

cancer at Rochester in which both the clinical history and pathological examination made it certain that they had originated in ulceration. Robson, in his Bradshaw Lecture, reports 59.3 per cent. of gastric cancer giving a previous history of chronic ulcer.

The good results of gastro-enterostomy in chronic ulcer are now admitted, and every physician who has advised and every surgeon who has practised this operation will have many cases to which they can refer with satisfaction. From my list of 53 I select 2 which will illustrate its effects.

The first was that of a man aged 58, who had suffered for years from dyspepsia. Eight years ago he had a sudden attack of haematemesis and passage of blood by stool; after this there was no more bleeding for several years, although his digestion was always bad, until three years ago, when it returned; he was at that time manager to a large firm, but the effect upon his health was so great that he was obliged to resign his position. For a time he lived quietly, attempting by diet and rest to recover his health, when a third and more profuse loss of blood occurred, causing his friends great anxiety as to his life. His recovery from this was slow, but as soon as he was sufficiently fit he came from London here for the operation. This was done and he returned home. As may be supposed, the loss of his situation, combined with the difficulty of obtaining another at his age, weighed on his mind, and he writes, some months later: "I should almost begin to despair but for the memory of what I have gone through and the constant feeling of thankfulness to be so healthy and strong; it is worth anything to be restored to good health. There has been nothing whatever to report in my condition that is unfavourable. I have not once been sick (however slightly), but am certainly stouter, and my appetite keeps always normal."

The other I mention as showing that good results are persistent, though, as several x-ray drawings and photographs which I have to show appear to demonstrate, the new stoma alters in its action as time elapses. This case is one of a girl who was operated upon in 1907.

Shortly, the case was one of pyloric ulcer with contraction and consequent gastrectasia. Symptoms had existed for several years; the pain was increasing and emaciation was great. She weighed only 6 st. on admission. Soon after the operation she began to gain weight; the pain disappeared almost directly after it; a year later she had gained 4 st., and she writes now, two and a half years since operation: "I am now better than I ever was in my life, which only serves to prove how successful was my operation."

It is interesting to note the progress of these cases as shown by Roentgen-ray observations. At first the gastric contents pass almost at once through the artificial stoma. In one case observed within eight days (it is difficult to obtain an observation earlier) the bismuthized food went through in large gulps and almost immediately so filled the small intestine that it was impossible to obtain a clear photograph. Later, in the course of two or three months, a time which varies in different cases, only a certain amount passed at once, and then the stomach was contracted, closing the opening, and allowing a clear space to become visible between the bismuth still retained in the stomach and that which had passed through the stoma. It was as if the intestine was able to signal to the stomach when it had received the amount which it was capable of digesting. After a time, also variable, the stoma reopened and allowed still more to pass, closing again when sufficient had entered the jejunum. At a later period in the history of the case the food began again once more to pass by the pylorus, less and less went via the stoma, more and more by the natural passage. At last—at least, in some cases—the original condition of things appears to be re-established. That is the impression produced by a study of these photographs and screen observations. No doubt in many cases, especially if the pylorus is organically contracted, the stoma will always remain the route by which gastric contents will find their way onwards; but, as in those in which ulcer is present, pyloric closure is usually due to spasm, which remains until the ulcer is healed, and relaxes when once that source of irritation is removed, it seems probable that these observations reflect the most common course of events.

A natural consequence of this is the question of closure by artificial means of the pylorus at the time of operation, which has been advised by some operators. I have never done this, for two reasons; no doubt the most startling results for good have been observed when exit by the natural route has been entirely stopped by organic closure, but it is doubtful how far such closure can be imitated by artificial means, or advisable if it can be done. As long ago as the

time of Travers it was observed that any suture applied outside the intestinal wall tended sooner or later to make its way through into the lumen of the gut; but it has been objected by some that this only resulted with the septic sutures in use at that time. An aseptic suture or ligature, it has been said, will remain. Allow me to call your attention once more to the photograph. The inner suture was cat-gut, but the outer was iron dyed silk, and was aseptic when applied as it was to the outer wall of the stomach, yet now it is almost loose in its interior. Asepticity of the ligature would therefore appear to have no effect in preventing this. Mucosa if pressed against mucosa will never unite. Unless the actual mechanical pressure of the ligature can be maintained the ultimate result will be a reopening of the pylorus as soon as the thread has worked its way through the tissues of the gut, leaving behind a linear scar in that opening. If the general tendency is to a *restitutio ad integrum*, is it advisable to produce such a scar, which must always hamper the dilatation of the pylorus whilst unable to close it?

## An Address

ON

# THE TREATMENT OF GASTRIC AND DUODENAL ULCER.\*

BY

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IN the last few years much attention has been paid to the pathology, symptoms, and treatment of gastric and duodenal ulcer. Most of the papers published have been devoted to special aspects of the subject. I propose this evening to review briefly the chief methods of treatment now advocated, most of which I have used in patients under my care, with or without the co-operation of surgical colleagues. I shall not burden you with many figures. The statistics of different methods of treatment are of great value, though figures compiled by different observers must not be compared too closely, because we cannot be sure that in each series the individual cases have been selected under the same conditions or even with the same care. In practice, however, when confronted at the bedside with the problem of treatment, we have to make our choice with a greater regard to the symptoms and circumstances of the particular patient than to the percentage of cures reported to have been established by this method or by that.

