing that in one-third of all the fatal cases other ulcers have been found, that in 20 per cent. of cases of ruptured ulcer the perforations are multiple (Finney), and that in a large proportion of cases recovering from operation the patients have subsequently had other gastric symptoms, or even a second perforation, the question of the desirability of gastro-enterostomy at the time of operating for the perforation is well worthy of consideration. Of 15 cases traced by Mr. Crisp English, 4 suffered subsequently from gastric trouble, and of 35 traced by Mr. Paterson 1 died from perforation within two years, 2 required subsequent gastro-enterostomy, 9 had definite symptoms of gastric ulcer, and 5 had gastric symptoms. In Mr. Moynihan's cases 7 out of 24 required an immediate or subsequent gastro-enterostomy.

The cases submitted at the same time to gastro-enterostomy are too few to argue from, but of those that recovered cure has been complete and permanent in all up to the present.

The chief argument against gastro-enterostomy is, of course, the prolongation of the time of operation in cases already very seriously ill from the perforation, but in cases not too ill to bear it the following arguments are decidedly in its favour :

1. Other ulcers present at the time of perforation will probably be cured by the operation.

2. If a second ulcer is on the point of perforation such perforation will probably be prevented, as tension and pressure on the stomach walls will be avoided.

3. After gastro-enterostomy more secure healing of the sutured ulcer is likely to occur, and there will be less likelihood of the stitches giving way.

4. It diminishes the risk of haematemesis occurring after operation.

5. It enables saline aperients to be given shortly after operation, and so secures more efficient drainage of the peritoneal cavity.

6. It permits earlier feeding than would otherwise be the case had no gastro-enterostomy been done.

On all these accounts, therefore, it is important that, where the patient's condition will permit of it, the question of the performance of a gastro-enterostomy should be seriously considered at the same time that the perforating gastric ulcer is closed.

HAEMORRHAGE.

The complication of haemorrhage occurs in a greater or less degree in from 50 to 80 per cent. of all cases of gastric ulcer, and according to various authors is fatal in from 3 to 11 per cent.

From the point of view of treatment it seems convenient to classify the cases under two divisions :

1. The acute, always alarming, and sometimes, though rarely, fatal attacks, that occur without any warning and without any premonitory symptoms pointing to ulcer; attacks that when occurring in young anaemic women

usually cease spontaneously or under treatment, and that do not tend to recur.

2. The attacks associated with or preceded by definite symptoms of ulcer, which may be: (a) Acute, ending rapidly in death; (b) acute, temporarily subsiding and recurring in a few hours or a few days, or after longer periods; and (c) the chronic haemorrhages, often slight in amount, but frequently recurring and leading to anaemia.

Treatment.

From the fact that medical and general treatment is successful in arresting acute haematemesis in from 93 to 97 per cent. of all cases, and that it is difficult in the present state of our knowledge to say at first that the bleeding is not occurring from capillaries or small arterioles, it necessarily follows that medical treatment should always have a fair trial in every case of acute haematemesis. The very fact of medical treatment being so often successful in cases of apparently alarming haematemesis, goes to show that capillary oozing or bleeding from arterioles, as in the first division, accounts for many cases of gastric haemorrhage. But while thoroughly believing this, we must also not close our eyes to the experience we have in general surgery of bleeding from medium-sized arteries, such as the radial or ulnar, which we know would rapidly bleed a patient to death, if only perforated on one side and surrounded by warm compresses, a condition that practically applies in all cases of haematemesis where the larger vessels are eroded. If, therefore, medical treatment and rest properly carried are not successful in arresting the bleeding, or if after being arrested it recurs, we should be suspicious that a large vessel is perforated, and if a surgeon has not been previously asked to see the case, I would say emphatically that a surgical consultation ought to be held with a view to considering the question of operation and arrest of bleeding by direct treatment if the patient is in a fit condition to bear it.

