A Hunterian Lecture

ON

SOME PROBLEMS OF GASTRIC AND DUODENAL ULCER.

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BY

SIR BERKELEY MOYNIHAN, Bt., K.C.M.G., C.B.,
F.R.C.S.,SENIOR SURGEON, LEEDS GENERAL INFIRMARY; PROFESSOR OF
CLINICAL SURGERY, UNIVERSITY OF LEEDS.

A BACKWARD look over a few years in the course of a man's life may be of great value. It is very necessary for the surgeon, whose opinion and whose practice can rarely stay unchanged. For he is one who must always be in eager search of a sounder judgement, or a better method; reluctant to abandon any well proved conclusion or trusted procedure, he will yet remain quick to give the fullest consideration to all the lessons that increasing experience may seem to teach. To review our own work is a very stern and salutary discipline. It will make clear the need to correct the impressions, often vague and sometimes very treacherous, which have been gained rather from the occasional dramatic occurrence than from the tranquil observance of a daily and placid routine; it may confirm our faith in convictions which have slowly grown, and strengthened almost imperceptibly; it will lead us to test once again an opinion not quite so impregnable as we had thought. The correlation of many incidents, apparently unrelated at the scattered times of their occurrence, will provoke a new inquiry or reveal a truth which lay buried deep. From a long array of cases we can glean knowledge that the single case can never disclose. The years certainly teach much that the days never knew.

For the purpose of this address I have passed in review my experience during the last ten years in the treatment of diseases of the stomach and duodenum. The literature of this subject is already formidable in volume, but unhappily its value is by no means proportionate to its bulk. The foundations of most of it are unsound. The present generation of physicians and surgeons are not wholly to blame. We have come into a deceptive inheritance; a large part of what we thought was gold has proved to be tinsel, the authority of a great name alone bestowing any interest upon it. Here at least we may agree with Damascenus, that "without exquisite knowledge, to work out of books is most dangerous."

In the older literature there is, however, much of great value. Matthew Baillie, Cruveilhier, Brinton, and a very few others may be read with interest and profit to-day. After them came a host of authors nearly all of whom taught what has proved to be rank error in connexion both with gastric and duodenal ulcer. Gastric ulcer was held to be a common disease, diagnosed with ease if certain symptoms were present. Of duodenal ulcer almost nothing was known; its occurrence was held to be very rare, its diagnosis difficult or unattainable. In the literature of the hour a great deal has still to be taken on trust. And we shall never arrive at the truth about these diseases until we refuse to accept anything on trust—until we decide, for example, that when we speak of a case of "gastric ulcer" we really do know that an ulcer is present. Not all even of the surgical literature of to-day will stand that simple test.

A definition of terms is necessary. I hold that a "chronic ulcer," whether of the stomach or of the duodenum, is a visible and palpable lesion which has existed for months or years. In it are seen clearly the evidences not only of destruction but of stubborn defence; there is a crater of varying size; in depth the ulcer involves at least the muscular coat, and may extend completely through all the coats, an acute perforation being prevented only by the firm adhesion of the ulcer to a neighbouring structure, which then forms its base. Such an ulcer is the cause of symptoms the chief character in which is the tendency to show intervals of freedom between attacks of pain. The cause of the symptoms is not the ulcer alone, for in the intervals of freedom the inert crater of an ulcer is still to be seen; and open ulcers are found *post mortem* in those not known to be suffering immediately before death from any symptoms of dyspepsia. It seems possible that an ulcer in the perfectly callous state does not provoke any symptoms until the time when there is renewed activity in the ulcerative process at a

part of the circumference of the crater. Activity and apathy of the ulcer are in this way the cause of exacerbation and remission of the symptoms. Transient attacks may be due also to the development of a number of acute ulcers round about the chronic ulcer or in an area of the stomach apposed to it. The breaking down of a healed scar has been seen in a small number of cases. Acute infections elsewhere may rouse activity in a dormant ulcer. The term "acute ulcer" is used to describe a condition in which chaps, fissures, erosions, or extensive surface destructions of the mucosa, or even of deeper layers, are found. There is often clear evidence of an impediment to the vascular supply resulting in a defenceless area, of which the gastric juice makes haste to take advantage. The ulcers thus arising develop rapidly often as terminal events, in consequence of a very heavy infection or a grave toxæmia, and they probably heal very rapidly. Their clinical importance is generally apparent only when hæmorrhage or perforation occurs, though a profound dislike of food, severe epigastric pain and vomiting controlled with difficulty, are to be attributed, in cases of acute septic disease, to the gastric erosions which are found on *post-mortem* examination. Acute ulcers are multiple; it is possible that a chronic ulcer begins in one of the acute ulcers that refuses to heal. We do not know any clinical symptoms which indicate the transition from an acute to a chronic ulcer, assuming such a change to occur. It is the chronic ulcer in the stomach or in the duodenum which is the cause of severe, protracted, and recurring attacks. It is with chronic ulcer alone that the following remarks are concerned.

The number of cases here reviewed is 718. These were as follows:

- 531 cases of duodenal ulcer (men 433, women 98).
- 164 cases of gastric ulcer (men 83, women 81); in 152 cases one ulcer was present, in 12 cases two or more ulcers.
- 23 cases of gastric and duodenal ulcers together (men 10, women 13).

In the total number of cases of gastric ulcer (187) a duodenal ulcer was found therefore in 12.3 per cent.

