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THE EARLY DIAGNOSIS OF GASTRIC CANCER.¹

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At present we know of no pathognomonic sign or symptom of cancer of the stomach. There is therefore no royal road to diagnosis. I cannot tell you how to diagnose gastric cancer; the most I can do is to emphasize the important points which will help you to make a diagnosis early, and to indicate some of the ancillary means which may help you to confirm such diagnosis.

In the early stage of the disease the symptoms are few and slight; in the later

stage so plain that he who runs may read. Many of the so-called symptoms, such as persistent vomiting, severe anæmia, jaundice and wasting, are late complications, and when such are present, the opportunity for successful treatment is gone for ever.

At the outset, I would emphasize the supreme importance of obtaining a detailed and accurate history of the case, and the making of a careful and thorough clinical examination. For these no laboratory investigations can be a substitute.

The earliest symptoms of gastric cancer are **gastric discomfort, loss of appetite, failure of strength** and a **slight degree of anæmia**.

Gastric discomfort may be defined as being conscious of having a stomach. A healthy individual is unaware of the existence of this organ. The onset of discomfort and uneasiness after food, insidious and scarcely noticeable at first, is

¹Part of a Fellowship Lecture delivered at the Medical Society of London, on Monday, February 9, 1931.

the earliest symptom which attracts the patient's attention. Occasionally the onset is comparatively sudden, perhaps following some indiscretion in diet. Soon the discomfort is accompanied by flatulence and belching of gas, at first following the ingestion of food but, as its severity increases, becoming more or less constant. At a late period the patient may complain of pain, described as of a dull, sickening character, referred to the epigastrium, but rarely of the severity experienced in gastric ulcer. Pain or discomfort is present in 86 per cent. of the cases ; in the remaining 14 per cent. it may be very slight or even absent. Radiation of the pain is a late symptom, and signifies that the growth has invaded the liver or pancreas.

Loss of appetite is gradual in its onset. The patient is disinclined for food, not because it brings on pain, but because he has no appetite. In many cases he evinces a marked dislike for meat.

Progressive loss of strength is an early symptom, sometimes the first to attract attention, and often is associated with depression of spirits and impaired mental activity. Almost invariably, even in the early stage of gastric carcinoma, there is a gradual and progressive loss of weight. If, however, the patient be kept in bed and dieted carefully, in some instances the body weight may be maintained or even increased.

As a rule, even in the early stage, a slight degree of anæmia is present ; occasionally, this is the earliest sign of the disease. When this is so, in my experience, the disease runs a very rapid course, and the patients are beyond the reach of surgery before the real cause of the anæmia is suspected. Fortunately, however, such form only a small proportion of all cases.

A palpable tumour is not an early sign of cancer. Our aim should be to establish a diagnosis, or at least to decide upon the need for surgical treatment, before a tumour can be felt. Nevertheless, a palpable tumour by no means contra-indicates the possibility

of complete removal. Occasionally the detection of a tumour is the first indication of the disease, the other symptoms having passed unnoticed. This emphasizes the importance of a careful and systematic examination in all cases. In palpating for a gastric tumour, the abdomen should be examined with the patient lying on the back, and also while lying on the left side with the knees drawn well up. The examination should be made, not only after emptying the stomach, but after distending it with air. The stomach may be distended by using Senoran's stomach evacuator as a pump, or by giving the two halves of a Seidlitz powder separately, the acid portion being given first. Sometimes by this manoeuvre a hardening can be felt in the region of the pylorus, probably due to spasm of the pylorus set up by the distension. When present, this sign is an indication, not necessarily of cancer, but of the advisability of surgical treatment.

In the early stage of carcinoma of the stomach, vomiting is an occasional symptom, but when the growth has caused pyloric stenosis, it is a constant and distressing feature. Usually, the vomit is dark brown in colour, has an acrid or offensive smell, and may contain blood. Although the existence of pyloric stenosis premises that the disease has progressed beyond the early stage, its presence does not negative the possibility of resection, because when stenosis is marked the indication for surgical treatment is obvious sooner than when there is no obstruction.

