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CARCINOMA OF THE STOMACH

BY

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In spite of the general progress of surgery carcinoma of the stomach still remains one of the greatest of human tragedies. It occurs so often that it concerns us all, in whatever branch of medicine we may be working. In England approximately 15,000 people die of it annually—that is, about forty a day—while in the United States of America the number is approximately 38,000. Of all varieties of carcinomata it is one of the commonest, sharing this position with carcinoma of the breast and uterus. In men it forms about one-fourth of all varieties, and in women about one-sixth. In the surgery of the abdomen it accounts for approximately one-quarter of all operations upon the stomach.

Only too often it slowly and insidiously attacks those who have apparently been in perfect health, and it occurs at an age when its sufferers are looking forward to and preparing for a peaceful and happy enjoyment of their retiring years. The progress of its treatment has not kept pace with that of other gastric lesions, and only too often its recognition is the harbinger of a rapid and miserable end. Yet, as I shall hope to show you, some progress has been made and radical treatment has restored many hopeless sufferers to healthy and happy people.

Incidence

It has often been stated that the disease is on the increase, but of this I am doubtful. Owing to the more careful and complete methods of investigation fewer cases are overlooked, and with an increase of the total population, and especially with an increase of those who reach the cancer age, more cases are certain to occur; but in my own series of 572 patients there has been an average of thirty new cases per annum during the past ten years. The condition is most frequently seen between the ages of 50 and 60, but a large number occur in the decades immediately above and below this, and, as shown in Table I,

TABLE I.—Age Incidence

Years	No.	Years	No.
20-29	5	60-69	163
30-39	51	70-79	20
40-49	113	80-89	1
50-59	219		
		Total	572

may even be found between the ages of 20 and 30, and over 80. Cramer has found that the incidence steadily increases with age, and that the infrequency in the later periods of life is solely due to the fact that there are fewer people of advanced age.

The male sex is more often attacked than the female. In my own series there were 398 males and 174 females—that is, 69.5 per cent. males—a preponderance which is rather less than that seen with peptic ulcers, where in a total of 2,143 cases there were 1,654 males and 489 females. It used to be generally believed that the majority of cases were primary and occurred in stomachs which

were previously healthy, there being relatively few that were recognized as being dependent upon some previous organic lesion. These few are, however, of very considerable importance, for I know of nothing more depressing than to operate upon an irremovable carcinoma of the stomach which has followed a benign lesion of many years' standing, and to realize that if only adequate surgical treatment had been performed earlier the carcinoma would have been prevented. I cannot help feeling that the modern fashion of treating all peptic ulcers medically has led to many carcinomata being overlooked by those who have not had enough experience to make the differential diagnosis.

A small percentage are undoubtedly secondary to adenomata. These benign lesions are relatively uncommon and often do not produce symptoms. In my own series only six cases were found in over 3,000 operations upon the stomach. Stewart in his post-mortem investigation found about one in 200 necropsies. Of the 572 carcinomata in my series twenty-seven were accepted as having started in adenomata or were associated with them. Occasionally a severe haematemesis may have occurred in the past history, but as a rule this variety is insidious in its onset. The importance of their recognition lies in the fact that they may give rise to a very massive carcinoma situated on the greater curve of the stomach, which may cause a big palpable tumour that is considered to be inoperable. The condition, however, appears to be relatively benign, for at operation it may be found to be quite movable and to have led only to secondary deposits in the local glands. For this reason it is my custom never to regard a case as inoperable simply because of the size of the tumour.