The last death from any operation for duodenal ulcer occurred in 1912; there have been over 500 consecutive cases without a death. Among the total number of patients operated upon for duodenal ulcer there were 6 who later developed jejunal ulcers. The mortality in cases of gastric ulcer, and gastric and duodenal ulcer, treated by gastrectomy is 1.6 per cent. A few cases have been treated by other methods to be mentioned later. In every case included in this review an ulcer has been seen and demonstrated. It is an essential preliminary to call attention to this fact, for so much of what is written is based upon opinions as to what may be present rather than upon certain knowledge of what in truth is present.

There is creeping into the literature of this subject the term "juxtapyloric" as applied to ulcers. It is an entirely unnecessary term; its use indicates loose thinking and will lead to great confusion. An ulcer is either in the stomach or in the duodenum. In the series of cases which I am now reviewing there have been three only in which there was any doubt as to the exact position or origin of the ulcer. The pyloric vein or veins and the pyloric white line indicate with quite sufficient clearness the separation between the stomach and the duodenum. A duodenal ulcer is almost always half an inch or more from these landmarks, though it may extend up to them, or even beyond them into the stomach. A gastric ulcer is very rarely within an inch and a half of the pylorus; it is with the fewest exceptions two inches or more from the pylorus, and is oftenest found on the lesser curvature or the posterior surface or both. A pyloric ulcer, an ulcer beginning exactly at the pylorus, is excessively rare. "Pyloric stenosis" is virtually always duodenal stenosis. For the term "juxtapyloric" there is no justification; its use betrays a lack of knowledge of the conditions found when the parts are inspected during life; it is a peg upon which to hang the half-truths.

The chief clinical symptoms of ulcer of the stomach are pain, vomiting, and hæmatemesia, and of these the really important one is pain. The supremely significant feature with regard to the pain is its punctuality. In the same patient after the same meals it appears with the most exact regularity after the same interval of comfort. If a breakfast is taken at 9 a.m. and pain appears at 10 a.m. on one day, the same breakfast on all other days will be followed by the same hour of comfort and the same appearance of pain at the due moment. A time-table of one day, then, fits any other day.

Far less attention than it merits is given to a searching analysis of a day's routine. A patient will not seldom tell you he can "set his watch" by the time incidence of his suffering. The periodicity of the pain is, of course, altered by variations in the quantity and quality of the food and by the irregularity of meals. A point which is well worth attention concerns the rhythm of the pain. In cases of gastric ulcer the pain which, after an interval, follows the taking of a meal gradually disappears before the next meal. In cases of duodenal ulcer the pain continues until the next meal, or until food is taken to give ease to a wearisome pain. The rhythm of gastric ulcer is "food, comfort, pain, comfort," and then again food, comfort, pain, comfort; of duodenal ulcer it is "food, comfort, pain," and then again food, comfort, pain—a quadruple rhythm in the former disease, a triple rhythm in the latter. In my series of cases pain appeared within one and a half hours in 3 cases out of 5 of gastric ulcer, and after two hours in 4 cases out of 5 of duodenal ulcer. Seasonal variations are common in duodenal ulcer, less noticed in cases of gastric ulcer. The occurrence of haematemesis is often held to indicate with great probability the presence of a gastric ulcer. Haemorrhage in formidable quantity cannot occur apart from a considerable lesion of the stomach, oesophagus, or duodenum. In the stomach such a lesion may be a chronic ulcer or an "acute" ulcer. In years gone by, when operations were performed as mistaken efforts at rescue work in cases of copious haematemesis, the mucous membrane was often seen to be studded with tiny points from which blood was steadily trickling—the stomach "wept blood." The blood came from multiple points of acute ulceration. If a patient has so large a haematemesis as to cause death, and if the cause of the bleeding is the erosion of a vessel in a gastric ulcer, a chronic ulcer will be found far more often than an acute ulcer. So many cases of haematemesis are due to the toxæmia of appendicitis or other grave infections, to cirrhosis of the liver, and to splenic anaemia, that no hasty conclusions as to the presence of a chronic gastric ulcer may be drawn from the occurrence of this symptom. In cases of duodenal ulcer both haematemesis and melaena may occur; the latter is almost invariably in excess of the former in quantity and frequency.

A very close scrutiny of all the details of the clinical history allows a diagnosis of duodenal ulcer to be made with a considerable degree of confidence. There should always be hesitancy in making a diagnosis of gastric ulcer. A duodenal ulcer is far more common than a gastric ulcer, and therefore when an "ulcer history" is elicited, a suggestion that the ulcer lies beyond the pylorus has the greater chance of accuracy, since probability is the very guide of life. But there is more to be considered than that. There are so many conditions having their origin elsewhere, within the abdomen or outside it, that are expressed in terms of gastric discomfort that even the most searching analysis of all symptoms may leave us unconvinced that a structural lesion in the stomach is present. I may perhaps sum up my experience of the clinical diagnosis of these two conditions by saying that when, with great confidence, I make the diagnosis of duodenal ulcer from the clinical history alone, I feel wounded and amazed if I prove wrong; whereas when, with a sense of pride in my courage, I make the diagnosis of gastric ulcer, I feel very contented, even a little elated, if I prove right. We turn, therefore, eagerly in all cases of gastric ulcer to other methods of examination in the hope of greater enlightenment.

