SOME CLINICAL FEATURES OF CARCINOMA OF THE STOMACH

JAMES F. MINNES, M.D., AND CHARLES F. GESCHICKTER, M.D.

(From the Surgical Pathological Laboratory, Department of Surgery, Johns Hopkins University)

Despite the progress made in gastric surgery since Billroth performed the first successful partial gastrectomy for a carcinoma of the stomach in 1881, gastric cancer still remains one of the unsolved problems in modern medicine. The lesion is one with a high incidence and an equally high mortality. It has been estimated that in the United States there are approximately 120,000 deaths from cancer every year, and that of these more than one-third are from cancer of the stomach. The possibility of reducing this mortality by a proper evaluation of the various signs and symptoms and of elaborating a more methodical clinical approach to the problem has prompted the present analysis of 541 cases.

Cancer of the stomach in its early stages is curable by surgery. The inherent difficulty of the problem is the recognition of the disease at a stage when the lesion is small and localized and consequently amenable to surgical removal. As a rule, gastric cancer is recognized clinically only after it has reached an advanced stage, as is clearly indicated by the following analysis. Of the 541 patients under consideration, 236 (43.6 per cent) had a readily palpable mass in the epigastrium. While the presence of such a mass does not necessarily signify inoperability, it is obvious that when a tumor of an inaccessible organ such as the stomach can be felt through the abdominal wall, it has in the majority of instances already extended beyond the limits of surgical resection. Furthermore, 15.3 per cent of the series were advised against operation because the attending surgeon believed that the extent of the lesion contraindicated surgical intervention, or the patient was so debilitated that he could not sustain a major operation. In 36.4 per cent the lesion was found inoperable after an exploratory laparotomy, the incision being closed and nothing further attempted; approximately 5 per cent of the patients refused operation.

The high mortality of this condition is indicated in Fig. 1, which shows the length of life after operation in 370 cases followed for more than five years or until death. There were but 3.5 per cent five-year cures.

The late recognition of cancer of the stomach may be attributed to three factors: (1) The first is the insidious nature of its onset. The disease is usually well advanced before it is manifested clinically by even the mildest symptoms. (2) The patient, ignorant of the potential danger of his vague gastric complaints, neglects medical consultation. At this time the condition has advanced to a hopeless stage and the symptoms are those of the typical text-book picture of gastric cancer. (3) The physician neglects the significance of the early symptoms and continues to treat the case as one of benign
dyspepsia until its progressive development makes him aware of its true nature.

Obviously the first factor is beyond control. With regard to the second, many have advocated an intensive educational campaign of the public concerning the ominous nature of epigastric symptoms in those of the cancer age. Although this might be helpful, too great optimism about the efficacy of such a program is not justified. Alvarez recently analyzed 41 cases of gastric cancer occurring in reputable physicians and discovered that the duration of symptoms was not less than that observed among the laity. How then can one anticipate greatly improved results from the education of the public who

![Graph showing duration of life following operation in 370 cases of carcinoma of the stomach.](image)

**Fig. 1. Chart Showing Duration of Life Following Operation in 370 Cases of Carcinoma of the Stomach**

at no time would have as comprehensive an understanding of the subject as this selected group? It is only in pursuit of the third factor, the early recognition of cancer of the stomach by the clinician, that we can expect a material improvement in the mortality rate of this condition.

**Clinical Observations**

*Age, Sex, Heredity:* Seventy-six per cent of the cases in this series occurred between the ages of forty-four and sixty-six, 10.7 per cent occurred before the age of forty, but 2.6 per cent after seventy (Fig. 2). The youngest patient was twenty-five, the oldest eighty. The average age of onset for the series was 53.6 years, but that for females was slightly lower than for males, 48.5 years as compared with 54.4.
In accordance with other statistical studies it was found that gastric cancer was roughly three times as common in males as females, 76.2 per cent in males, 23.8 per cent in females. A family history of cancer was elicited in 12.7 per cent of 305 cases in this series.