Hæmorrhage, as evidenced by hæmatemesis or by melæna is a late rather than an early sign of cancer. On the other hand the persistent presence of blood in the stools, so small in amount that it is not recognizable macroscopically (occult blood), although the patient is on a meat-free diet, is suggestive of cancer. The examination for occult blood is carried out as follows :—

A piece of fæces the size of a hazel nut mixed with water in a test-tube, so as to form a thick emulsion ; to this, one-third

its volume of glacial acetic acid is added and the mixture shaken. Then 5 c.c. of ether are added and the two fluids are mixed by being shaken. On standing, the ethereal extract separates, and of this, 2 c.c. are mixed with 2 c.c. of a saturated solution of benzidin (para-diamido-diphenyl) in rectified spirit and 2 c.c. of a solution of hydrogen peroxide. If blood be present in considerable quantity, the solution assumes immediately a deep blue colour; in lesser quantities the colour is less intense or greenish.

For three days before the test is applied the patient's diet must be free from blood-containing foods.

We are told that the ancient Egyptians used to take a purgative once a week and wash out their stomachs once a month. This procedure might be adopted with advantage in our modern civilization. At any rate, I am convinced that gastric cancer would be diagnosed earlier and more frequently were the use of the stomach tube part of the routine of gastric diagnosis. The use of this ancient and valuable appliance is far less common than it should be.

For purposes of gastric analysis a test meal is given. This consists of two thin slices of dry toast and 15 oz. of tea containing a lump of sugar but no milk. The gastric contents are drawn off *exactly* one hour after the commencement of the meal.

In gastric cancer the quantity of the gastric contents withdrawn one hour after the test meal is considerably above the average; the toast is ill-digested; the fluid contains a considerable amount of mucus, and consequently is so thick and ropy that the gastric contents are difficult to pour. Not infrequently it is possible to diagnose malignancy simply by inspection and smell of the contents withdrawn after a test meal.

The two important points to be ascertained by the use of the test meal are:—

(1) Evidence of impairment of the motor functions of the stomach.

(2) Diminution of the chlorides in the gastric contents.

(i) *Evidence of Impairment of the Motor Functions of the Stomach.*—In 65 per cent. of cases of gastric cancer the disease begins at, or close to, the pylorus. It follows, therefore, that one of the earliest signs of cancer of the stomach is impairment of its motility. The simplest method of estimating this is to give the patient overnight a few raisins and twelve ounces of milk and to draw off the stomach contents twelve hours later. By this time the stomach should be empty; the presence of food remains indicates impaired motility. If, on carrying out this test, 50 c.c. of fluid containing food residue is drawn off, it is probable that there is some condition present rendering an operation advisable. As a rule, persistent impairment of the gastric motility requires surgical intervention.

(ii) *Diminution in the Amount of Chlorides:—*

(a) Diminution of the total chlorides. The amount of total chlorides found by analysis after a test meal invariably is less and usually considerably less, than the average. In my experience the amount is never more than 0.300 per cent., and in about half of the cases is less than 0.200 per cent.

(b) Absence of free hydrochloric acid. As a rule, free hydrochloric acid is absent from the stomach contents in gastric carcinoma. For long this was regarded as pathognomonic of cancer. We know now, however, that this is not the case. This sign, like many others, "has been weighed in the balance and found wanting." Free hydrochloric acid is absent in many other conditions. Nevertheless, absence of free hydrochloric acid is the rule, and its presence the exception. My experience is that when free hydrochloric acid is present, the growth is more likely to be at the cardiac end of the stomach or in the duodenum.

(c) Diminution of the protein hydrochloric acid. In my experience, a marked diminution of the protein hydrochloric acid is an early sign of cancer of the stomach. It occurs also in chronic gastritis due to causes

other than malignant disease, but in estimating the value of this sign we must consider its importance in relation to the clinical history.

Radiography.—In recent years there has been great advance in the technique of radiography for gastric diagnosis, and often an X-ray examination is of great help in confirming the opinion formed after examination of the patient. As a rule, screening is of more value than radiographs. Failure of the peristaltic waves to pass beyond the pyloric end of the stomach is suggestive of a pyloric growth. The radiographer must be one who has had much experience in this class of work to enable him to interpret correctly what he sees on the screen.