One conclusion may be reached from a glance at the published papers advocating the various methods of treating gastric ulcer at the present day—namely, that there is no one exclusive way of dealing with this disease. For there are now several large series of cases treated on divergent principles, all showing a low mortality with a large proportion of successes. In these series we note that when one observer has made use of one method, he has usually attained success; this I interpret to mean that success does not depend upon the particular method so much as upon the care and prudence with which it is carried out. Men do well what they do often.

Gastric ulcers are of two types—acute and chronic. The acute gastric ulcer, occurring in well-nourished young anaemic women, is probably one of the easiest diseases to treat successfully; indeed, so striking is the response to treatment, that the doctor may be said in this disease, if in any, to cure the patient. Chronic gastric ulcer, on the other hand, though seldom fatal when carefully treated, is a more difficult complaint.

### Diagnosis.

Before making up our minds as to the method of treatment to be adopted we must form an opinion as to the existence of an ulcer, how long it has been there, and whether it is in the cardiac or pyloric end of the stomach or in the duodenum. We must then find out whether

\* Read before the British Medical Society.

there have been any previous attacks, what treatment was applied, and with what success. I am not going to speak of diagnosis, but will say that, though there are borderline cases which offer difficulty, in most cases there is but little. Cases of severe hæmatemesis have been described in which no definite ulcer could be found at an operation or *post mortem*. I am now referring to the multiple hæmorrhagic erosions occurring in a number of toxæmic states, such as pneumonia, appendicitis, and anaemia, and in severe gastritis, but to the vomiting of blood in patients with the symptoms of gastric ulcer. Recently Dr. Hale White has described this in this country under the title "gastrotaxis." I shall include such cases of hæmatemesis with gastric symptoms in young people as cases of acute gastric ulcer; in some of them the existence of a little ulcer involving a vessel has been proved by minute examination. I have seen such myself. The great difficulty of demonstrating a small lesion in the rugose lining of the stomach must be remembered. At an operation it is impossible to be sure that a small ulcer or fissure is not present, and after death it is quite easy to miss one, even when the stomach is carefully pinned out. It appears likely that the lesions both in "gastrotaxis" and in gastric ulcer arise from the action of the digestive juice upon disintegrated lymphoid patches. Lymphoid tissue is especially abundant in the stomach of the dyspeptic. Neither from the point of view of diagnosis nor, as we shall see, of treatment, is it of importance whether a small lesion involving a vessel is present or whether such a lesion has proceeded to the stage of a round ulcer.

#### *Rest.*

In accordance with the teachings of the English physicians of the last century, I believe that the most important point in the treatment of gastric ulcer is to ensure complete and prolonged rest in bed. It has been my lot to treat cases in the out-patient department who would not or could not lie up entirely, and to see patients in better circumstances who have remained up and about against advice. Dietetic and medicinal treatment will relieve such but seldom cure them. On the other hand, I have seen cases in bed treated in many different ways with good results. From these observations the conclusion may be drawn that complete rest is a factor without which all other treatment is likely to be disappointing. I have no doubt that the absolute rest and simple diet enforced after an operation has a great part to play in the relief afforded. If operations for gastric ulcer were arranged at the end of three weeks in bed instead of at the beginning they would, in not a few instances, be postponed indefinitely. I need not dwell longer on the importance of rest, and should have not said so much about it did I not know how many people there are walking about with gastric and duodenal ulcers who could be cured if they went to bed for a month or even a shorter time. The rest in bed should be absolute; no getting out or sitting up, and as little rolling over as possible. The indications for complete rest are still more stringent when there has been a recent hæmorrhage; the patient should not move from the supine position for ten days. An ice-bag on the epigastrium helps to keep the patient still; it also diminishes stomach movements and relieves pain.

#### *Dietetic Treatment.*

This must be looked at from the point of view of the condition of the stomach, and from that of the general nutrition of the patient.

The stomach contains an unhealed wound, and very often an eroded blood vessel loosely plugged with newly-formed clot. It also produces an acid digestive ferment capable of irritating the ulcer and dissolving the clot; further, the patients who are most liable to gastric ulcer produce this digestive juice abundantly.

We ought not to speak of hyperchlorhydria, if by that is meant a higher proportion of hydrochloric acid in the gastric juice, because it is probable that the percentage of acid in the secretion never rises much above about 0.4, which may be regarded as a normal figure. When pure gastric juice has been obtained from a fistula in man the proportion of hydrochloric acid has been, as in animals, surprisingly constant.<sup>7</sup> That proportion may be depressed in disease, but the evidence is wanting that it can be much raised.

There are, however, three ways in which the total amount of acid, as distinguished from the percentage, in the stomach may be increased. First, by hypersecretion of juice. This was observed by Pawlow to take place in a dog who developed a gastric ulcer in a small accessory stomach made by operation from the normal stomach. During the formation of the ulcer there was a continuous secretion of three or four times the normal amount of juice.