**Location:** Roentgen studies and operative and necropsy findings showed that 49.8 per cent of the tumors occurred at the pylorus, 19.2 per cent on the lesser curvature, 12.1 per cent affected the fundus, 6.6 per cent the greater curvature, and in 5.6 per cent the entire stomach was involved. In 4.8 per cent the cardia was involved and in 1.6 per cent carcinomatosis of the stomach was discovered (Fig. 3).

**Symptomatology:** Fig. 4 shows the duration of symptoms before admission to the hospital. In the majority of cases the symptoms had been present from six months to a year. The mode of onset was varied. There were three groups of cases: (1) the dyspeptic, (2) the cachectic, and (3) the ulcerative. The majority of cases came within the first group. The symptoms referable to the stomach varied from a feeling of mild discomfort and sense of fulness after meals, with loss of appetite, to acute epigastric pain, nausea and vomiting, and occasionally hematemesis. In the cachectic group, which was small, there were no symptoms referable to the stomach until late, the patient complaining of progressive weakness, fatigue, and loss of energy. In the third or ulcerative group, which formed but 7 per cent of the entire series, the
patient gave a typical history of gastric ulcer of six months' duration or longer, the pain changing in character and losing its relation to meals. Only 2 per cent gave a history of five years' duration or longer.

Pain was present in 405 cases or 74.8 per cent, indigestion in 254 or 46.9 per cent, and nausea in 310 or 57.3 per cent. There was nothing constant in the character of pain. It varied both in quality, intensity, and location. It was described as gnawing, dull, burning, or stabbing. Sometimes it remained localized in the epigastrium; sometimes it radiated down into the abdomen, flanks, or behind the shoulder blades. Commonly, it was aggravated by eating. Pain apparently was not dependent upon ulceration or obstruction, for in many instances both of these factors were absent and yet pain remained a conspicuous feature. Pain may arise from involvement of Meissner's or Auerbach's plexus by infiltration of the carcinoma cells or the accompanying fibrosis. In this connection it is interesting to note that the mucous membrane of the lesser curvature is closely attached to the muscle. Consequently tumors of the lesser curvature, as noted by Cerf, are especially painful because of early invasion of the muscularis and the adjoining plexus of nerves.

Constipation, though infrequent, occurred in 44 or 8.1 per cent of the cases. When present, it was chronic and persistent.

Clinical and Laboratory Findings: The most constant and conspicuous feature in the above series of cases was the rapid loss of weight, which was present in 91 per cent of 400 cases. The average weight loss was 30.9 pounds. A number of reasons for this loss of weight might be suggested. In some of

---

**Fig. 3. Chart Showing Location of 541 Cases of Carcinoma of the Stomach**

---
the patients dehydration was an outstanding feature and large amounts of fluids had to be administered before operation could be attempted. In another group a diminished intake of food, because of pain or anorexia, resulted in partial starvation. In a third group, in which neither dehydration nor loss of appetite was conspicuous, interference with the function of the stomach and other digestive organs played a possible rôle.

On physical examination emaciation and pallor were almost constantly present. A mass was found in 43.6 per cent of the cases and epigastric tenderness was noted in 32.3 per cent.

Occult blood in the stool, as determined by the guaiac or benzidine test on a three day meat-free diet, is an important observation. While this finding is not pathognomonic of cancer, it provides evidence of an organic lesion high in

![Fig. 4. Chart Showing Duration of Symptoms Prior to Treatment in 541 Cases of Carcinoma of the Stomach](image)

the gastro-intestinal tract which demands careful roentgen studies. Such a finding precludes a gastric neurosis or benign gastric dyspepsia, which are too frequently assumed as an explanation of the patient's complaints. In this series of cases occult blood in the stool was present in 58 per cent of the 193 cases in which a test for such bleeding was performed.