Relation of Carcinoma to Gastric Ulcer

The question whether carcinomata may be secondary to a previous gastric ulcer has in the past led to a great deal of discussion, and even to-day there is no unanimity of opinion as to its frequency. The majority of workers, however, accept Stewart's figures as being approximately correct, and my own experience very largely agrees with his. He finds that about 9.5 per cent. of ulcers become carcinomatous; but this change is likely to occur in one in four of ulcers situated in the prepyloric area. About 17 per cent. of the carcinomata start in an ulcer. It is my own custom to exercise a very strict supervision over the classification of the types of carcinoma, and only to accept as starting in a previous ulcer those cases which fulfil the following four requirements: They must have had a history suggestive of a past ulcer; the test meal must show the presence of free hydrochloric acid, often above the normal; at operation the lesion must simulate a chronic ulcer; and the microscopical report must indicate that this was the nature and origin of the growth. With these criteria sixty-one of my 572 cases

are grouped as having arisen in an ulcer—that is, 10.5 per cent. This is rather less than Stewart's 17 per cent., but of course it does not include any of the cases that are already inoperable, for in this group the pathological proof cannot be obtained. It is on this question of the pathological appearances that probably the greater number of the disagreements have arisen. For a case to be accepted the four pathological points which Newcomb has stressed should be present. They are: a complete destruction of the muscle in the base of the ulcer, the presence of much fibrosis in and around the base, the presence of surrounding endarteritis, and a fusion of the muscularis and muscle coats at the edge of the ulcer. Whatever be the exact frequency is not of practical importance, provided we all recognize the fact that an ulcer may become malignant, and that many cases of carcinoma may in their early stages give a history suggestive of an ulcer. For this latter reason the percentage of those cases primarily diagnosed as ulcers which later become malignant is higher than the figures I have already given. In my own series 112 of the cases gave an early history which suggested a chronic gastric ulcer, and I am sorry to say that in a considerable number of these medical treatment had been persisted in for so long that when the patient sought my advice the condition was already inoperable. It is in this group, relatively small though it is, that I feel progress can be made by a more careful attention to the clinical details and a recognition of those points which are suggestive of the presence of carcinoma. In this consideration an interesting point is the relation of carcinoma to the scars of healed ulcers, and, to us surgeons more especially, the relation to the scars of ulcers which have been healed by previous operation. If such a relation was relatively common it would be a strong argument in favour of the more routine use of radical operations in the treatment of peptic ulceration. My own series throws interesting light on this point. There were in all twenty-three cases which had followed a previous operation for ulcer (Table II). In four of

TABLE II.—*Carcinoma after Operations for Ulcer*

Shortly after	4
Remote from ulcer ..	9 (4, 7, 7, 7, 14, 15, 17, 23, 25 years after)
Later in ulcer site ..	10 (3, 5, 5, 6, 6, 12, 14, 15, 21, 29 years after)

these the ulcer was so big that a palliative operation had alone been performed, and the carcinoma followed shortly afterwards. There can be no doubt that in them the condition was already carcinomatous at the time of operation. The error was of course of no importance, for the ulcer was inoperable and would have remained so even if it had been known to be carcinomatous. In the second group (nine cases) the carcinoma occurred in some portion of the stomach remote from the site of the previous ulcer, and did not take place until many years afterwards. It is manifest that these cases had nothing to do with the primary lesion, and although it is true that a partial gastrectomy might have prevented the onset of carcinoma, this would have been no more justifiable an argument in favour of its employment than it would be to suggest that such an operation should be performed in normal people in order to prevent them getting carcinoma later on. The third group is that in which carcinoma occurred at the site of the ulcer many years afterwards, and probably could have been prevented if the ulcer had been excised at the time of the first operation. There were ten such cases in my own series.

Probably one of the greatest advances in our knowledge of the aetiology of this disease lies in the recent conclusions of Sir Arthur Hurst. His investigations have