Secondly, by any interference with the natural discharge of the stomach contents. The pylorus has been shown to open as soon as a certain proportion of free acid is present in the stomach; the time which elapses after a meal before the food begins to leave the stomach will, therefore, vary with the nature of the food. Protein will take up a good deal of acid, and its affinities must be satisfied before acid appears free in the mixture of food and secretion, and stimulates the pylorus to open. Carbohydrate, on the contrary, does not take up acid, and therefore, if the meal is chiefly starchy, the acid of the gastric juice is not neutralized and the pylorus opens earlier. We see, then, that if this mechanism is interfered with, as for instance by an ulcer near the pylorus, which may be supposed to render the musculature of the pylorus unduly irritable, the pylorus would not open at the proper time, and instead of the acid juice passing on into the small intestine to be neutralized, it would accumulate in the stomach. It is probable that such interference with the motor functions of the stomach is often responsible for the so-called hyperacidity.

Thirdly, the total amount and percentage of free acid may be raised by the fermentative production of organic acids. In this way the percentage of total free acid, but not, of course, of hydrochloric acid, may be higher than about 0.4; indeed, the total acidity may be equivalent to 0.6 or 0.7 of hydrochloric acid. Fermentation is most likely to occur as a result of deficient motor activity of the stomach.

The dietetic treatment adopted depends upon the view taken of the relative importance of the above-mentioned conditions in the stomach. If the most urgent requirement is to protect the ulcer from all contact with foreign material, whether fluid or semi-solid, then no food at all must be given by the mouth; if, on the other hand, the harm is done by the gastric juice, then means must be used to prevent its secretion or to neutralize its activity after it has been secreted.

If we could be sure that the withholding of food by the mouth would be followed by the cessation of gastric secretion, the course to be taken would be plain; but we do not know this. It is true that the normal stimulus to the secretion is a meal; but the flow begins before food is sent into the stomach, for the thought of food is sufficient to arouse it; and the hungrier the patient the more likely is such a thought or any stimulus to call forth secretion. Further, I have already mentioned that the ulcerated stomach is prone to hypersecretion of juice; and several observers have reported that the administration of a nutrient enema, which is associated by the patient with the idea of food, does excite the production of gastric juice, and one of them has actually observed this in a patient with a gastrostomy wound.

If, then, we cannot be sure that starvation really secures the ulcer from all irritation, we may turn to see what means may be employed to neutralize the gastric juice and to lessen its secretion. When the etiology of the gastric and duodenal ulcer is considered, it is evident that this course is a reasonable one, for these ulcers only arise in those parts of the mucous membrane which are exposed to the action of the gastric juice. Dr. C. Bolton has shown that the ulcers which follow the injection of "gastrotoxic serum" into the peritoneum in guinea-pigs are not formed if the activity of the gastric juice is arrested by neutralization. It is the digestive power of the acid secretion which is the immediate cause of the ulcer, and appears to be the chief factor in preventing it from healing.

The gastric juice may be neutralized, and thus rendered harmless, by giving protein and by giving alkalis. Both these methods are useful, but the former has the advantage that food is being supplied which, when it has been passed on into the intestine, will be absorbed and nourish the patient.

Another plan which may be adopted is that of mechanically draining off the gastric juice and the food from the stomach by means of a gastro-jejunal fistula. This operation is effectual in cases of ulcers at the pyloric end of the stomach, but it is less likely to be so in those at the cardiac end. I have seen recently a case in which a later operation showed that an ulcer in the cardiac part had leaked and become adherent to the abdominal wall after a gastro-jejunostomy had been performed.

The secretion of juice may be lessened or inhibited by giving fat, which, again, is a valuable food; indeed, from one point of view, that of the heat value, the most valuable of the three foodstuffs.

Leaving now the discussion of the local condition in the stomach, let us consider the general nutrition of the body. This is undermined in many cases by a long period of dyspepsia suffered by the patient before an ulcer had formed or was recognized. Some patients are, however, well covered, but these are commonly anaemic, and anaemia has been shown to delay the healing of ulcers in the stomach.<sup>9</sup> There is no danger to life in withholding food altogether for a few days or even two or three weeks in fairly stout people, provided that fluid is supplied freely. In the emaciated, however, such a proceeding cannot fail to be harmful. It is true that food can be given per rectum, and under favourable conditions about half the needs of the body can be supplied in this way. It is seldom, however, that the absorption of this amount of food can be continued for more than a few days. We must remember that only a part of what is introduced into the sigmoid is really absorbed, and, in the average case, only a small part. We cannot, therefore, regard rectal feeding as anything but a temporary makeshift, valuable though it may be in a few individual cases.

The injection of oil under the skin has been practised, but in the only cases that I have found in which its effect has been estimated by a metabolism experiment, it appeared that but little, if any, of it was oxidized,<sup>10</sup> and in one patient unused oil was found lying in the body spaces after death.

Having briefly discussed the chief considerations which have formed a basis for the methods of treatment put forward at the present day, I will proceed to describe a few of these methods which have been used widely. I will not apologize for detailing them at some length, for they are not described in the ordinary textbooks, and my experience is that they are often carried out imperfectly from ignorance of the details. Of course, no method should be followed blindly, and in particular cases modifications must be made when necessary.