Of all ancillary methods of diagnosis that of the radiologist should be of greatest value. In the diagnosis of gastric ulcer it has pride of place; in competent hands it is far more accurate than any other method of diagnosis, clinical or chemical, or than all other methods combined. It is, indeed, so trustworthy that unless a diagnosis of gastric ulcer made upon clinical evidence is confirmed by the radiologist it should rarely, if ever, be accepted. There are, indeed, only two certain and unequivocal methods of making a diagnosis of gastric ulcer—that of the radiologist and that of the surgeon. Unless a gastric ulcer is seen we can never be quite confident of its presence. We must walk by sight and not by faith. I think it is quite true to say that no merely clinical diagnosis of any condition is so apt to be fallacious as is that of "gastric ulcer." Yet cases are met with very frequently in which this diagnosis has been made upon the flimsiest clinical evidence. When such a diagnosis becomes the warrant for medical treatment, when such treatment is expanded into a "system," and when the statistical results of such systems

are offered for our consideration and respectful admiration, we cannot but feel aghast at the mountain of falsity which looks so imposing and is in truth so unreal. Until we have learnt far more than we know at present, might we not resolve to apply the term "gastric ulcer" only to the cases in which the diagnosis is certain, and to judge of the efficacy of therapeutic methods, and of the pathological destiny of the lesion, only in such proven cases?

The radiological evidences of an ulcer have been fully described by Carman and others. The niche or accessory pocket has been well seen in exactly one-third of our cases; the abiding spasm of a zone of the stomach, the "notch" on the greater curvature, seen with or without the crater, indicates just as certainly as the niche the presence of an ulcer. The condition of the stomach in respect of its general muscular tone is now always observed; it is interesting to find that the orthotonic, the hypotonic, and the hypertonic types occur with exactly equal frequency in cases in which a gastric ulcer has been proved to exist. In cases of duodenal ulcer an orthotonic condition was found in 44 per cent., a hypotonic in 24 per cent., a hypertonic in 32 per cent. Deformities of the duodenal bulb are as certain an evidence of ulcer as are the niche and notch in cases of gastric ulcer. When stenosis has resulted from the firm healing of an ulcer, whether in the stomach or duodenum or both, the radiological examination reveals the clearest proof of the conditions present.

An additional method of inquiry which we follow in the great majority of cases consists in the examination of the gastric contents by the fractional method of Rehfuß. In my earlier experience I had several hundreds of cases examined after an Ewald test meal, but I found that so little helpful information was given at so great an expense of time and trouble, both to the patient and to ourselves, that I was glad to abandon the procedure altogether. The new method, which we have used for over a year, is more rational and has been most informative. The following table shows the results obtained, the classification of the six grades of acidity being that suggested by Dr. J. R. Bell of Melbourne, to whom I am indebted for a part of this work.

Results of New Method of Examination of 110 Cases of Ulcer.

	Gastric Ulcer (39 Cases).		Duodenal Ulcer (71 Cases).	
	No. of Cases.	Per Cent.	No. of Cases.	Per Cent.
Achlorhydria	5	13.1	4	5.5
Hypochlorhydria	6	15.7	3	4.1
Low normal	7	18.4	9	12.8
Normal	13	34.2	4	5.5
High normal	6	15.7	17	24.2
Hyperchlorhydria	2	5.2	34	48.5
Curve with terminal ascent	1	0.2	21 (in 45)	46.6
Stomach empties—				
Within 2 hours	7	18.6	20	28.5
Between 2 and 3 hours ...	12	31.5	35	50.0
Over 3 hours	18	47.3	16	22.8

It will be noticed that only 20 per cent. of the cases of gastric ulcer show a high normal curve or hyperchlorhydria, whereas the percentage of such changes in cases of duodenal ulcer is 72.7. The most characteristic feature of the chart in cases of duodenal is the "terminal ascent," yet this was present in less than half the cases. Delay in emptying the stomach was conspicuous in both groups. The rapid emptying of a hypertonic stomach when the test meal showed hyperacidity or a high normal curve was found in 6 cases only of duodenal ulcer, and in one case where there was a small gastric ulcer high on the lesser curvature.

To compare with this table I show another compiled from the records of patients referred to me as probably suffering from gastric or duodenal ulcers. In none was any ulcer discovered, in 2 cases a hypertonic stomach emptied rapidly and the Rehfuß chart indicated hyperchlorhydria, in one a similar gastric condition was associated with a low normal type of acidity.

23 Cases of Chronic Infection within the Abdomen, including Cases of Appendicitis, Tuberculous Disease of Intestine or of the Mesenteric Glands, all Clinically Resembling Gastric or Duodenal Ulcer.

	Cases.	Per Cent.	
Achlorhydria ...	3	13	
Hypochlorhydria ...	8	34.7	
Low normal ...	5	21.7	
Normal ...	6	26	
High normal ...	—	—	
Hyperchlorhydria ...	1	4.3	4.3
Curve with terminal ascent ...	3	13	
Stomach empties—			
Within 2 hours ...	4	17	
Between 2 and 3 hours ...	12	52	83.0
Over 3 hours ...	7	31	

Let us assume that a diagnosis of gastric or duodenal ulcer has been made with great confidence. The question will at once arise as to the method of treatment that has now to be adopted in order to relieve the patient of his symptoms, and finally to remove the grave peril to his life which the disease undoubtedly threatens. There has been great strife between physician and surgeon over this matter—strife in which I must confess to the most languid interest. I claim that I rarely offer advice to patients. My endeavour is to present a case for consideration, to discuss the probabilities of diagnosis and the reasons for and against any method of treatment, whether medical or surgical. Being a physician doomed to the practice of surgery, I feel no desire to press one method or another, and I most earnestly seek to put the whole problem before the patient as I should put it before myself or before anyone near and dear to me. I ask a patient to assume—what may prove to be inaccurate in the case now for discussion and decision—that my diagnosis is right, and that he has an ulcer in the stomach or in the duodenum. The relative advantages of medical or surgical treatment are then to be considered.