produced very strong evidence to show that the cases which were previously regarded as primary are dependent upon a gastritis. He believes that the achlorhydria is caused by the gastritis and is not due to the growth, for he found that in every case of undoubted ulcer-cancer free hydrochloric acid was present; and when there was no evidence of such a previous ulcer the acid was usually absent, even in very early stages of the disease. He states that he has in his own series five cases in which the achlorhydria was present before the carcinoma developed, and that he has found record of twenty-two similar reported cases. He does not believe the acid falls after the onset of the growth. This latter point is of very considerable interest. I had previously believed that with the onset of carcinoma a gastritis might be set up and the acid diminish, but in my own series, in which test meals had been taken previously and had shown a fall with the onset of carcinoma, a gastro-enterostomy had been performed, and therefore these observations were of little value. It is true that Comfort has investigated a series of cases at the Mayo Clinic in which he seems to show that the acidity falls with the progress of the carcinoma, and that cases have been reported by Robertson and Wilkinson where there appeared to be a definite fall in the acidity in test meals taken before and after the onset of the carcinoma. The evidence which Hurst produces, however, is very strong, and he concludes that carcinoma never develops in a healthy stomach; but if a patient with a constitution predisposing to carcinoma also has achlorhydria and gastritis he will probably develop carcinoma, and Hurst holds out a strong hope that the early recognition and treatment of the gastritis may do much to diminish the frequency of carcinoma. He lays stress upon the interesting fact that although the incidence of carcinoma is much the same in all countries, yet in England only 22 per cent. of the cases occur in the stomach, whereas in Holland this percentage is 55. He believes that this difference is due to the greater incidence of gastritis in the latter country.

If the achlorhydria is the primary factor then we should expect to see cases of carcinoma occurring in patients who had had pernicious anaemia. It is of course only in recent years that the sufferers from this disease have been kept alive long enough for such a possibility to occur. Sir Arthur Hurst states that he has seen six cases of carcinoma of the stomach with pernicious anaemia, and that he has knowledge of twenty-four others which have been reported. In two cases he has seen the development of carcinoma after the pernicious anaemia had been cured. In my own series there have occurred two cases with pernicious anaemia. In one the anaemia arose seventeen years after an operation for gastric ulcer, and two years later carcinoma occurred. In the second case the patient had had pernicious anaemia in 1927, which had been treated and apparently cured, and in 1930 developed a carcinoma of the stomach.

It would be of little practical value in this discussion to consider in detail the pathological types of carcinomata which may be found in the stomach; but I may point out that the rare cases of sarcoma and lymphogranuloma, four examples of which occurred in my series, are clinically indistinguishable from carcinomata.

Symptoms

The main difficulty in the successful treatment of carcinoma of the stomach is that nearly two-thirds of the patients only seek surgical help after their disease has become inoperable. I wish I could say that this was due

to the fact that errors of diagnosis had been made in the earlier period, for then one could hope that with a wider recognition of the symptoms more cases would be cured; but unfortunately in many the symptoms may have been present for only two or three weeks, but the condition is already inoperable when advice is first sought. There are, however, still some cases where the symptoms, in the earlier stages, are so indefinite or may so resemble a non-malignant tumour that they are overlooked for too long and are treated medically. It is these cases that we can hope to save by earlier surgical treatment. I am still confident that, even with the modern methods of investigation in use to-day, the greatest certainty of diagnosis lies in a careful investigation of the clinical history, and that sometimes indeed the more modern methods may lead one astray after a correct primary diagnosis has been made. The first point of importance, which has been so often stressed before but which cannot be too often reiterated, is that a gastric ulcer practically never starts after the age of 40, and that if a patient over the age of 40 with a clear past history comes up complaining of dyspepsia he has got a carcinoma of the stomach unless the contrary can be definitely proved. Moynihan's clinical classification is still of the greatest value. He pointed out that these cases may appear in three separate groups—namely, carcinoma of the cardiac orifice, of the pyloric orifice, and of the body—and that the latter, which is the biggest group, shows three methods of origin: those with a sudden onset, those with an insidious beginning, and those which are secondary to a peptic ulcer. The frequency of these types in my own series is shown in Table III.

TABLE III.—*Clinical Types*

Pyloric obstruction	216
Cardiac obstruction	46
Body: Sudden onset	29
Insidious	167
Secondary to ulcer	112
Total	572