A second important laboratory procedure is the determination of the secretory function of the stomach as revealed by the hydrochloric acid content of the gastric juice. Clinicians have long regarded achlorhydria as a constant accompaniment of cancer of the stomach, so much so that they have hesitated to make a diagnosis of gastric cancer in its absence. However Hartman has shown that this is by no means invariable. An analysis of 339 cases in the present series shows that, although achlorhydria generally is found, hypochlorhydria and even hyperchlorhydria sometimes occur. Achlorhydria was present in 64.6 per cent of the cases, hypochlorhydria in 25.9 per cent, normal
values in 6.7 per cent, and hyperchlorhydria in 2.6 per cent. Lewis regards the presence of achlorhydria following the preliminary injection of histamine as an early sign of cancer of the stomach. Regarding the pathogenesis of achlorhydria it was found that the degree of acidity or anacidity was not dependent on the location of the tumor nor conditioned by the direct destruction of the oxyntic cells in the fundus of the stomach where the hydrochloric acid is thought to be formed. Its production seems to result from an irritative gastritis created by the cancer. The presence of the neoplasm apparently gives rise to an abundant secretion of mucus with consequent occlusion of the gastric crypts into which the hydrochloric acid is discharged.

**Roentgen Features:** Perhaps there is no single diagnostic procedure of such importance as the roentgen examination. Rehfuss states that experts in the method of palpation under the fluoroscopic screen can diagnose over 95 per cent of gastric cancers. It is not within the scope of this paper to give in detail the x-ray features of cancer of the stomach. But the conclusions of Rehfuss are worthy of reiteration. He recommends: (1) fluoroscopic study in the lateral as well as the antero-posterior position to disclose lesions on the anterior and posterior walls; (2) examination in the recumbent posture for discovery of lesions in the cardia as well as for more perfect visualization of the pylorus; (3) a suspicious attitude toward negative defects even though they have the dimpled appearance of a healed ulcer; (4) repeated re-raying of healed ulcers owing to the possibility of malignant change; (5) routine Wassermann tests in every case of gastric defect to exclude syphilis.

Carman, in distinguishing the crater of ulcerating cancers from the typical niche of a benign ulcer, emphasizes three points. (1) The crater is not within the stomach wall and therefore does not project from the visualized gastric lumen. (2) In profile the crater appears as a meniscus. (3) It tends to retain its barium content during palpatory manipulation.

For revealing an infiltrating type of cancer, that is one which does not produce any alteration in the conformity of the lumen of the stomach, the technic of Fraenkel may be employed. Ten serial pictures are taken at intervals of two seconds so that a single peristaltic wave is followed in its entirety. If infiltration or fibrosis is present, interruption of the wave is observed at the site of the lesion.

It is generally believed that competent radiological examination establishes conclusively the presence or absence of gastric cancer. In the present series of cases such studies were not infallible, although the largest percentage of negative examinations was recorded prior to 1915. Among 197 cases where radiological examinations were adequately recorded, there were 34 in which no organic lesion and no disturbance in the function of the stomach was disclosed, although in all of these patients carcinoma was subsequently proved by operation or at autopsy. In 6 additional cases disturbances in motility only were noted. In one instance displacement of the pylorus was observed. In all the remaining cases definite organic findings, such as obstruction, dilatation, filling defect, ulceration, perforation and other deformities of the stomach, were noted.
Pathology

While the present analysis does not include a detailed study of the pathologic material, the records of such study in 332 cases of this series may be summarized. In approximately two-thirds (226) of the cases the lesion consisted of a fungating and ulcerating mass, variously described as polypoid, bulky, or fungoid carcinoma. The majority of these cases were microscopically adenocarcinoma. In 20 cases the tumor was gelatinous or translucent in appearance, suggesting mucoid carcinoma or adenocarcinoma with mucoid change. In 30 cases the lesion was infiltrating and sclerosed in character. Ulceration only or carcinoma in ulcer was noted in 14 cases. In 19 cases the stomach was involved diffusely or by multiple nodules. Perforation was recorded in 8 cases; malignant change in a benign papilloma in 3.

Histologic study of the sections obtained at operation or autopsy in the above series of cases revealed the following: adenocarcinoma, 212; adenocarcinoma with mucoid change, 21; primary mucoid carcinoma, 18; fibro- or scirrhous carcinoma, 15; anaplastic or medullary carcinoma, 65; squamous-cell carcinoma, 1.