Where there have been distinct signs of gastric ulcer preceding the haemorrhage, and where a sudden haematemesis has occurred with great loss of blood accompanied by an attack of syncope, a large vessel will usually be found to be the source of the bleeding. In such haemorrhages not speedily yielding to medical and general means, or recurring, surgical treatment will probably be advisable, though there can be no absolute rule formulated that will apply to every case, and each must be considered on its merits. The present condition of the patient, the previous history, the surroundings, the possibility of skilled surgery and of good nursing, and other circumstances, will all help in the decision. Although both surgical and medical treatment in cases of fulminating haemorrhage have, so far, yielded disappointing results, in the acute cases not immediately fatal, where repeated bleedings occur, and the interval between the first seizure and death varies from a few days to two or three weeks, medical treatment will have been fully tried and failed, and there can be no question as to the advisability of surgical procedures being adopted.

At present, with the exception of Dieulafoy, who advocates operation during the first bleeding if as much as half a litre of blood is lost, all other surgeons who have written on the subject agree that general means ought to be relied on during and after a first attack, as in from 93 to 97 per cent. of cases such treatment succeeds, and until our means of diagnosis as to the size of vessel injured is rendered more reliable we must advise assent to this rule; but after a second bleeding I have no hesitation in advising surgical treatment as soon as the condition of the patient will permit operation to be done, for experience tells us that further haemorrhages are almost certain to occur unless preventive measures be adopted.

The surgical treatment of haematemesis may be direct or indirect.

By the *direct* method is meant: (a) Excision of the ulcer or of the ulcer-bearing area; (b) arrest of haemorrhage by ligation of the bleeding vessels, by cauterization of the ulcer, or by ligation of the mucous membrane *en masse*.

By the *indirect* method gastro-enterostomy is meant.

Any operation for haematemesis must, as a rule, be at first exploratory, and when the condition of the stomach is made out the question of direct or indirect treatment can be decided on.

In all the early cases of operation for haemorrhage from

the stomach the direct method was adopted, as it had not then been realized that by securing physiological and physical rest to the stomach by a well-executed gastro-enterostomy, not only could bleeding, as a rule, be arrested, but the condition of ulceration giving rise to it could be cured.

Mr. Mansell Moullin still advocates the direct method by ligation *en masse* of the bleeding area or by excision of the ulcer, and he urges in support of his view the fact that there have been cases recorded in which haemorrhage has persisted or recurred after gastro-enterostomy; but we must not lose sight of the fact that several cases have been recorded in which haematemesis has also occurred after local treatment of the bleeding ulcer.

My only experience of recurrence of haemorrhage after short-circuiting has been in two cases of tumour of the pylorus, probably malignant, supervening on ulcer. In one a fatal haematemesis occurred one month after what appeared to be a very successful operation, when the patient was apparently well. The other occurred in a man, aged 75, operated on for pyloric stenosis with persistent vomiting. He had had profuse haematemesis two weeks previously; after the operation the bleeding recurred in forty-eight hours, and proved fatal. In neither of these cases could excision of the ulcerated area have been performed with a probability of success, as extensive adhesions with enlarged glands prevented the pyloric tumour being brought forward even for inspection. Had it been practicable I should have performed wide excision of the tumour in both of these cases.

An extensive personal experience and the consideration of a large number of cases operated on by others, whose work I have had the opportunity of seeing or studying, has convinced me that the operation of gastro-enterostomy is usually an efficient means of treating haemorrhage from the stomach; and it is only under exceptional circumstances that I should now think it worth while to open the stomach and treat the ulcer directly; but even should I deem direct treatment of the bleeding point necessary, I should also think it equally desirable to perform a gastro-jejunostomy in order to secure rest to the stomach and to the ulcer, so as at the same time to stop the bleeding and cure the condition giving rise to it.

Gastro-jejunostomy possesses the advantage that it is applicable to both acute and chronic haemorrhage, that it avoids the necessity of a prolonged search through a gastrotomy opening, that it is quickly performed, and, not least, that it involves little shock, and has a very small mortality.