It is well to remember that carcinoma of the cardiac or pyloric orifice will generally lead to obstruction, and that in either case the symptoms of the obstruction entirely mask the underlying cause. A patient with a carcinoma of the cardiac orifice will begin to develop symptoms of difficulty in swallowing. The history will usually be short and steadily progressive, the obstruction being marked at first only for solid food, but later increasing until there is difficulty even in the passage of fluids. Such cases do not as a rule cause much perplexity, for it is universally recognized that a rapidly increasing difficulty in swallowing in a patient over the age of 40 is generally due to a carcinoma either of the oesophagus itself or of the cardiac orifice of the stomach. Their recognition is, however, becoming of greater importance, for not only are they relatively common—in my own series there were forty-six cases at the cardiac orifice over and above the true cases of carcinoma of the oesophagus—but operations upon this type of growth, aiming at its radical removal, although at present tentative and somewhat experimental, are beginning to be more and more successful and are giving us hope that the intrathoracic or the combined abdomino-thoracic operation may lead to the cure of a considerable number of these unfortunate sufferers.

PYLORIC OBSTRUCTION

When leading to pyloric obstruction the individual symptoms of the obstruction are indistinguishable from those caused by a stenosing ulcer or by involvement of the pylorus from some lesion without, such as a chronic cholecystitis, chronic pancreatitis, or carcinoma of the

head of the pancreas; but here again a careful consideration of past history should prevent the possibility of error. The short and steadily progressive history is the factor of chief import, and it must always be remembered that the onset of pyloric obstruction in a patient over the age of 40 is due to a mechanical cause, and must be treated by early operation. In the early stages the patient chiefly complains of a feeling of discomfort and distension, which increases as the day goes on, and is soon associated with a loss of appetite and with occasional vomiting. As the disease progresses the vomiting becomes more marked and takes on the projectile character. The vomit itself becomes large, generally occurs in the evening when the stomach has been filled, and the emptying of the stomach gives very considerable relief. The physical signs are often definite, and three stages of obstruction can be recognized. In the first the stomach is dilated and atonic, the atony being shown by the presence of splashing over the stomach. This may be obtained on physical examination, or the patient himself may complain of it during movements. The evidence of the dilatation can be heard but not seen or felt. As the condition progresses the stomach undergoes a certain amount of hypertrophy, and tends to contract upon the large mass of its contents. On physical examination its outline may generally be felt as a distended bag. Later still the hypertrophy is accompanied by peristaltic waves, which may be so forcible that they are readily visible through the abdominal wall, and the outline of movements of the stomach can then be seen. Such a degree of obstruction may be associated with a considerable amount of gastritis, and thus an absence of free HCl may be found in the test meal even if the obstruction is not carcinomatous; but in my own experience the fall in acid is never so early and never so marked with the benign lesions as with the carcinomata. An x-ray investigation may again disclose only the pyloric obstruction, for the barium meal may be unable to pass into the pyloric canal, and thus will not show the irregularity and filling defects due to the growth. In other words, all the methods of investigation will reveal only the presence of a pyloric obstruction, and will not indicate its nature. This will be indicated solely by the age of the patient, the shortness of the history, and the progressiveness of his symptoms.

SYMPTOMS IN THE BODY OF THE STOMACH

When the lesion is in the body of the stomach the symptoms may arise with a suddenness of onset which is very deceiving. Fortunately such cases are rare. In my own series there were twenty-nine examples. A few may occur with a perforation, but these are so rare that they are of little practical importance. In my series there were only two. Sometimes the onset is with a large haematemesis, and I have known several such patients who after the collapse from the haemorrhage had been treated for many weeks or months for a supposed ulcer, until the carcinoma was hopelessly inoperable. If it had only been realized that even a haematemesis occurring in a man over the age of 40 with a clear past history was most probably due to a carcinoma this mistake would have been avoided. The interesting variety is that in which a patient partakes of a meal which is perhaps for him of a rather unusual character. It is followed by a severe indigestion, which persists from that time, and when he seeks advice he will date the whole of the symptoms back to that one meal. The danger is that the condition may be regarded as one of food poisoning and the possibility of carcinoma be entirely overlooked. The fact that he has a constant gastric pain which is not relieved by

vomiting, that his appetite is completely lost, and that he has no diarrhoea should arouse suspicion. If he is fortunate his vomit may contain a small amount of blood, and the underlying nature of the lesion be suspected early. Even if this does not occur an investigation of the vomit will generally show the presence of occult blood. A test meal will reveal the absence of free HCl, and the radiograph will generally show a filling defect.