#### *Rectal Feeding and Graduated Milk Diet.*

The plan which has, until recently, found most favour in this country—at all events, in textbooks and in hospitals—is that of deprivation of food by the mouth, with rectal feeding, followed by a graduated milk diet. The patient is kept in bed, and if haemorrhage is recent nothing whatever is given by the mouth—not water nor ice to suck; the mouth is washed out repeatedly with antiseptic solution, and bismuth lozenges are given to suck. An ice-bag is placed over the stomach. A nutrient enema is given three times a day at intervals of six hours. At the fourth injection time the bowel is well washed out with normal saline solution, and, after an interval of half an hour, then a fresh quantity, up to a pint, of normal saline passed into the bowel and allowed to remain. The enemas should be run in slowly with a soft rubber tube and funnel; if greater pressure be used, such as is produced by a syringe, the fluid is likely to be returned. The hips should be raised so that the fluid injected may run by gravity into the colon. The patient must keep still for some time after each injection. The enema recommended by Boyd and Robertson is as follows: The yolk of two eggs, 1 oz. of pure dextrose, 8 grains of common salt, peptonized milk to 10 oz. There is no difficulty in 9 or 10 oz. being retained if it is run in very slowly and the bowel washed out thoroughly every day. In well-nourished people the nutrient enemas may be dispensed with. Enemas of half a pint of normal saline solution are then given every six hours. An intermediate course is to give 7 or 8 per cent. of dextrose in normal saline. The length of time that enemas should be continued is differently fixed by different physicians; some, after a severe haemor-

rhage or with a chronic ulcer, continue them for two or three weeks. Probably ten or fourteen days is enough. After five or six days small quantities of milk may be given by the mouth, say 2 or 3 oz. every two hours, increased gradually to 4 or 6 oz. at a feed. Each feed must be taken slowly in sips. If pain is caused, 10 grains of sodium bicarbonate may be given with the milk. After the tenth day a little bread and milk or milk boiled with flour is allowed and the enemas discontinued. Arrowroot, tapioca, sago, and ground rice are now added to the milk with  $\frac{1}{2}$  oz. of plasmon. Bread and butter, rusks, eggs, and milk puddings follow. After four weeks, or, according to some physicians, not until the sixth week, pounded fish or boiled calves' brains, or very underdone scraped meat is carefully tried.

The advantage of this method is its exceeding caution. The disadvantages are its neglect of the possibility of the irritation of an ulcer by the gastric juice leading to recurrence of haemorrhage; the slowness with which a sufficient amount of nourishment is obtained; and the risk of parotitis from oral sepsis.

Leube has elaborated a diet on similar lines which has had a great vogue abroad. Patients with recent haemorrhages are treated with abundant nutrient enemas for the first three days, but are sometimes allowed a little iced milk by the mouth. After a few days they begin the diet upon which patients without haemorrhages are placed at once. This diet is designed to give a good deal of nourishment with a minimum of gastric work, and is as follows: For the first ten days small quantities of boiled milk, meat extract, soup, unsweetened biscuits. On the fourth day, for instance, the patient receives two and a half pints of milk, six ounces of rusks and some meat extract. A tumbler of Carlsbad water is taken fasting every day. If all goes well, the patient may get up after ten days. In the next seven days gelatinous soups, rice, and sago cooked with milk, raw and lightly-boiled eggs, boiled calves' brains, and boiled chicken and pigeon, without fat or skin, are added. In the next five days the diet is increased by minced underdone beefsteak, potato soup, rice soups, a little tea, and coffee. The fourth diet, from the twenty-second day to the end of the fourth week, contains also tender beef, roast chicken and pigeon, well-cooked venison or partridge, macaroni, and a little white bread. From the fifth week on a return is gradually made to ordinary food. Strauss recommends a similar diet, but gives nothing by the mouth until the faeces have been shown to be free from blood.

Leube's plan is much less exhausting and rigorous than the first described; the patient is taking a concentrated and nourishing diet in a fortnight, and is soon being well fed. The enemas and the graduated milk diet are not carried to an extreme. Leube's régime has been successful in a large number of cases, and the mortality is low. It is open to the same objections as the first plan detailed, though in a less degree. But both the above methods include nutrient or saline enemas, and these are difficult to administer properly unless skilled nursing can be provided. They are also, under all circumstances, strongly objected to by patients and their friends. Indeed, nutrient and saline enemas have never been used in private practice in more than a small proportion of cases. In the majority treatment has consisted of rest in bed on a diet of milk, beginning with small quantities soon after the haemorrhage, if any, has ceased, the amount of milk being increased rapidly in favourable cases. Dr. Saundby in 1891 recommended rectal feeding only for a day or two in cases of haemorrhage. This was followed by 1 oz. of a mixture of equal parts of milk and lime water every hour. Then bread-and-milk and custard were given, and then eggs and pounded chicken, the patient being led to an ordinary nourishing diet as soon as possible. An iron pill was taken daily, and magnesia.

#### *Treatment by Immediate Feeding.*

We may now consider the plan recommended by Lenhartz, which has been on trial for a comparatively short time, but long enough (eight years) for a large number of cases to have been treated by it. I first gave it a trial in 1906,<sup>14</sup> and published a series of cases, with a short review of the literature, last year.<sup>15</sup> The following account of the method is taken from that paper:

The routine of the Lenhartz method is as follows: The patient is kept absolutely in bed for four weeks, for the first two of

which she is not allowed to move from the supine position for any reason whatever. All mental excitement must be avoided. An ice-bag is kept upon the stomach almost continually for the first two weeks. The dietary consists of eggs, beaten up with sugar, or in some cases with wine, and iced; and of milk. These two foods are taken in small quantities at frequent intervals from a teaspoon, the quantity prescribed being spread over the day and not given at definite meal times. The first day 7 to 10 oz. of milk are given, and one egg. The quantity is increased daily by 4 oz. of milk and one egg until 2 pints of milk and six eggs, or in some cases eight eggs, are reached. From about the third to the eighth day raw or almost raw mince is added, starting with 1 oz. in divided doses, either beaten up with the egg or alone; the next day, if the mince is well borne, 2 oz. are given. In my own cases minced beef was used.