In all the cases that come for judgement symptoms have been present for years. During the last ten years the average duration of symptoms has been seven and a half years in cases of duodenal ulcer (excluding the perforation cases, when the duration is shorter), and nine and a half years in cases of gastric ulcer. Every patient has been treated by a medical man in one or in many of his "attacks"; medical treatment has helped greatly to relieve the pain and to curtail the attacks, but a period of repose has been followed at greater or less length by one of renewed and perhaps fiercer activity. Medical treatment, then, has failed in its essential aim, the permanent healing of the ulcer. And there is some reason to fear that it will inevitably fail in a majority of the cases. Anyone who knows the appearance which a chronic ulcer of the stomach or the duodenum presents at the time of operation will realize how considerable an event it must be for sound healing to take place, and how prone the large and deep scar which so results may be to break down under a provocation that the normal stomach would perhaps easily resist. That healing does sometimes take place is shown by the discovery of sound firm scars in the *post-mortem* room. It is evident that to ensure complete cicatrization of the ulcer the greatest care must be exercised from the first, and be scrupulously and unremittingly continued over a prolonged period.

The medical treatment of these conditions is too often haphazard and perfunctory. So far as hospital patients are concerned I think it is hardly possible to ensure that they shall receive adequate treatment over a sufficiently long period. No hospital can afford to keep them as in-patients, and as out-patients they prove careless, and are unable to observe, or willfully disregard, the instructions as to rest and diet that are given to them. In private practice few patients seem willing to surrender themselves whole-heartedly to treatment, and especially to what appears to be a wearisome prolixity of supervision long after symptoms have completely disappeared. I should suppose that a great many weeks in all cases, and perhaps many months in some cases, must be passed in bed, on a restricted diet, appropriate drugs being duly administered, before an ulcer with a large surface, a deeply excavated crater, and a hard unyielding edge, can have any chance to heal.

It is important to remember that the subsidence of symptoms often noticed very shortly after treatment has begun does not indicate the healing of the ulcer; for every surgeon knows, as I have said, that in operating after an "attack" has subsided, an open ulcer crater may be found. Treatment must therefore continue long after all pain has disappeared. In the operation I sometimes practise for irremovable gastric

ulcer—that is, gastro-enterostomy combined with jejunostomy—the patient is fed through a tube which passes directly into the jejunum, and no smallest quantity of food, solid or liquid, is given by the mouth. The healing of the ulcer is watched by screen examination with the x rays. It is always very slow—it has varied from six months to three and three-quarter years. A longer period, we must suppose, will be demanded if food even of the blandest kind is taken by the mouth, for the contact of food with the raw surface of the ulcer, the retention of particles of food in recesses of the crater, and the active movements of the stomach, especially if the ulcer is adherent, are all incidents likely to retard the deliberate processes of healing.

Before treatment begins a general survey of the patient must be made, especially in reference to the existence of sources of infection in the mouth and the accessory sinuses. I never operate upon a case of gastric or duodenal disease until the dental department is satisfied that there is no infection remaining in the mouth; a great deal may require to be done before this result is assured, but whether we regard the risk of the anaesthetic or the diet after operation, it is a most essential preliminary.

Most of the "systems" of medical treatment have as a very essential part the administration of alkalis. The "Sippy" method includes the frequent administration of alkalis by the mouth, and the practice has been carried to an extreme which in a very few instances appears to have been harmful. It is interesting to note that in nearly 50 per cent. of our proved cases of gastric ulcer the Rehfuß chart has shown a subnormal curve, in nearly 35 per cent. a normal curve; in only 5 per cent. was hyperchlorhydria present. Has the practice of the administration of alkalis originated in a desire to neutralize the "acidity" of which the patient sometimes complains, although it may chance that he has an amount of free hydrochloric acid less than the normal? Or is it based upon the chemical examination of the stomach contents of patients who are only said to have "gastric ulcer," and not certainly known to have one? The great discrepancy which exists between the alleged frequency of gastric ulcer in practice and the known rarity of the disease upon the operation table is a reason for accepting the diagnosis with most cautious hesitation in large numbers of cases. If that hesitation is justified, much of the medical treatment of "gastric ulcer" is being applied to quite different diseases. I would like to ask whether an "acid" treatment of gastric ulcer would not be more rational than an "alkaline" treatment. The cells of the gastric mucosa are born, live, thrive, and, in due course, perish in an acid medium. In cases where a gastric ulcer has been proved to exist a diminished acidity is far more common than an increased acidity. If the result of the administration of the alkali is to provoke a later acid response (this is certainly true of sodium carbonate in particular) then the treatment is rational; but this, I understand, is not the ground upon which the alkaline method is based. And I would further ask why the medical treatment, including the giving of alkalis, is the same in cases of duodenal ulcer as in cases of gastric ulcer. The chemical conditions in the two diseases are quite dissimilar.

VALUE OF MEDICAL TREATMENT.

The position with regard to the value of medical treatment appears, then, to be as follows:

I.

Medical treatment, scrupulously undertaken, will almost invariably and with great rapidity cause an alteration in the gravity of the symptoms; the patient will quickly lose the severe pain from which he has suffered, and will begin to wish for, and find himself freely able to take, those simple foods which are most easily digested and easily propelled. The "attack" may be brought to an end within a very few days in the case of duodenal ulcer, and within two or three weeks even in the case of those most recalcitrant gastric ulcers which have intermittently caused symptoms for many years. So far as I have been able to tell from an examination of the specimens removed by operation symptoms disappear as soon as an ulcer shows any evidence of healing; the ulcer, though still large and unhealed, becomes "latent."