The greater number in this group have a slow and insidious onset, and it is this variety which may be regarded as giving the most characteristic evidence of carcinoma of the stomach. The symptoms are variable. At times they are entirely extragastric, and the man may seek advice not for his indigestion but because he is cognizant of an increasing weakness and loss of energy. When questioned he will usually admit that he also has a loss of appetite and that he has a certain amount of discomfort after his food. From the time of the onset his symptoms are steadily progressive; his appetite will decrease, his discomfort after food may become more severe and is always continuous, so that although it may be made worse by the taking of food it does not entirely disappear before the next meal. At the same time he may complain of the eructation of foul gas or of quantities of foul and bitter fluid. Later true vomiting is added, but it does not give complete relief to the pain. There is often a visible anaemia, and loss of weight, although by no means characteristic, may be present. The persistence of such symptoms for two or three weeks should at once arouse the suspicion of carcinoma, and an investigation should be carried out. Visible blood may be present in the vomit or stools, but even if this is absent it will nearly always be found on chemical examination. I feel that here one ought to issue a word of warning. If occult blood is found in the stools it is often the custom to treat a patient medically for a supposed ulcer, and only to consider the question of carcinoma if the occult blood fails to disappear. This is a loss of very valuable time, and medical treatment should only be persisted in if there is strong positive evidence, either in the past history or in the other methods of investigation, of the presence of a gastric ulcer. If the history is suggestive of carcinoma it should not be continued. In many such cases the x-ray investigation will give positive evidence of the presence of carcinoma; unfortunately, indeed, it may in some cases give evidence that the growth is already past surgical treatment. On the other hand, in very early cases the evidence obtained by these means of investigation may be indefinite. In such cases gastroscopy may be of value. The blood should be investigated: a low haemoglobin content is not only suggestive but may have to be corrected before operation is considered.

GROWTH SECONDARY TO GASTRIC ULCER

Even in that type of growth which occurs secondarily to a gastric ulcer a consideration of the symptoms is of very great value. My own experience has been that a positive diagnosis can often be made by a consideration of the history of the clinical symptoms, even when an investigation by the x rays and the gastroscope is still uncertain. It is important to realize this—for, as I have already pointed out, there were in my own series 112 cases which presented the symptoms of a past gastric ulcer—and to remember that ulcers in the pyloric antrum are specially prone to become malignant. The changes first to be looked for are in the nature of the periodicity. The patient will so often himself state that the last attack is different from the previous ones: it is longer and the symptoms may be different; the pain is more continuous

throughout the day, has not the same close relation to the ingestion of food, is less severe but more continuous. He will note that whereas in previous attacks his appetite has remained good, in this attack it has begun to fail, and it is an interesting thing to note that this may be quite definite, although he still has a high acid content in the test meal. Vomiting often becomes rather more frequent, although the vomits are small; but if it was present in the previous attacks the patient may note that whereas before it relieved his pain it has now ceased to do so. The presence of such a group of symptoms should at once raise the suspicion of the possibility of a carcinomatous change. Personally, I would regard them as a definite indication for operative treatment, and I should be but little inclined to waste further valuable time in making prolonged investigations of the stomach content and the stools or in x-ray or gastroscopic investigation.

In this variety, as in those with an insidious onset, a careful examination of the abdomen may reveal the presence of a tumour. Stress must here be laid on the fact that a careful inspection may often show a tumour which can be felt with difficulty, and that, generally speaking, the lighter the palpation of the abdomen the more will be felt within it.