From the seventh to the eighth day boiled rice is added, followed by softened bread, and, later, by a small quantity of bread-and-butter. One or more eggs may now be lightly boiled. The diet is then gradually increased by the addition of minced or pounded fish with a corresponding reduction of eggs, until by the end of the fourth week the patient is on an ordinary mixed diet containing the common foodstuffs with the exception of indigestible foods—such as peas or other seeds. The patient is instructed to masticate very slowly. On the twenty-eighth day the patient is allowed to get up, and discharged from the sixth to the tenth week.

For the first ten days bismuth subnitrate is given in doses of 30 grains in water without mucilage twice or three times a day. In my cases, however, the carbonate or the oxychloride was used. From the sixth to the tenth day sulphate of iron is prescribed in the following soft pill:

Sulphate of iron ... ..	150 grains
Calcined magnesia ... ..	20 grains
Glycerine ... ..	1 drachm.

Mix and divide into 60 pills.

Two of these are given two or three times a day. Lenhartz increases the dose gradually, giving three for three days, four for four days, up to ten for ten days, and then down again. In some cases arsenic is added. The bowels are not disturbed at all during the first week unless they are naturally opened. An enema is then given, and repeated every fourth day during treatment. The mouth should be washed out and attended to regularly.

In my own cases I have usually begun with 4 oz. of milk and one egg on the first day, and have seldom given the iron pill more than three times a day.

It is claimed for the Lenhartz method that it is suitable for all forms of gastric ulcer except, of course, those associated with mechanical deformities, such as stenosis of the pylorus and those in which some serious complication, such as perforation, peritonitis, or subphrenic abscess, is present. The sour regurgitation, the vomiting, and the pains and distress after food disappear in from a few hours to a few days. The method has been found successful after recurrent hæmorrhages have occurred on rectal feeding.

The diet introduces an amount of food which soon becomes adequate to the needs of the body. A table is given by Lenhartz in which the calories given per diem are shown to reach nearly 1,600 on the seventh day and 2,500 on the tenth. The actual figures for the first fourteen days are: 280, 420, 637, 777, 956, 1,135, 1,588, 1,721, 2,138, 2,478, 2,941, 3,007, 3,073 calories.

It is important that patients should be kept in hospital some weeks after they have reached full diet, for a case cannot be recorded as cured until not only are there no symptoms, but the percentage of hæmoglobin and the weight are normal. Unfortunately, it is difficult to keep the average hospital patient in after all symptoms have subsided.

The ulcer cannot be regarded as healed until the motions have been free from blood for several weeks. If hæmorrhage persists in small quantities, the attention should be directed to the possibility of cirrhosis or carcinoma. In cases in which the blood test is being regularly made, the mince must be omitted altogether from the diet.

From a comparison of my own series of cases, with a similar number of cases treated by other methods, it was concluded:

First, that the Lenhartz method of treatment is not more dangerous than treatment by nutrient and saline enemata, followed by a graduated milk diet. In these particular cases the recurrence of hæmorrhage was less frequent, and there were no deaths.

Secondly, that the pain suffered by the patient in the course of treatment is less on the Lenhartz diet.

Thirdly, the diet gives far more nourishment than can be introduced into the body by nutrient enemata, and is, therefore, more desirable in patients who have frequently been for a long time in a state of semi-starvation, or have suffered a loss of blood, or both.

Fourthly, that in cases treated by this method rectal injections may be entirely avoided. This is an advantage in a hospital, and a still greater advantage in treating cases at their homes, where rectal injections are not

only regarded as extremely unpleasant, but are seldom efficiently administered.

Gerhardt used the Leube and the Lenhartz methods, and obtained good results with each. This is my own experience. The choice may, then, turn upon convenience, and there is no doubt that the latter method is more convenient.

Whenever the Lenhartz method is discussed, the objection is put forward that it does not seem wise to put food into the stomach immediately after a hæmorrhage. The fact is that such patients do well, and recurrent hæmorrhages are less frequent than in patients treated by other methods. It is extraordinary how some very severe cases have responded to this treatment. Here is an example (from notes by the house-physician, Dr. G. W. H. Carpenter):

M. W., aged 25, a cook, was admitted into St. George's Hospital on August 23rd for gastric ulcer. In the previous two years she had had indigestion several times. On the day before admission she brought up "half a pailful" of bright blood. She was given nothing by the mouth, except a very little water in sips. That evening she vomited 51 oz. of blood;  $\frac{1}{4}$  grain of morphine was injected; and 15 oz. of saline given per rectum, six hourly, one of which contained 10 c.c.m. of horse serum. The pulse-rate quickened, and at 10 p.m. was 132. The next evening a third hæmatemesis of 29 oz. occurred. A little iced milk was allowed, and adrenalin solution administered in 20-drop doses in white of egg. Morphine was again injected, and an ice-bag applied to the epigastrium. For the next two days all went well. A little raw beef juice and horse serum was taken in drachm doses. On the fifth day after the first hæmorrhage a clot, representing about 33 oz. of blood, was vomited. Morphine, horse serum, and rectal saline injections were continued. The next day the fifth hæmorrhage occurred, about 20 oz.; adrenalin in egg-white was given again. The patient was blanched and the pulse 140. The next afternoon a sixth and a seventh hæmorrhage took place, 35 oz. in all. The pulse could sometimes scarcely be felt, and the patient was in an extreme condition. Continuous subcutaneous saline infusion was given. Operation had been discussed, but put on one side on account of its high mortality when performed for hæmorrhage.