Medical treatment must, however, necessarily be carried out, not only in ignorance of the exact conditions present in any ulcer, for not even the most expert radiologist can tell us all that we are eager to know, but also in ignorance of the associated and possibly causal infections present within the

abdomen. In this series of 718 cases I have removed the appendix 307 times, and the gall bladder 23 times. In more than 50 cases the gall bladder, or the appendix, or both, had been previously dealt with by operation. In many of the cases in which I have removed the appendix I have felt that its obvious and sometimes gross disease antedated the development of the ulcer or ulcers in the stomach or duodenum, and I have consequently regarded it as a primary source of infection. An occasional case has seemed to give support to the view of Arbuthnot Lane, that the colon plays a part in the causation of gastric disease; and in a few cases the very loose and overfull ascending colon has tempted me to follow the practice of Waugh and to fix this part of the bowel by his method to the posterior abdominal wall.

The interrelationship of abdominal disease is, as yet, rather a matter of confident surmise than of certainty. The tenacity with which some surgeons hold their extreme views upon this subject often seems in little proportion to the evidence they adduce in support of them. Convictions masquerade as truths. The strength of a man's conviction may display only the defect or weakness of his knowledge. Our acquaintance with the so frequent associated disease in the appendix, with the mimicry of the symptoms of ulcer by a diseased appendix, with the "pyloric blush" which is caused by a lymphangitis spreading to the stomach from other parts, with Wilkie's work on retrograde embolism in the omentum, with Braithwaite's on the lymph drainage of the ileo-colic angle, and so on, leads to a realization of the truth that medical treatment can do nothing to inform us upon many of the relevant matters which it is most desirable, indeed essential, that we should know. If it is necessary to clear away oral sepsis before commencing medical treatment, it cannot surely be a matter of negligible importance to allow the persistence of any infective lesion within the abdomen; for this, too, may be a primary or at least a contributory causal agent. It is therefore as a method of temporary solace, of postponement of discomforts or of impending dangers, rather than as a means for our enlightenment or for the cure of the patient, that medical treatment claims our appreciation, and on these restricted grounds it most warmly merits all that we can find to say in its favour.

II.

Medical treatment, however loyally followed during an "attack" and for weeks or months after the symptoms have passed away, seems quite powerless to prevent recurrence of symptoms in a very large number of cases. So far as the patients who come to hospital are concerned the constant feature in their clinical history is the presence of "attacks" followed by periods of remission. In my present series there must be not less than one hundred patients who have submitted to a series of "treatments" involving rest in bed from four to six weeks on more than two occasions; there is not one who has not had medical treatment on several occasions, and, weary and disheartened, many of them turned only at a late hour to a surgeon for relief. A very distinguished surgeon has said that he rarely operates upon a patient whose ulcer has not been "cured" nine times. The cure which follows such treatment may last from a few months to a few years. There must be cases in which a recurrence never takes place, but although I have made a long search which cannot be called desultory among many patients, I have not met with half a dozen of whom this can truthfully be said. And the discovery of the scar of a chronic ulcer in the stomach or duodenum of a patient during the performance of an operation for disease elsewhere in the abdomen is excessively rare, as all surgeons know.

In the "recurrent attacks" the catastrophes which we dread so much may make their sudden appearance. If haemorrhage occurs we may be gravely perplexed as to what it is best to do. If we adopt medical treatment, rest in bed, abstinence from food, administration of an alien serum, intravenous injection of calcium chloride, or the direct transfusion of blood, the haemorrhage may be arrested and the patient recover sufficiently to brave the risks of operation. But in spite of all that can be done, or indeed before there is a chance to do anything, the patient may die. Last year I was consulted by three patients suffering from duodenal ulcer, all of whom had undergone prolonged medical treatment. Because of family or weighty business reasons they all desired to postpone operation. If I am asked in such cases to sanction delay I protest that I am a surgeon, not a prophet, and that I cannot foretell the risks that lie ahead and may be imminent. The three patients died of haemorrhage before

any surgeon had the chance to help them. If I am to find three patients who have died under my care after operation I have to go back many years and search nearly a thousand records.

With the help of Professor M. J. Stewart I have obtained a record of the cases of gastric and duodenal ulcer which have died in the Leeds Infirmary in the years 1910 to 1921 inclusive. Of gastric ulcers there were 75 in which death was due to haemorrhage or perforation and peritonitis. These grave catastrophes may occur in connexion either with "acute" or with "chronic" gastric ulcers. There were 61 deaths from perforation—in 60 cases the ulcer was of the chronic type, in one it was acute. There were 14 deaths from haemorrhage—in 13 cases the ulcer was of the chronic type, in one it was acute, and was a terminal condition in a case of advanced cardiac disease; the haemorrhage was not the only or chief cause of death. Deaths from these emergencies occur, therefore, comparatively rarely in cases of "acute" ulcers. It is the chronic ulcer in an acute phase that at last bleeds or perforates, and causes death. The patients with this type of ulcer have, almost without exception, undergone treatment not once or twice only, but many times. It is true that the treatment has often been brief, and that it has ceased rather in consequence of a patient's negligence than because the medical attendant had sanctioned its omission. The warning to every patient that the checking of the symptoms does not mean closure of the ulcer is very necessary.