A collection of a large number of cases of the direct treatment of the bleeding point not only shows a very heavy mortality, but also want of relief to the condition giving rise to the bleeding in a large proportion of cases, unless at the same time gastro-enterostomy has been performed.

Statistics of Operations for Haematemesis from Ulcer.

I have operated in 4 cases of acute haematemesis during the continuance of the bleeding. All the patients recovered and remain well. In 2 of these cases numerous bleeding points were ligatured *en masse* and gastro-enterostomy was done; in 2 gastro-enterostomy was alone performed.

I have also operated between the attacks on 22 patients suffering from haematemesis due to ulcer; in all a gastro-enterostomy was performed, with recovery from operation in 21. In 1 case death occurred at the end of a week from exhaustion.

To put the matter succinctly I would say:

1. In a case of acute haematemesis from ulcer or erosion when the onset of bleeding is sudden and the previous history of ulcer is absent, medical and general means should be very thoroughly tried, and if the bleeding ceases as the result of rest and general treatment there will be no cause to interfere surgically, though treatment should be carried out thoroughly and persistently until the ulcer has healed.

2. In case of recurrence of bleeding, or if the bleeding persists despite treatment, surgical measures are called for.

3. In case of bleeding from a chronic ulcer, whether the bleeding be slight or severe, surgical treatment is demanded, not only for the arrest of haemorrhage, but also for the curative treatment of the ulcer itself.

4. As the risk of operation during the quiescent interval is less than if undertaken while the bleeding is continuing, it is desirable if possible to secure arrest of the haemorrhage, even in chronic ulcer, before undertaking operation; but if the haemorrhage is persisting the surgeon is not justified in waiting until the patient is reduced to such a condition that it is too late to operate.

PYLORIC STENOSIS AND OBSTRUCTIVE DILATATION.

The very process of cure in pyloric ulcer can only result in stenosis, which if moderate in extent is overcome by hypertrophy of the gastric muscle. While this compensation is maintained symptoms may be slight or even absent, but sooner or later compensation fails and dilatation occurs, leading to stagnation of the stomach contents, with fermentation and the generation of acid acids and offensive gases, giving rise to gastritis. Relief is obtained for a time by vomiting, but as the stenosis increases, less and less food passes into the intestine, and death from starvation is the inevitable result should not tetany or perforation hasten the end.

In perhaps no other variety of so-called chronic indigestion are the patients so miserable, and as the disease may drag on for months, or even years, the sum total of suffering probably exceeds that from almost any other form of disease.

Treatment.

In the early stages of obstructive dilatation, when the symptoms are slight, relief will doubtless have been given by semi-liquid diet and lavage of the stomach, but as soon as the symptoms are pronounced it is a mere waste of time to persevere with the use of drugs, massage, electricity, or even lavage, except in those rare cases where the stenosis is due either to syphilitic ulcer or gumma, which should speedily respond to specific treatment.

Surgical treatment is alone of avail in order to remove the cause of the stenosis, or to create a new channel by which the stomach contents may pass onwards into the intestines.

It may sometimes be possible to remove the cause of the stenosis by division of peritoneal bands or adhesions, or the removal of a tumour obstructing the pylorus, but in the majority of cases it will be necessary either to enlarge the contracted pyloric orifice or to perform a gastro-enterostomy.

The operations available are: (1) Pylorodiosis or forcible dilatation of the pylorus, (2) pyloroplasty, (3) Finney's operation, (4) Kocher's gastro-duodenostomy, (5) pylorotomy, (6) gastrolisis, (7) gastro-jejunosotomy.

It is not necessary to describe or dilate on the various operations that may be performed in case of dilatation of the stomach due to simple pyloric stenosis, as the greater number of experienced surgeons are agreed that gastro-jejunosotomy is the procedure that should be followed in such cases, not only because it can be done with very little risk, but also because the after-results of the operation in these cases are extremely satisfactory. The risk, as I have shown, is under 3 per cent., and the cases permanently relieved or cured are 90 per cent.