At 8 p.m. feeding with milk and eggs was begun, one egg in 4 oz. of milk being given in the next twenty-four hours. No more bleeding occurred. The saline infusion was continued two days longer. The patient made an uninterrupted recovery. Six weeks after admission she looked well, had a good colour, and was able to take all her food without discomfort.

The advocates of the treatment by this method go so far as to say that it is a valuable means of diagnosis, for in cases which do not yield to it cancer or cirrhosis may be suspected, or, in cases without bleeding, neurosis. I have seen this verified as regards cancer more than once.

The Lenhartz method seeks to protect the ulcer by neutralizing the acid of the gastric juice with protein, and by inhibiting its secretion by the fat of the yolk of egg and milk. It has long been known that fats inhibit the secretion of gastric juice, and butter, cream, and bacon fat have been given in conditions of hypersecretion; the work of Pawlow's pupils has established their use upon a scientific basis. Senator with fats prescribes gelatine, with a view of arresting bleeding and sparing protein. He claims that his plan has all the advantages of the old and the new methods without their disadvantages. He orders teaspoon doses of 10 per cent. gelatine in water every quarter or half hour, with an ounce of butter, in small frozen pellets, and 9 oz. of cream in the twenty-four hours. This is followed by milk, beaten eggs, and scraped meat.

Others adopt further compromises by withholding food for two or three days, milk and cream being begun on the fourth day. I find that many of my colleagues follow with success this rule, which differs from that recommended by Dr. Saundby in that a larger proportion of fat is given.

Rosenfeld gives half a litre of cream a day for the first three or four days. This, by diminishing the secretion of acid and causing the pylorus to open, has the same effect, he points out, as gastro-enterostomy. Pain is allayed and bleeding arrested.

#### Oil Treatment.

P. Cohnheim in 1900 introduced the treatment of gastric ulcer by large doses of olive oil. Walko (1902) recommended the oil alone for the first few days in the form of 1 or 2 oz. of olive or almond oil, three or more times a day. I have found this method successful. The great objection

to it is the repugnance which it excites in some patients' and to which I shall refer again under the heading of duodenal ulcer.

In my own experience, very few cases have failed to respond to one or other of the above methods of treatment, if carefully carried out. We read of cases operated upon because medical treatment had failed; this happens of course, but it need not happen often. Any form of milk diet is regarded by some surgeons as efficient medical treatment, whether it was applied strictly with due attention to absolute rest, and to the quantities taken, or not. The fact is, just as much care and attention both to principles and to details should be given to the medical treatment of a gastric ulcer as are necessary to the performance of an aseptic operation. It is not enough to say, Rest as much as you can, and feed upon slops.

#### *The Arrest of Haemorrhage.*

The most important measure is absolute repose. Surgical aid during haemorrhage is not to be recommended, the mortality being greater than when no operation is done. Bleeding from the stomach is seldom immediately fatal; the patient may, however, die in a few days from exhaustion. An ice-bag is placed upon the stomach to cause contraction of the stomach wall; it also keeps the patient still, since any movement tends to dislodge the bag. Morphine is given subcutaneously in doses of  $\frac{1}{4}$  grain; atropine is also recommended. Many styptics have been used; the most valuable is adrenalin, in doses of 30 drops of a 1 in 1,000 solution. I have given this in a little egg-white, with the view of the protein taking up any gastric juice that may be present. No styptic can be expected to arrest haemorrhage from a large vessel. The bleeding goes on until the fall of pressure in the arteries allows a clot to form; the aim of treatment must then be to ensure that the clot is not dislodged by the rise of pressure caused by movement, or by direct movement of the stomach, or from digestion of the clot by gastric juice. Horse serum is also given. Some physicians have used large doses of bismuth in haemorrhage.

#### *After-Treatment.*

The after-treatment of cases of gastric and of duodenal ulcer is of great importance, owing to the tendency to recurrence. The teeth of the patient must be kept in order and the food well masticated. Alcohol is best avoided; if taken at all it must be in a very weak solution. Sternberg has shown that concentrated alcohol promotes the formation of ulcers in animals. No vinegar should be allowed. Dr. C. Bolton found that 0.5 per cent. acetic acid favoured the extension of "gastro-toxic" ulcers of the stomach; vinegar is a solution of eight times that strength. Strong spices, peppers, and irritants of all kinds must be prohibited. Foods containing small indigestible particles, such as seeds and stringy fibres, should be avoided. The patient must not take aerated waters, which are likely to distend the stomach unduly. If tea is taken, it should be China tea, very weak, and only once a day. All bland and non-irritating foods may be recommended, and especially cream and butter, gelatinous soups, and soft, well-chewed fish, meats, and farinaceous foods.