During the same period there have been 129 cases in which death was directly attributable to haemorrhage from a duodenal ulcer or from perforation. There were 12 deaths from haemorrhage; in all the ulcer was of the chronic variety. There were 117 deaths from perforation. In 12 of these there was an acute ulcer; in 4 of the 12 chronic ulcers also were present, and in each case it was the chronic ulcer which had perforated, the acute ulcer being merely incidental. In the remaining 105 cases the ulcer or ulcers were of the chronic type. Perforation, therefore, is found here also far more commonly in cases of chronic ulcer. A full clinical history is not always to be obtained, for even nowadays patients are brought in a moribund state to the hospital two, three, or four days after the catastrophe has occurred. But the records show that the very great majority of patients had undergone treatment, for longer or shorter periods, on a number of occasions. The full mortality of surgery is known, but all is not yet disclosed of the death rate among patients "cured" of their attacks who die months, or it may be years, later in the acute emergencies from which there is no time to rescue them.

III.

In cases of gastric ulcers treated medically we cannot afford to neglect a consideration of the problem of carcinomatous degeneration at the edge of a simple ulcer. Opinions upon this matter appear to be irreconcilable, in consequence, I believe, of different aspects of the total volume of evidence being alone considered by each of the contending parties. I can only speak of cases that I see, and these are, of course, largely, but by no means exclusively, a very special group in which all efforts other than those a surgeon can make have been exhausted. I operate upon rather less than half the cases sent for operation, so that I may lay claim to some knowledge of cases that are labelled "medical."

Of the cases of cancer of the stomach that I see upon the operation table a steady average of two out of three give a past history that is extremely suggestive of gastric ulcer. That such a history is apt to prove fallacious or misleading no one knows better than I do, but before I admit the history as probably indicative of ulcer I sift it very carefully and discount it as much as possible. In some such cases an ulcer, apparently of the usual chronic type, may be found at the time of operation. No slightest suspicion may be entertained as to its malignancy from any naked-eye examination that is made. Under the microscope early malignant changes at one edge only of the ulcer are found. This has been the case in 18.5 per cent. of the supposed chronic ulcers. In other cases a chronic simple ulcer is seen, one edge of which is thickened, upraised, red, and softer than the normal rigid, steep or overhanging edge. This part shows carcinomatous changes. In one case there were two such patches at opposite edges; one showed columnar carcinoma, the other scirrhus. Again, there are cases of duodenal ulcer where the symptoms are often unequivocal and persistent, on and off, for years, in which a new and more formidable menace has lately appeared. At the operation a very old duodenal ulcer is seen

to have lately transgressed the line of the pylorus, and the gastric edge of the ulcer is found to be malignant.

In a long series of cases of gastric ulcer treated by gastrectomy, in which the pathologist has reported an absence of malignant disease, two patients have died of "recurrent" cancer with growth in the stomach or its glands, and the liver. Ulcers of the stomach, we are told, which exceed a certain size, roughly 1 inch in diameter, are always malignant. Does this mean that a simple ulcer never grows so large, or that a simple ulcer of such a duration as to grow to such a size inevitably degenerates to malignancy? When resection of the stomach is performed for frank carcinoma of the stomach, plain for anyone to recognize, the disease will probably have invaded a large part of the stomach. Every trace of an original chronic ulcer, if such there were, will then be overlaid by growth and be quite unrecognizable. If patients die of carcinoma of the stomach without operation the disease will be so advanced that there is little chance to discover any evidence of earlier disease. On the question of the incidence of cancer in ulcer *post-mortem* evidence is therefore of the slenderest value. It is in the examination of specimens of gastrectomy performed in the early stages of carcinoma that the only trustworthy evidence can be obtained. Is there any surgeon who finds that cases of this type are sent to him too early?

I do not profess to give any figures, but the cumulative effect of the evidence I have offered makes me acutely anxious as to the destiny of any patient suffering from gastric ulcer. If we regard the change from a simple disease to a malignant one as possible, even if infrequent, the method of gastrectomy in cases of chronic gastric ulcer clearly has advantages which no other operation can claim. Its mortality is much less than the mortality from that form of cancer of the stomach which proves fatal after gastro-enterostomy alone has been done for the supposed simple chronic ulcer in which the cancer has already started to grow, or in which it grows later when the ulcer refuses to heal. It is perhaps worth while to recall the fact that the real chronic ulcer is a rare disease. If gastric ulcer is considered a common disease—if, that is, the clinical diagnosis alone is accepted—the proportional incidence of carcinoma among such cases is certain to be very small.

IV.

Finally, the question may be asked whether, in the case of a gastric ulcer, medical treatment does in truth often attain its paramount object, the permanent healing of the ulcer. The answer is not so simple as it may seem. Before we can give that answer we must know, of any case—first, that an ulcer has without doubt been present, and the evidence of this must not be merely clinical; secondly, whether a radiological examination which confirmed the diagnosis now shows that the ulcer is healed; and thirdly, that the healed ulcer has not broken down again some months, or years, later. Is this evidence forthcoming even in a small number of cases? Of the supposed healing of a fictitious ulcer we have abundant evidence; but of testimony that fulfils the essential conditions I have mentioned there is almost none. Yet I most respectfully submit that if it is claimed that medical treatment can lead to the healing of an ulcer in the stomach nothing less than this degree of proof ought to be offered for our consideration.

The dangers of medical treatment, therefore, are very formidable. The mortality is far greater than with surgical treatment. It is probable that only the most serious cases are submitted to operation, yet the number of deaths occurring after operation is quite insignificant compared with the number of those who die without the chance of benefit by surgery. The deaths which occur unhappily with such great frequency from haemorrhage or from perforation, whether patients are operated upon as the twelfth hour is almost striking or not, are deaths which have not been prevented by the medical treatment, which almost all the patients have had intermittently for months or years. A patient is just as dead if he dies after medical treatment as he is when he dies after surgical treatment. If he dies after an operation surgery will probably get the blame, and may occasionally deserve it. If a patient suffering from a gastric or a duodenal ulcer is treated medically on one or numberless occasions and dies from haemorrhage or from perforation, such treatment must take the blame for its failure to prevent a fatal termination. The mortality is the mortality of medical treatment just as certainly as the mortality following an operation is the mortality of surgical treatment.