ACCESSORY METHODS OF INVESTIGATION

Although the greatest reliance is to be placed upon the careful taking of the patient's history and upon his clinical investigation, there is no doubt that in difficult cases much help may be obtained by the accessory methods of investigation. The presence of occult blood in the stools and test meal is of very considerable importance, and there are many physicians who state that the persistence of occult blood is indicative of carcinoma. My only criticism of this is that if too much reliance is placed on this test alone valuable time may be wasted. The presence of achlorhydria is suggestive, but it may be found with a simple gastritis. A careful screening and x-ray examination is of the greatest value, but it must be undertaken by one who is skilled in this type of work. One or two simple films may be of absolutely no value, yet a careful screening and a careful investigation of the mucosal contours may show a minute lesion. Gastroscopy carried out by one skilled in its use may in a difficult case be of inestimable value, and this is especially so, I think, in those cases of gastric ulcer which are showing a very early carcinomatous change. By its use Mr. Hermon Taylor has enabled me to carry out radical operations in a few extremely early cases of carcinoma. Nevertheless I am frequently seeing cases reported in the literature where a positive diagnosis ought to have been made on the history, and valuable time has been lost in making several gastroscopic examinations.

Treatment

In considering the indications for surgical treatment one must ever remember that without such intervention the patient is condemned to death. In the present state of our knowledge there is no other measure which can be said to offer any hope, and although it is true that the majority of these patients are poor operative risks, and that any operation which hopes to be successful must be extensive, yet the majority will be only too willing to accept a chance, slender though it may be. My own practice is to advise operation in every case in which there is no evidence of secondary deposits. It is even a debatable point whether an operation should not be advised where there is a suspicion of only one secondary deposit. It may sometimes happen that a palliative removal of a primary growth,

even when there is such a secondary deposit, may give a prolonged period of comfort and happiness. Even in doubtful cases an operation should be advocated, for not only may very large tumours prove to be removable, but should removal be impossible it is a solace to the relations as well as to the patient himself to know that no chance of a cure had been missed. Unfortunately even to-day the percentage of cases in which a radical removal is possible is still relatively small. In my own series of 572 cases such a removal was possible in only 224—that is, a percentage of 39.1. In spite of the attention which is now given to this disease, I still feel that it should be possible to improve on this figure. I have already laid stress upon the fact that many patients are already in the inoperable stage when they first seek advice, but I still meet a considerable number of patients who have had medical treatment carried out for too long a period, either because the condition had been mistaken for an ulcer or because it had not been realized that there was an organic lesion of the stomach. It is probable that if an operation had been performed a few months earlier the disease might have been radically cured. In this respect, however, it is satisfactory to know that there has been a steady improvement. In my first seven years only 28 per cent. of the cases were removable. In the second seven years this had increased to 35 per cent., and in the third seven years to 44 per cent. It is of course possible that with increasing experience on my part I am attempting the removal in many patients whom in the earlier years I should have condemned as inoperable; but nevertheless I do feel that in large measure this progress is due to increasing care and skill on the part of the general practitioner. It is still probable, however, that the operability rate will be improved with a wider appreciation of the fact that any dyspepsia starting in a patient over the age of 40 is carcinomatous unless a rapid and full investigation has eliminated this possibility.

I do not propose to discuss the technical details of the operative steps. It will suffice to say that after the abdomen has been opened a rapid survey must be made to determine the presence of secondary deposits in the pelvis, in the glands, in the liver, and by local spread to the surrounding tissues. If the condition is favourable the resection of the stomach must be as wide as possible, and it must include all the lymphatics in the areas which drain the stomach. So wide a removal is bound to carry with it a relatively high mortality, especially as many of these patients are elderly and are already in a poor state of health. The majority of the published statistics show that the operative mortality is in the neighbourhood of 30 per cent., and in my own series it was only just below this figure. It is as well to remember, however, that any operation on these patients is bound to be serious. In my own series there were fifty-seven cases in which an anterior gastro-enterostomy to relieve obstruction was alone possible, yet this relatively simple operation was associated with a mortality of 42 per cent.; and even those cases in which the only resort was an exploratory laparotomy carried with them a mortality of nearly 18 per cent. As regards the operation of gastro-enterostomy, it is well to point out that this should only be performed if there is a definite pyloric obstruction. It will give little or no relief to a fungating growth in the body of the stomach, and the very high mortality is due to the fact that the patients are such bad operative risks. It is therefore not justifiable to undertake it unless the greater part of the symptoms are obstructive in nature. In lesions which are situated at the cardiac orifice, and are associated with a difficulty in swallowing, a gastrostomy is a justifiable and