#### *Indications for Operation.*

What are the indications for operation? Perforation, of course, pyloric stenosis, or other mechanical deformities. If the symptoms, and especially severe pains, do not yield to treatment, and recur more than two or three times, I advise gastro-enterostomy, particularly if there is reason to suspect a chronic ulcer at the pyloric part of the stomach. The operation gives relief just as does appropriate medical treatment, and the relief is often persistent. The symptoms may, however, recur after operation, as they may after other treatment. I have seen a number of such cases—indeed, considering that only a small proportion of cases are operated upon, a striking number. It must be remembered, however, that as I do not recommend operation until medical treatment has been followed by recurrence, only the more resistant of my own cases have been passed on to the surgeon. If every case diagnosed as gastric or duodenal ulcer is operated upon without delay, as is the practice of some surgeons, no doubt much more uniform success may be obtained,

though a great many unnecessary operations will be, and indeed are, done.

It appears that a gastro-enterostomy is not likely to be so efficacious for a cardiac as for a pyloric ulcer, since it cannot prevent food and gastric juice from passing over the cardiac part of the stomach. In such cases it is advisable that the ulcer be tucked in at the operation whether a gastro-jejunosomy be done or not. Clairmont in Vienna, at v. Eiselsberg's clinic, noted in a large series of cases that the nearer the ulcer was to the pylorus the more favourable was the effect of gastro-enterostomy.

My own experience is that the cases which are refractory to careful medical treatment are sometimes the same to surgical treatment. It is well, therefore, not to promise the patient too much. In Clairmont's series 52 per cent. were cured and 15 improved, leaving 33 per cent. of less satisfactory results.

A certain number of cases have a palpable tumour in the epigastrium. These masses are not necessarily carcinomatous, but nevertheless an operation should always be done to ascertain whether they are or not. Here is such a case:

A woman of 35, a patient of Dr. Atkinson, of Catford, suffered for months from gastric symptoms in spite of treatment. A mass formed in the epigastrium. Mr. English opened the abdomen at my request, and found a large bossed tumour at the pyloric end of the stomach. A gastro-jejunosomy was done and a piece of the mass removed for microscopical examination. It proved to be inflammatory. That is eighteen months ago, and the last report is that the mass is much smaller, and the patient enjoys good health and can walk for miles.

Such cases may recover without operation, as did a patient whom I saw three years ago:

An elderly gentleman had a hard tumour in the upper abdomen associated with gastric symptoms. Two or three medical men had made a diagnosis of carcinoma, and in view of his extreme emaciation and anaemia and the extent of the tumour, I could not dissent from that view, and did not advise an operation, but contented myself with instructions as to a non-irritating and nourishing diet, with large doses of bismuth. The patient, to the surprise and gratification of all, made a good recovery and is well now.

It is important to take out a piece of the growth, and not only a gland. I have known an enlarged gland reported benign whilst the mass was a carcinoma. In another case, a male, presenting almost the same symptoms as the young woman referred to above, the piece of growth taken out was malignant. A second operation was then performed by Mr. English, who excised the major part of the stomach, sewing up the duodenum. The patient recovered, grew fat, and was well a year later. Shortly after this, however, he put an end to his life. His medical man, Dr. Mayston of Erith, reported that he had had severe headaches, and these may have been due to a recurrence in the cranial cavity.

#### *Treatment of Duodenal Ulcer.*

We owe a great deal to the Mayos in America and to Mr. Moynihan in this country for their enterprise in opening the abdomen in patients suffering from this complaint, and thereby enabling us to diagnose the disease with much more accuracy than formerly. The patients who have been thus operated upon should also receive the gratitude of the profession for their contribution to an important new chapter in experimental medicine. Provided that the patient is willing to submit to proper medical treatment and to rest in bed, duodenal ulcer is, in the large majority of cases, easily curable. Many mild cases may be cured by giving bicarbonate of soda in 20-grain doses when the pain comes on, and prescribing a bland fatty diet. Here is an example:

R. R., male, aged 45, ill for two months, sought advice on April 23rd, 1909, for bad pain occurring three to four hours after a meal, relieved by food. Two years before he had vomited some blood. The bowels were only opened every second or third day. A week later black motions were passed. On May 7th he was better. The motion contained no blood either to the eye or to chemical tests. On May 18th there remained a slight pain only before meals. On June 11th he reported that he had had no pain for a fortnight and felt well. I have just heard from him, after nine months, and he has had no return of the complaint. This patient was treated simply by a diet containing abundance of milk, eggs, butter, dripping, with milk and eggs alone for the first few days. A mixture containing 20 grains of sodium bicarbonate was ordered to be taken when the pain came on. He rested in bed only for the first few days.

As a rule, however, the patient should be entirely in bed and should be treated like a gastric ulcer. Duodenal ulcers are of the same nature as gastric ulcers, in that they occur in that part of the alimentary tract which is exposed to the gastric juice before its acid is neutralized by the bile and pancreatic juice. Cases of duodenal ulcer do well on the Lenhartz diet; did time permit I could quote a considerable number. I often combine with it  $\frac{1}{2}$  oz. of olive or almond oil three times a day, following the method introduced by Cohnheim and by Walko, and advocated by Dr. Hertz. On this plan  $\frac{1}{2}$  oz. of oil is given every three hours and increased to 1 oz. or 2 oz. Nothing else is given, except water for thirst, until there is no blood in the stools. Cream is then given, and the foods of the Lenhartz diet are added gradually, but not the rice. The oil is now reduced to 1 oz. before each meal.