Inasmuch as 75 per cent. of all cases of gastric cancer occur in patients between the ages of 40 and 70, intractable indigestion at this period of life should always be regarded with suspicion, especially if it be of sudden onset, for, as Hale-White has pointed out, "If symptoms of serious chronic gastric indigestion first appear after the age of 40, organic disease of the stomach should be strongly suspected." Nevertheless, we must bear in mind that gastric cancer, rarely, it is true, does occur in young persons—I have seen it in a young woman only 26 years old—so we must not overlook this possibility, even in young persons.

Although it is true that in a majority of the cases the onset of the symptoms is sudden, in at least 40 per cent. there is a long history of chronic indigestion. These are the cases in which it is difficult to unravel a clear picture of the onset of cancer. In most of them, questioning will usually point to gastric atony or chronic intestinal stasis as the cause of the previous indigestion, and a searching cross-examination will almost always elicit that there has been a recent exacerbation in the severity and persistence of the symptoms, so that the patient no longer experiences the remissions which occurred in the past. Just as long before there are physical signs, pulmonary tuber-

culosis may often be suspected when the patient has a slight cough accompanied by loss of strength and mental and physical lassitude, so gastric cancer may be recognized from the history in conjunction with the general appearance and condition of the patient. Gastric distress, accompanied by loss of appetite, loss of strength and general listlessness and lassitude, presents a clinical picture which is suggestive of cancer.

I will try to put before you a picture of gastric cancer. As the patient walks into your room observe him closely. He is a man in the prime of life, but he is listless and walks with less vigour and sprightliness than he should. He looks anxious and careworn. His age is 50, but he looks older than his years. He tells you that for two or three months he has suffered from discomfort after food, slight at first but gradually increasing. Now, the discomfort is almost constant, and he is troubled by belching of gas, sometimes by sour eructations. He has little inclination for food, and eats as a duty rather than to satisfy the appetite. He tells you that he feels tired and disinclined for any form of exertion, mental or physical. Although he sleeps fairly well, he does not wake up refreshed and ready for the day's work. Probably you will find a slight degree of anæmia, and that his skin is dry and wrinkled, as if he has been losing weight. On examination, his abdomen is flat, but if you examine him while lying on his side, you may feel an indefinite resistance in the region of the pylorus. On distending the stomach with air you may detect a sudden hardening due to spasm of the pylorus, but there is no tenderness or rigidity anywhere. Such a clinical picture excites a suspicion of gastric cancer. When in addition you ascertain that there are food remains in the stomach in the morning, that on examination of a test meal the contents of the stomach are thick and ropy, perhaps of a dark brown colour, that the total acidity is low, and that there is a marked diminution of the protein hydrochloric acid, suspicion

is changed to probability, and the wisdom of exploration is no longer in doubt.

The chief conditions which may give rise to difficulty in differential diagnosis are gastric ulcer and its consequences, and chronic gastritis.

GASTRIC ULCER AND ITS CONSEQUENCES.

When an extensive ulcer is present the symptoms may simulate closely those of cancer. There is emaciation, hæmorrhage and consequent anæmia, absence of free hydrochloric acid, and impairment of the gastric motility. In the case of an ulcer, however, the percentage of the protein hydrochloric acid rarely, if ever, is as low as in carcinoma. In cancer the loss of appetite is an early symptom, while the appetite of a patient with an ulcer remains good until the last stage, but he does not eat for fear of the pain caused by food. In the case of ulcer, the loss of flesh and the failure of strength are in proportion to the duration of the disease and to the extent of abstinence from food. When cancer is present, the loss of strength is more marked, becomes worse more rapidly, and is greater than can be accounted for by the mere lack of appetite. When an ulcer of the duodenum has resulted in much contraction of the pylorus, or a gastric ulcer has produced an hour-glass stomach, the emaciation may be so pronounced that a suspicion of malignancy is raised.

As a rule, the washing-out test, and the results of gastric analysis will settle the diagnosis, although it must be remembered that occasionally malignant disease of the body of the stomach causes an hour-glass constriction.