Although pylorotomy or partial gastrectomy is a much more severe operation than gastro-enterostomy, yet there is a certain class of cases of pyloric stenosis associated with tumour in which it is difficult to say whether the tumour of the pylorus is simple or malignant.

If the obstruction of the pylorus is associated with a tumour due to inflammatory disease, in all probability it will be so adherent to the under-surface of the liver or to the pancreas, that pylorotomy will be extremely difficult and hazardous. In such cases it will probably be deemed necessary to rest content with gastro-enterostomy, in the hope that the rest induced by the operation will cause a subsidence of the tumour. I have found this to apply in many such cases, in which at the time there was a question of malignant disease, but in which after gastro-enterostomy complete and permanent recovery followed. If, however, under these circumstances the pylorus should be free and the disease limited, it may be quite justifiable to perform pylorotomy in case of doubt.

As pylorotomy, even in cancer, can be performed with a mortality of 15 per cent. or less, the risk of operation, should the disease prove to be simple, should not exceed half that amount.

My views on pyloroplasty and its modifications I have already given.

The operation of pylorodiosis, though recommended and performed by Loreta in some cases of cicatricial contraction of the pylorus, is not a procedure to be recommended, as, though it has given good results in some cases of obstruction due to simple spasm of the pylorus, the procedure is attended with much more risk than either gastro-enterostomy or pyloroplasty, and the only form of obstruction in which I should consider Loreta's operation at all justifiable is in congenital hypertrophic stenosis where spasm is taking a share in the obstruction.

GASTRIC TETANY.

To make a distinction between the severe and fatal form of gastric tetany and the tetanoid spasms associated with gastric dilatation is purely arbitrary, and it seems more rational to include all cases of tetany and tetanoid spasms dependent on stomach diseases under the term "gastric tetany."

Moreover, to conclude that gastric tetany is almost necessarily fatal, as is insisted on in certain medical works, is to my mind a great mistake, as an extensive experience of the disease, both of the mild and severe varieties, has convinced me that under efficient surgical treatment hardly any case is hopeless.

The treatment of gastric tetany is essentially surgical, as I had the privilege of first pointing out in a paper in the *Lancet*, November 26th, 1898, when several cases were given as examples of successful surgical treatment. Since that time my experience has increased, and out of a large number of cases in which I have operated I can state definitely that in no single case has drainage of the stomach by gastro-enterostomy failed to give relief. Moreover, at the same time that relief to the tetany is secured, a cure of the disease producing it is accomplished, as in almost all cases there is a grave mechanical obstacle to the onward passage of the food. It is this obstacle which causes dilatation and hypertrophy, to be later followed by stasis and fermentation of the contents of the stomach. To relieve this obstruction, and to do away with the stagnation of the stomach contents, surgical measures are necessary. In simple cases pyloroplasty or gastro-enterostomy will be the methods of choice; in malignant cases a partial gastrectomy or gastro-enterostomy, as circumstances dictate. In hour-glass stomach, gastro-gastrostomy, combined with gastro-enterostomy performed in the distal pouch, will, as a rule, be the suitable operation.

HOURLASS STOMACH.

Hour-glass stomach owes its origin to definite organic disease—chronic gastric ulcer, cancer, or perigastritis—but the greater number of cases are caused by the cicatricial contraction due to ulcer. Doubtless, very rarely the condition may be congenital, just as congenital narrowing may be found at the pylorus, in the intestine, or in the rectum. As yet, however, in an experience of considerably over 1,000 operations on the upper abdomen, in which the stomach could be seen and examined, I have not met with a single instance in which I could say that the case was one of congenital hour-glass contraction.