I have tried this method thoroughly, and can recommend it for patients who will endure it, and not a few will. To others it is exceedingly nasty, and fails on that account. Whenever retching or vomiting is caused the treatment should be altered. If the patient does not respond to one or other form of dietetic treatment, the possibility of the symptoms being due to gall stones must be carefully reconsidered.

The indications for operation in duodenal ulcer are the same as in gastric ulcer. It is to be noted that a proportion of cases of ruptured duodenal ulcer have had no premonitory symptoms. As in gastric ulcer, a certain number of cases relapse after operation—25 per cent. in 28 cases operated on by Drummond and Rutherford Morrison and 15 per cent. in the series recently published by Mr. Moynihan, which includes many cases that cannot be regarded as severe. If those surgeons who advocate surgical treatment as a routine could do a year or two's work on the medical side of a hospital, they would learn that many cases get well as out-patients, and most of the remainder as in-patients, with rest and dietetic treatment.

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## DOES GASTROSTAXIS EXIST AS AN INDEPENDENT DISEASE?

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It is well known that profuse haemorrhage may occur from the mucous membrane of the stomach apart from gastric ulceration. For example, in severe anaemias, in infective disease, in purpuric conditions, and in toxæmias associated with diseases of the liver and kidneys, it is a common experience to find the mucous membrane of the stomach intact when vomiting of blood has occurred during life.

In the condition known as gastrostaxis, however, there is said to be an oozing of blood from the mucous membrane of the stomach not only in the absence of any ulceration of that organ, but also in the absence of any other disease in which bleeding is likely to occur. Gastrostaxis is also said to possess a definite clinical history simulating that of gastric ulcer—namely, pain, vomiting, and haematemesis occurring in attacks in either sex, but

especially in young females. It seems to me that the actual existence of gastrostaxis as a common clinical entity is hardly established on a sufficiently sound basis, and that it is extremely important for the question to be definitely decided one way or the other, because it is obviously absurd to treat a case of gastrostaxis by operation, whereas in the haemorrhage of gastric ulcer life may often be saved by timely operative interference.

For some time my attention has been particularly directed to the difficulties in the way of proving that this disease exists, and my object in writing this paper is to emphasize these difficulties and to encourage others to pay especial attention to the condition of the stomach at all *post-mortem* examinations of patients who have died of haematemesis. I am continually on the look-out for cases of gastrostaxis, but have never yet encountered such a condition on the *post-mortem* table, in all cases having found one or more acute gastric ulcers.

The evidence that gastrostaxis exists is threefold, namely: (1) That at certain *post-mortem* examinations of patients who have died of haematemesis no lesion has been found in the stomach to account for the bleeding. (2) That at certain operations performed upon such patients an ulcer has not been found. (3) That gastrostaxis possesses a definite clinical history. I shall critically examine each of these statements in turn.

Haemorrhage from the mucous membrane of the stomach is due to one of two pathological conditions:

1. There is some lesion of the walls of the blood vessels, allowing of the escape of blood, which breaks through the surface of the mucous membrane into the cavity of the stomach. There are two distinct conditions of the mucous membrane produced:

(a) If the haemorrhage be profuse enough to kill the patient it is quite common to find at the autopsy multiple erosions of the mucous membrane. These erosions are quite superficial, the bases of the glands being preserved, and form slight depressions in the surface of the mucous membrane as if the latter had been lightly rubbed off with the finger. When the stomach is hardened in formalin they can hardly be seen by the naked eye unless there be any altered blood adherent to them, but they are easily recognized microscopically. These erosions are of no importance, except that they may help to keep up the bleeding, and they do not develop into ulcers because the stomachs of such patients are kept in the resting condition, the secretion of gastric juice being therefore at a minimum, and secondly, the gastric cells themselves are healthy, and there is no tendency towards their further digestion by the gastric juice.

(b) If the haemorrhage be not profuse the condition found after death, which is always due to the primary disease, is one of multiple small or large interstitial haemorrhages into the mucous membrane, with perhaps a little coffee-ground material in the cavity of the stomach. Such interstitial haemorrhages appear as black patches on the inner surface of the stomach, which on microscopic examination are seen to be portions of mucous membrane infiltrated with blood which has not escaped externally. These haemorrhages cause no symptoms, and the patient is fed in the usual way, with the result that the stomach is actively digesting, and the infiltrated patch of mucous membrane is digested owing to the destruction of the gastric glands, and removed, leaving an ulcer. These two pathological conditions occur quite independently, and constitute two distinct types; but there is no doubt that at the same time one may see all transitions and combinations in different cases.

2. The haemorrhage is a secondary event resulting from ulceration of the mucous membrane. The ulcer is the primary condition and the haemorrhage due to a secondary opening up of a blood vessel. There is a great deal of confusion with regard to the conception of what is an erosion and what is an ulcer, and the two names are sometimes applied to precisely the same condition.

Both the terms "ulcer" and "erosion" imply a loss of substance, and when the lesion is once formed, there can hardly be a clear distinction between them, the difference being only one of depth. From the point of view of morbid anatomy, therefore, an erosion may be regarded as a superficial ulcer.

From the point of view of general pathology, we are not yet in a position to formulate precise definitions of these