often a helpful procedure, but it is doubtful whether it should be performed in patients in the poorer classes of life, to whom feeding through a gastrostomy orifice becomes a difficult and even impossible procedure. In many cases a partial gastrectomy may be the best palliative procedure. Even if secondaries are present the removal of the large mass of fungating growth in the cavity of the stomach may make the patient's life much more comfortable, and he may be able to live in happiness for many months or in some cases for several years. At one time I was hopeful that the implantation of radium after opening the abdomen, and after the removal of the main mass of the growth, might diminish the possibility of recurrence. I found, however, that it added considerably to the risk of the operation, and was sometimes followed by the formation of duodenal fistula. I therefore feel that it is a procedure which is of very little value.

Results of Treatment

Compared with the results of carcinoma elsewhere those obtained in treatment of carcinoma of the stomach are very disappointing. This is mainly due to the fact that in any big series so large a proportion of the cases are inoperable; but even in those in which the growth can be taken away one has to be content, owing to the anatomy, with a more local removal than would satisfy us in many other forms of carcinomata. As a general rule the growth spreads chiefly along the lesser curvature of the stomach, which is so short that even in our widest removals we are often only an inch or less beyond the margin of the growth. Increasing technical knowledge has led to wider resections, and not only can the greater part of the stomach be taken away but the glands around the coeliac axis and elsewhere can be more widely removed, with a greater chance of a more successful issue. At the same time such operations are likely to increase the mortality, and therefore there arises the apparent paradox that the greater the surgeon's experience is the higher his mortality is likely to be. In my own early series the operative mortality for resection was 26 per cent., but in my later series it has risen to just below 30 per cent. Nevertheless I feel that it is the surgeon's duty to carry out a resection wherever it is possible, but the patient should be most carefully prepared for the operation. A blood transfusion may also be required, but in my experience it is only of value if the haemoglobin is reduced; so that a blood examination should always be regarded as a necessary investigation before operation is undertaken. Because of the small proportion of cases in which a radical operation is possible, and because of the high mortality, there are still many physicians who advise against operative treatment, but I feel this is a wrong view. With an operability rate of only 40 per cent. and a 30 per cent. mortality, it means that twenty-eight patients in every hundred will survive operation and will have a good chance of remaining free of their disease. It is surely better to give 28 per cent. a chance of life and happiness than to condemn the whole hundred to a slow and lingering death. It is to the actual end-results of operation, however, that we must look for its value.

It is one of the tragedies of this disease that one is unable to say with certainty that a patient is cured, as the recurrence may occur at very late periods after operation. In fact, one can only say that he has been cured of his carcinoma when he has died of some disease unconnected with his gastric lesion. It is usual, however, in evaluating late results, not to regard any patient as permanently cured, but to consider those who have survived for a five-year interval without any evidence of recurrence.

Many of my more recent patients have recovered from their operation and are at present in a state of good health, eating well and with no gastric symptoms; and it is possible that a considerable number of these may ultimately pass the five-year period. In my own series the patients who have been operated upon for five or more years number 422 (Table IV). In 150 (35.5 per cent.)

TABLE IV.—Results of Operation

	Total	Resections	Operative Survivals
All cases	572	224 (39.1%)	143 (25%)
5 years or more	422	150 (35.5%)	111 (26.3%)

Late Results

	Alive and Well	% of All Cases	% of Resections	% of Operative Survivals
All cases	45	7.8	21	31.4
5 years or more .. .	27	6.4	18	24.3