If, therefore, the physician claims these cases as "medical"

rather than "surgical," it is his plain duty to recognize that, whether we regard the risk to life, or the continual return of suffering, medical treatment is at present a far less effective and definitely more dangerous undertaking than any operation which the surgeon may practise. I say this not to encourage the physicians quickly to relinquish these cases to the surgeon, but rather to suggest that medical treatment should be raised to a general level of efficiency and of safety corresponding to that which surgical treatment has now reached. The occasional discovery of the scars of chronic ulcers of the stomach or duodenum in the *post-mortem* room makes it probable that even the most obdurate ulcers can sometimes be induced to heal, and perhaps to remain long healed.

SURGICAL TREATMENT.

The operative treatment of chronic gastric ulcers has passed through many phases, and there appears to be little chance of general agreement upon this matter even at the present time. The operation first to be practised was gastro-enterostomy, and in a very large number of cases the results have been good. But to satisfy the demands which the surgery of to-day must be fully able to meet, the results have not been good enough. A reference to the table of gastric analysis will show that in rather more than half the total number of cases there is a little delay in the emptying of the stomach. It is now well known that an ulcer on the lesser curvature of the stomach, far away from the pylorus, may be associated with so considerable a degree of spasm at the pylorus that the gastric contents are unable to escape at the normal rate. In such cases gastro-enterostomy will permit of easier drainage of the stomach, and according to its advocates will "give rest" to the ulcer. The objections to gastro-enterostomy, however, outweigh all its trivial advantages. The simplicity of the operation is one of its greatest dangers; for the operation is practised far too frequently by inexperienced surgeons. It is performed when no ulcer is present, the lesion primarily responsible for the gastric symptoms being overlooked; it is performed in place of more appropriate operations, and is followed perhaps by temporary relief, when they would result in "cure"; its performance, in the hands of some of its warmest advocates, has a mortality as high as that of more radical operations, and is followed in too large numbers by the development of cancer in the ulcer which the operation fails to remove. The operation is believed to have a "physiological" effect, and this is supposed to have a beneficial influence upon the healing of the ulcer; no adequate evidence has ever been offered that tempts me to indulge my credulity so far as to accept either of these fictions. Gastro-enterostomy acts mechanically and in no other way.

The operation has been combined with excision of the ulcer, or, as by Balfour, with destruction of the ulcer by cautery. Clean excision of the ulcer by the knife appeared to be a method full of promise. I practised it many times, and discarded it in consequence of the large proportion of cases in which the ulcer recurred. Balfour's operation has the great advantages that it destroys the ulcer completely, and that it destroys also, because of the selective action of heat upon the cancer cells, any early malignant degeneration that may have set in at the margin of the ulcer. Balfour, whose opinion always carries great weight, has pleaded for this operation with eloquent cogency (*Annals of Surgery*, 1921, lxxiv, 448), and all those who practise it at the Mayo Clinic are well satisfied with it. I practise it very rarely, reserving it exclusively for ulcers of small size high up on the lesser curvature, associated with pyloric spasm and gastric retention. Ulcers in this position are sometimes most inaccessible, and are apt to form adhesions to the pancreas or any near structure. The removal of them by gastrectomy would mean that the whole stomach would be sacrificed—a grave measure out of all proportion to the needs of the case. I therefore in such instances choose either Balfour's operation, or more often and by preference the method of gastro-enterostomy in Y combined with jejunostomy. This latter method has been most valuable in cases of extensive indurated inaccessible ulcers, firmly grown to the diaphragm or liver or pancreas. In such cases, especially if haemorrhage has occurred, or if there is a profound degree of inanition, a resection of the stomach would be sometimes impracticable, and always a most formidable or highly dangerous procedure. The complete rest to the stomach which the operation of jejunostomy affords gives fullest opportunities to the ulcer to heal. An examination by the radiologist from time to time will show that, unhappily, the

healing of the ulcer even in such conditions is a most tedious and protracted process.

The operation that I regard with the utmost confidence as thoroughly satisfactory for the great majority of cases is gastrectomy. There are very few cases in which it cannot be performed. It is safe to a degree that one could hardly expect. In the ten years the mortality has been 1.6 per cent., a shade lower than the lowest published death rate from Balfour's operation. The results in my hands have been excellent. I have had the following unsatisfactory experience in connexion with it: One patient has died of cancer of the stomach over five years after the gastrectomy had been performed; a second patient developed cancer of the remaining part of the stomach two years later. These two are examples of mistaken diagnosis, both clinical and pathological. One patient had to submit to a secondary operation on account of obstructive vomiting; a long loop had been left between the duodeno-jejunal flexure and the anastomosis of the bowel with the stomach. This patient subsequently made a perfect recovery. One patient from whom I removed a group of tuberculous mesenteric glands at the time the gastrectomy was being performed has had a second operation and another group of glands has been removed; this operation was done three months ago and the patient has since gained 15 lb. in weight. That is all that I can find to bring against the method of gastrectomy. No other operation gives such admirable and uniform results. I have greatly simplified its performance by introducing the "anterior no-loop" method. The jejunum is brought from the flexure across the transverse colon from left to right and applied to the divided stomach so that the proximal part of the jejunum joins with the greater curvature. This method has been followed in every case since June, 1920; there has been no death, and not the slightest untoward symptom at any time after operation, early or late. There has never been a recurrence of ulceration (apart from the two cases of carcinoma mentioned above); there has been no return of dyspepsia; there has been no sign of persistent or profound anaemia in any case in this series.