For chronic gastric ulcer to be allowed to pursue its course until this extreme deformity, hour-glass stomach, occurs, can only be described as a disgrace to modern medicine, for the disease giving rise to the condition has definite signs and symptoms, and is one attended by considerable suffering. In nearly all my cases the patients had been ill for years, some of them for 10, 12, or 16 years, whereas by a timely operation they might have been cured before the development of the deformity.

Surgical treatment is alone of service in this disease, and the conditions to be aimed at are to overcome the obstruction, and to secure physiological rest for the healing of the ulcer, which is by far the most frequent cause of this deformity. Out of 26 cases operated on by myself and 22 reported by my friend Mr. Moynihan, 41 were the result of ulcer.

The operations available are: (1) Gastroplasty, (2) gastro-enterostomy, (3) gastrolisis, (4) gastro-gastrostomy, (5) excision of the ulcerated area or partial gastrectomy, (6) division of the stricture, and (7) jejunosotomy.

It would occupy too much time to consider the indications for the different operations mentioned, but seeing that the disease is usually associated with active ulceration in the centre of the stomach, no operation will be

likely to be permanently effective that does not provide for efficient drainage of both pouches, in order to secure healing of the ulcers; hence a double operation is often necessary, and a gastro-enterostomy into one or both pouches is generally advisable.

Of 7 cases in which I performed posterior gastro-enterostomy for hour-glass contraction all recovered, and 5 are well at the present time (three to six years later), 1 died of cancer of the sigmoid flexure of the colon four years, and one of cancer of the stomach a year after operation.

Of 10 cases in which I performed simple gastropasty all the patients recovered, and 6 are known to be in good health at the present time, from three to six years later; 1 was well a year after, but cannot be traced; 1 required gastro-enterostomy two years later for ulcer of the pylorus; 1 was well for four years, had recurrence of ulceration, and died of haematemesis; and one writes to say that after five years she has had some gastric pain, but has not needed medical attendance.

CONCLUSIONS.

Since gastropasty has been followed by 25 per cent. and gastro-gastrotomy by 30 per cent. of relapses, while gastro-enterostomy alone has given much better results, and the combination of the two former operations along with gastro-enterostomy has been uniformly successful, it seems quite clear that whatever procedure is adopted for making a communication between the two stomach cavities, a gastro-enterostomy ought to form part of the operation in order that the ulceration giving rise to the disease may be cured.

PERIGASTRITIS.

Perigastritis leading to disabling adhesions is so commonly associated with ulcer that I must mention it among the principal complications.

When the adhesions tie up the pylorus so as to produce a kink, the normal peristalsis of the stomach may be interfered with, leading to dilatation and stasis so extreme that stenosis of the pylorus may be suspected. If slight, the adhesions may be separated, and the right free border of the omentum may be interposed between the pylorus and its abnormal attachments, so as to prevent close adhesions re-forming, but if the adhesions are extensive a gastro-enterostomy will be found to be the more satisfactory operation, and to give excellent results. If adhesions form on the anterior wall of the stomach, fixing it to the abdominal parietes, normal peristalsis will be interfered with, and the patient's sufferings after meals or on exertion may be considerable; the condition may give rise to irregular dilatation or to hour-glass deformity and to stasis of the stomach contents.

The adhesions must be detached, but are apt to re-form if at all extensive unless the raw surfaces can be covered by sliding the omentum or grafting peritoneum over them.

Simple gastrolisis or detaching adhesions is practically unattended by risk, and in many cases I have seen excellent results by this simple operation; but in several cases relief has been followed by relapse, necessitating a short-circuiting operation. Posterior gastro-enterostomy should under such circumstances be performed where feasible, but in case of adhesions being very extensive, and involving the posterior wall, an anterior Roux's operation will probably be found to be the best procedure to adopt.

In conclusion, I should like it to be understood that I do not advise operation in ordinary acute gastric ulcer, the medical treatment of which should, I think, be much more careful and more prolonged than was formerly considered necessary.