a radical operation was possible. Of the total, 111, or 26.3 per cent., survived the operation, but of these 111 only twenty-seven have remained free from recurrence for over five years. This seems a very small proportion of the whole, and indeed one must admit that such results are extremely disappointing; but when one remembers that up to a few years ago a carcinoma of the stomach was regarded as an inevitably fatal disease one has to agree that some progress has been made. Of the 422 patients who sought relief 6.4 per cent. are as the result of surgical operation alive and well after five or more years. Of those in whom a resection was possible—namely, 150—18 per cent. are alive and well, and of those who survived a partial gastrectomy 24.3 per cent. are alive and well. This perhaps brings out more clearly than any other statement the importance of straining every effort to operate upon these cases in the early stage, for earlier operation gives us the one hope of raising the 6.4 per cent. to 24.3 per cent. If one keeps constantly in mind the fact that a dyspepsia arising in a man over the age of 40 is probably due to carcinoma, and that an ulcer in the prepyloric region of the stomach is very prone to become carcinomatous, it is probable that a large number will be operable and have a chance of being restored to complete health. The end-results of these cases are perhaps best shown in Table V, where it will be seen that

TABLE V.—Survival Periods

Years	No.	Years	No.
5	8	14	1
6	1	17	1
7	5	21	1
8	1	23	1
9	3	24	1
10	3		
11	1		
		Total	27

patients are alive and well for 24, 23, and 21 years after operation. But even this table does not give a true indication of the length of cure, for some of the patients were elderly and have died of conditions not connected with their gastric lesion. Two, for instance, died respectively at ten and eleven years after operation from lesions quite distinct from carcinoma of the stomach.

We must conclude, therefore, that although the outlook is still bad despite the results of surgical intervention, yet the figures are improving, and that cancer of the stomach, which is otherwise bound to be fatal, can in a certain number of cases be cured by surgical operation.

LYMPHATIC LEUKAEMIA

THE VALUE OF STERNAL PUNCTURE IN THE
DIAGNOSIS OF ATYPICAL CASES

BY

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In classical lymphatic leukaemia the blood picture shows diagnostic changes; a typical overwhelming lymphocytosis—50,000 to 500,000 white cells per c.mm., of which 90 per cent. or more are lymphocytes. The sternal marrow merely reflects these changes; it is very cellular, and 70 per cent. or more of the cells are lymphocytes. But often some of the clinical signs may be missing: Naegeli (1923) listed ten variations, and the lymphocytes of the blood may not be significantly increased. In these patients sternal puncture will often provide the clue to an otherwise open diagnosis. The following records give five examples of this type of case. Detailed figures of the blood and marrow counts are given in the table.

Table of Blood and Marrow Counts

Case No.:	I	II	III	IV	V
<i>Blood</i>					
Red cells, millions per c.mm.	2.570	2.470	4.526	2.480	4.680
Haemoglobin, per cent. . .	56	45	93	54	84
Colour index	1.10	0.90	1.01	1.08	0.90
White cells, per c.mm. . .	11,500	6,800	9,800	3,200	12,400
Polymorphs, per cent. . .	8.0	34.0	17.5	30.0	19.5
Lymphocytes	91.5	63.5	75.0	64.0	77.5
Monocytes	0	2.5	7.0	5.5	2.0
Eosinophils	0.5	0	0	0.5	1.0
Basophils	0	0	0.5	0	0
<i>Bone Marrow*</i>					
Lymphocytes, per cent. . .	87.0	75.0	88.0	30.4	64.0
Lymphoblasts	1.2	0.8	0	22.0	0
Polymorphs	3.4	14.2	3.2	8.2	8.6
Metamyelocytes	0.8	6.2	0.6	1.2	4.2
Myelocytes	0.4	3.0	0.8	2.0	12.0
Normoblasts A	0	0	0	2.6	0.4
B	4.0	0.4	1.2	16.2	4.2
C	3.2	0.4	1.4	11.8	4.2
Pro-erythroblasts	0	0	0	0.6	0
Haemocytoblasts	0	0	4.8	4.4	2.2
Plasma cells	0	0	0	0	0.2
Monocytes	0	0	0	0.6	0

* The nomenclature of the marrow cells is that adopted by Israëls (1939a).

Case I

A married woman aged 40 had noticed a swelling in the left side of her abdomen for three months. During the same period she complained of increasing weakness, palpitation and dyspnoea on exertion, dizziness, and loss of weight. On examination she was very pale and some purpuric spots were seen on the shoulders and arms. The spleen was large and painful; the liver was not palpable. No enlarged lymph