Diagnosis

A review of the clinical data on 541 cases, together with the various laboratory and roentgen features, indicates the importance of a most searching history and investigation of the patient who presents himself with a gastric complaint. The mode of onset should be carefully inquired into. If in a patient of middle age who has previously been free from any subjective gastric symptoms there gradually appears loss of weight or an actual distaste for food, mild epigastric distress after eating, or simply a sense of discomfort, or if a history of chronic ulcer is obtained in which the pain has become increasingly severe and has lost its periodicity, neither being relieved by food nor exacerbated by the absence of food, cancer of the stomach should be suspected and excluded before concluding that the underlying pathology is of a benign nature. The presence of loss of weight, anemia, occult blood in the stool, and achlorhydria are confirmatory findings. If, however, there is any uncertainty in the mind of the clinician, the true nature of the lesion can be put to a therapeutic test. Cancer of the stomach is always progressive, whereas peptic ulcer, chronic gastritis, and gastric syphilis will abate with remedial measures. If after a fortnight's treatment no regression in symptoms is noted, then serial plates of the stomach following a barium meal should be taken and repeated if necessary after a few days if the lesion still remains questionable. On failure of roentgen studies either to confirm or exclude the diagnosis of cancer the patient should be subjected to an exploratory laparotomy, for resection of the growth provides the only means of cure in the present state of our knowledge.

Treatment

On the basis of treatment the cases in the present series fall into three groups: (1) cases in which no operation was performed; (2) cases in which
a laparotomy only or laparotomy and palliative operation were performed; (3) cases in which some form of resection was done.

Approximately 21 per cent of the patients were either advised against or refused operation. In approximately 20 per cent of the cases an attempt was made to eradicate the disease and some form of resection was carried out. In these cases the postoperative mortality varied from 40 to 17 per cent by decades, the lowest mortality being recorded in the decade 1926-1935. In the remainder of the cases exploratory laparotomy was performed, with or without palliative procedures. The ultimate results in the cases followed are shown in Fig. 1. Of the entire group, only 3.5 per cent survived more than five years.

**SUMMARY**

The present study discloses that, regardless of the clinical features, all cases of carcinoma of the stomach are unfavorable from the standpoint of curability. In 370 cases followed more than five years or until death there were but 3.5 per cent of five-year cures. Of 541 cases, slightly over 75 per cent occurred in males and an equal percentage occurred between the ages of forty-four and sixty-six years. Fifty per cent of the tumors occurred in the pyloric region, 20 per cent on the lesser curvature, and the remainder elsewhere in the stomach. In the majority of cases the duration of symptoms varied between six months and one year. The cases were divisible into three groups according to their mode of onset. In one, the dyspeptic group, the symptoms varied from gastric discomfort to acute pain accompanied by nausea and vomiting with occasional hematemesis. In the second, the cachectic group, there was progressive weakness, fatigue, and loss of energy. In the third, the ulcerative group, there was a typical history of gastric ulcer with symptoms changing in character and severity after a period of six or more months. The majority of cases fell into the dyspeptic group.

The most conspicuous clinical finding was marked and rapid loss of weight with an average loss of 30.9 pounds. This occurred in 91 per cent of the cases. A palpable mass in the epigastrium was found in 236 of 541 cases. Occult blood was found in the stool in 58 per cent of 193 cases in which the test was performed. Analysis of the gastric contents in 339 cases showed achlorhydria in 64.6 per cent, hypochlorhydria in 25.9 per cent, normal values in 6.7 per cent, and hyperchlorhydria in 2.6 per cent. In just under 200 cases in which radiological examinations were recorded, organic lesions were disclosed in 157 cases. In 34 cases neither an organic lesion nor disturbance in the function of the stomach was disclosed and in 6 cases disturbances in motility only were noted.

The cardinal clinical features of carcinoma of the stomach are gastric distress in a patient past middle age, accompanied by loss of weight, anemia, or occult blood in the stool, and achlorhydria. The lesion is generally situated in the pylorus; it is palpable in 43.6 per cent of the cases, and is manifested radiologically by an organic defect or changes in the contour and motility of the stomach. In cases which are clinically doubtful laparotomy should be performed.
BIBLIOGRAPHY


CARMAN, R. D.: Benign and malignant gastric ulcers from a roentgenologic viewpoint, Am. J. Roentgenol. 8: 695, 1921.