Nor do I advise operation in chronic ulcer before medical treatment has had a fair trial; but I think it is unfair to our patients to advise a continuance of general treatment for chronic or relapsing ulcer until serious complications supervene, when by timely surgical treatment many of them can be prevented.

In perforating ulcer, in chronic or relapsing haemorrhages, in pyloric obstruction or other mechanical causes leading to dilatation, medical treatment is as inadequate and useless as is operative treatment in gastric neuroses and other functional diseases, and to continue it beyond the period in which it can benefit, is as unscientific and unwise as it is to operate and expect good results in improper cases.

OPERATIONS UPON THE LOWER PART OF THE COMMON BILE DUCT.*

By B. G. A. MOYNIHAN, M.S., F.R.C.S.,
LEEDS.

WHEN a stone enters the common bile duct from the gall bladder, it does not, as a rule, travel far before it is arrested. The common duct, as is well-known, is funnel-shaped, narrowing gradually as it descends towards the duodenum. A stone entering it and fitting quite loosely in the upper part, may be soon checked in its downward passage owing to the lessening calibre of the duct in which it lies. An important factor in the retardation of the stone is doubtless a spasm of the muscular fibres existing in the duct wall. Before long the stone begins to increase in size and may be joined by others entering from the cystic duct. The larger a stone becomes the less likely is it to pass onwards into the duodenum. The increase in size of a stone lying stationary within the duct is probably rapid. In not a few operations I have found a stone which, to judge by the clinical history, has lain in the common duct not more than two or three months, to be of the size of a nutmeg or an olive, when other stones in the gall bladder (the cystic duct being patent) are only one-quarter or one-sixth of that size. The calculus on its escape from the gall bladder may have been larger than its fellows, but the added deposit upon it has been sufficient to remove all traces of facets.

Calculi are therefore found during operation more frequently at the upper than at the lower part of the duct. The removal of a stone from the first part of the duct is now a comparatively common operation. There are, however, a certain small number of cases in which the stone is arrested and fixed in the second and third portions of the duct or in the ampulla of Vater and must be directly removed therefrom. Such operations are still so uncommon as to be worthy of individual record.

OPERATIONS UPON THE SECOND AND THIRD PARTS OF THE COMMON DUCT.

The second part of the common duct—the retro-duodenal or pancreatic portion—is 1 to 1½ in. in length (see Fig. 1); it lies behind the duodenum and in contact with the pancreas, either in a groove or in a canal in the head of the gland. The third portion of the duct—the transduodenal or pancreatic portion—lies in the inner and posterior wall of the duodenum, and terminates at the diverticulum of Vater; it is about ½ to ¾ in. in length. These parts of the duct may be approached in one of two ways: (a) from behind by retroduodenal choledochotomy, (b) from the front through the duodenum by duodeno-choledochotomy.

(a) Retroduodenal Choledochotomy.

This operation was first described by Haasler in a paper read before the German Surgical Congress in 1898. Similar procedures have been carried out by Oscar Bloch and Berg. The principle of the operation consists in the making free of the duodenum by stripping up the peritoneum on its outer side, so that when the duodenum and the pancreas are turned over to the left the stone can be seen and felt projecting posteriorly, and be removed by incision of the sclerosed pancreas which covers it. After removal of the stone the duct is explored for other calculi and is then closed by suture; drainage is always necessary, for the duct, being here devoid of a peritoneal covering, does not heal rapidly or securely. I have never performed this operation, and I will not therefore describe it in detail.

(b) Duodeno-choledochotomy.

Of this operation there are two varieties, according as to whether the common duct is opened in its second or its third portions or whether the ampulla of Vater is opened. If the duct itself is incised, the operation is known as transduodenal choledochostomy, or Kocher's operation (Figs. 2 and 3); if the ampulla is opened, the operation is known as duodeno-choledochotomy, or McBurney's operation (Fig. 4). The former will be described first:

* A paper read before the Yorkshire Branch of the British Medical Association.