I feel, therefore, that I can justly excuse myself for not performing gastrectomy only when the condition of the patient prohibits any major operation, or when the location of the ulcer, or any other of its attributes, renders the operation quite impracticable or disproportionate to the needs of the individual case. And so far as the condition of the patient is concerned I feel fairly confident that by the most watchful care, by the performance of direct transfusion of blood once or oftener, and by the copious administration of glucose, with and without sodium carbonate, so great an improvement may be brought about that any operation that is required may safely be performed.

After all is said and done, that operation for the treatment of chronic gastric ulcer will alone survive which with the smallest risk brings about a complete subsidence of all symptoms, a permanent freedom from any recurrence of the like disease, and immunity from any disorder associated with the operation in consequence of its mechanical or physiological effects. The operation which seems destined to fulfil all these indications is gastrectomy.

How is it that the surgical mortality is so low? The patients who come for operation are often very ill; they have suffered for years; obstruction with grave inanition may have resulted; and haemorrhage on one or many occasions may have sapped their strength almost to exhaustion. It is a question of taking pains. I once heard a very distinguished surgeon say that no one could continue to operate upon even simple cases such as inguinal hernia without mortality; one or two might die in every hundred. If this view is taken, the practice of the surgeon will justify and sustain it. But if you deal with cases as units, and say, "The last case may yet die, and the next case be a desperate one which no man can save, but *this case must not die whatever happens*," you will find your practice will go far to vindicate your determined optimism and your confidence. The units saved swell into multitudes. Surgery, after all, is an affair of the spirit; it is a fierce test of a man's technical skill sometimes, but in a grim or long fight it is above all a trial of the spirit; and there are few things that cannot be conquered if a man's heart is set on victory.

The lecture was illustrated by a number of lantern slides, many of which were kindly lent to me by Professor M. J. Stewart, to whom I am greatly indebted not only for this kindness but also for the preparation of the statistics I quote from the records of the post-mortem department of the Leeds General Infirmary.

An Address

ON

SLEEP AND SLEEPLESSNESS.

DELIVERED TO THE DORSET AND WEST HANTS BRANCH OF THE
BRITISH MEDICAL ASSOCIATION,

BY

W. JOHNSON SMYTH, M.D.,

BOURNEMOUTH.

SINCE coming to Bournemouth twenty-five years ago my professional work has chiefly been concerned with patients in the middle and later periods of life. Of these I believe the majority have presented certain decided defects in their nervous system—organic or functional. Of their troubles by far the most frequent has been the symptom of insomnia, and I hope you will bear with me when I place before you certain well known physiological facts.

SLEEP.

Sleep is a mysterious phase of all living things, animal and vegetable. Its causation in man remains an unsolved problem, and therein lies the fascination of the pursuit of a study so important, for in a true comprehension of its causation must ultimately lie a scientific understanding of insomnia and its treatment.

The question of sleep has interested men of all ages. Scripture teems with reference to sleep. Poets have sung its praises, sculptors and painters have found it a fitting setting for beauty; the classical writers—Sophocles, Horace, and Ovid—all but worshipped it; nor did Aristotle nor our own Shakespeare pass it by in silence.

Under normal circumstances we spend roughly one-third of our life in sleep. It is a normal condition of the human body occurring periodically, in which there is a greater or less degree of unconsciousness due to inactivity of the nervous system, and more particularly of the brain and spinal cord. It may be regarded as the condition of rest of the nervous system, during which there is a renewal of the energy that has been spent in the hours of wakefulness, for in the nervous system the law holds good that periods of physiological rest must alternate with periods of physiological activity, and, as the nervous system is the dominating mechanism in the body, when it reposes all the other systems participate in a general condition of rest.

In all vital phenomena rest alternates with activity. The heart muscle as well as the secreting gland has each its period of repose. Nervous action involves physico-chemical changes of matter and the loss of energy. This is true even of the activity of the brain in connexion with volition, perception, emotion, sensation, and so on, so that the higher nervous centres require rest during which they are protected from the stream of impressions flowing in from the sense organs; this permits of the elimination of waste products and the recuperation of cerebral structure so as to fit it for further mental activities.

Time of Sleep.

Most people sleep during the night. The silence of the night and other circumstances co-operate to bring this about. But the advent of sleep does not necessarily depend on terrestrial phenomena—but rather on bodily conditions. Some animals sleep during the day and prowl about at night; some persons have to perform night duty and sleep in the day; bodily fatigue is the main factor in determining the time of sleep.

Just as the sensation of hunger is referred to the stomach, thirst to the throat, and breathing to the chest, so sleepiness is referred to the region of the head and neck. A sensation of weight occurs in the eyelids, spasm of the hyoid muscles causes yawning, and the head droops. A gradual obscuration of the intelligence, depression of general sensibility and special senses, with general muscular weakness, follow—and "Nature's soft nurse steeps our senses in forgetfulness."

Sleep having supervened, there are gradations in its completeness. It may be so light that the individual is partly conscious of external impressions and disordered trains of thought. This is the dream state. On the other hand, sleep may be so profound that all psychical phenomena are abolished. The first couple of hours are those of most perfect sleep. As the state of awakening approaches, sensibility becomes more acute, and external impressions are