Chronic Gastritis.—To differentiate early carcinoma from simple chronic gastritis is often a difficult problem. In both conditions the symptoms are similar and the onset insidious. In all elderly persons symptoms of chronic gastritis should be regarded as a possible evidence of cancer until the contrary is proved. The most important dis-

tinguishing feature of carcinoma is the early period at which the patient notices loss of strength and energy. The progress of chronic gastritis is much less rapid, and the general health is not affected until a late period of the disease. In cancer, the early morning vomiting so characteristic of chronic gastritis is absent, and vomiting, when it occurs, does so towards the evening or after the chief meal of the day. The anæmia so often present in the early stage of carcinoma is absent in chronic gastritis. In gastric cancer, impairment of the gastric motility is an early feature, but in chronic gastritis this is not present until a much later stage. In most cases a differential diagnosis is possible by examination of a test meal. Diminution of the protein hydrochloric acid is an early sign of cancer. In chronic gastritis the protein hydrochloric acid may be diminished, but not to such a degree; but the important point is the relation of the degree of diminution of the protein hydrochloric acid to the duration of the patient's symptoms; in other words, the shorter the history and the greater the diminution of the protein hydrochloric acid, the greater the probability of cancer. Let me illustrate this by analyses of the gastric contents of two patients, neither of whom had any palpable tumour.

The first refers to a man who had suffered from gastric symptoms for just on a year :—

Total acidity	44	Normal average	60
Total chlorides	0.206	" "	0.320
Free HCl	0.000	" "	0.020
Protein HCl	0.082	" "	0.230
Mineral chlorides	0.124	" "	0.070

The chemical findings in this case are those of a chronic gastritis with a very marked diminution of the protein hydrochloric acid. This might be due to inflammatory disease or to cancer. The comparatively long history, and at the same time fair condition of the patient and the absence of any degree of anæmia were against malignant disease. Cancer of such long standing

should have resulted in a lower total acidity and an even more marked diminution of the protein hydrochloric acid. At the operation a gumma of the liver was found which had become adherent to and invaded the pylorus.

The second analysis is that of the gastric contents of a woman who had suffered from gastric symptoms for four months :—

Total acidity	...	...	...	29
Total chlorides	...	...	...	0.183
Free HCl	...	...	...	0.000
Protein HCl	...	...	...	0.070
Mineral chlorides	...	...	...	0.113

In this case the degree of gastritis was rather greater than in the first case, and yet the history was much shorter. This, together with the fact that the patient had evidently lost flesh and was slightly anæmic, led to a diagnosis of carcinoma, which was confirmed by operation and successfully removed.

The results to be obtained by surgical treatment depend on early diagnosis. This is the key to success. My experience is that 18 per cent. of the patients remain free from recurrence for five years, and 27 per cent. for three years. I have had five patients who have lived for over ten years and then died from other causes. With earlier diagnosis and earlier surgical treatment the results would be incomparably better. It behoves us all to use every means at our disposal to perfect our diagnosis, so that we may recognize the disease early and urge operation before it be too late. It is by earlier operation, rather than by more extensive operation, that the results of the surgical treatment of cancer will be better in the future than they are to-day.

THE SURGICAL CLINICS
OF VIENNA.

By REYNOLD H. BOYD,

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PART I.

WHILE the fame of various and scattered Continental clinics is known to the few, that of the Wiener group is known to all. It may be of use, then, to give some brief account of the facilities they offer to post-graduates.

It is difficult to see much in Vienna without the help of the American Medical Association, at 9, Alserstrasse, Wien VII. There, every evening, the operation lists are posted up. No fee is charged for attending operations and, as the theatres are spacious with well-arranged stands, a good view is always obtained. English, with a liberal admixture of American idiom, is spoken in all the clinics and the surgeons talk freely of their methods and cases. Classes in English can be arranged only through the American Medical Association. These tutorials are usually very good but the fees for them are rather high. The range of subjects, which are nominated by members, extends from proctology to cosmetic surgery.

On arrival in Vienna the best course is to take a taxi to the American Medical Association rooms, join the Association (the fee is about £3), and select suitable accommodation from their list of sponsored hotels, pensions and rooms. Taxis, food and lodging are all extraordinarily cheap.

While much may be gained from watching operations at the various clinics, the most outstanding features of surgical interest are the treatments employed by Böhler for accident cases and the universal use of local anæsthesia.

THE ARBEITER UNFALLKRANKENHAUS.

This is a highly-organised workmen's accident hospital, run at the expense of the