DIFFUSE CARCINOMA OF THE STOMACH, ESOPHAGUS AND DUODENUM.*

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The most common form of carcinoma of the stomach is the one presenting a more or less sharply demarcated tumor near the pylorus. Less frequently there is simply a diffuse thickening of the stomach wall with not very sharply defined margins. Occasionally the latter type involves almost the entire extent of the stomach, causing a diffuse thickening of the stomach wall. The former type usually has an ulcerated surface; in the latter often the mucosa remains intact. When there is a very extensive involvement of the stomach in a diffuse growth the term "leather bottle stomach" has been applied, and it is not an inapt descriptive term. Such cases are uncommon, and it seems worth while to place another on record, especially since in this case a large extent of both esophagus and duodenum in addition to almost the entire stomach were involved.

Patient.—L. K., aged 62, was admitted Jan. 23, 1906, to the Massachusetts General Hospital, in the service of Dr. R. H. Fitz, by whose permission I report the case.

History.—Family and past history negative in so far as concerns the present trouble. Habits good, neither tobacco nor alcohol indulged in.

History of Illness.—For the past three months the patient had had what he termed "stomach trouble," with a full feeling after eating small amounts. For two months he had had pain in the epigastric region. At first there were eructations of gas, now very slight. There has been no nausea, but food regurgitated easily for a time after each meal. This latter condition became less marked. The pain continued and grew worse. Vomiting occurred frequently from five minutes to one-half hour after eating. Vomitus was not large in amount and had not been observed to contain food eaten the day before. There had been no evidence of blood in the vomitus. Appetite poor; patient said he thought he vomited from one-third to one-half of what he ate. Bowels constipated since onset of present illness. Dejecta formed, firm, not ribbon like. For two weeks he had been short of breath and feet and legs had been swollen. He had passed but little urine for ten days. He drank little water, however. He urinated two or three times at night. For six or seven years he had had bleeding piles. The patient thinks that he has lost much weight and grown very weak during past three months.

Physical Examination.—A large framed, emaciated man with skin dry and slightly rough, mucous membranes slightly pale, pupils normal, tongue moist and clean, throat negative, heart not enlarged, no murmurs, radial and brachial arteries thickened but not beaded. Pulses synchronous, regular, slow, good volume, fair tension and regular size; veins of arms and chest visible and prominent. Lungs: no dullness, few medium moist râles in both lower backs. Abdomen full and moderately distended, with a few bluish distended veins extending upward on the chest wall. Flatness in the flanks and in the lower portion of the abdomen up to within two inches of the umbilicus, shifting on turning from side to side, and with a slight fluid wave. Moderate tenderness in the epigastrium, especially just below the ensiform and also in both hypochondria, but more in the right. No palpable masses. Circumference of abdomen at umbilicus, thirty-three inches. Liver flatness beginning at sixth rib and extending to costal margin: edge not palpable. Splenic dullness 2x3½ inches, edge not palpable. Kidneys not palpable. A few pea and bean sized glands in groins, axillæ and neck. Moderate edema of ankles and legs up to knees. Urine: slightest possible trace of albumin with an occasional epithelial cell and rare hyaline cast.

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Lavage and Test Meal.—Stomach tube was passed down for fourteen inches, where it met an obstruction and could be passed no further. A large catheter was then used, which passed the obstruction and about one ounce of yellowish liquid was removed. There were no signs of blood. An Ewald test meal was given and after one hour removed by means of the catheter. The stomach could hold nineteen ounces of water, of which fifteen ounces could be recovered. Inflation showed the lower border to lie two and one-half inches above the umbilicus. The residue from test meal showed no free hydrochloric acid with Congo red or Töpfer's solution. There was a weak reaction for lactic acid. The guaiac test for blood was negative. Total acidity was 0.2 per cent. Stool showed no blood by the guaiac test and was otherwise negative.

Course of Disease.—January 30, an increase in abdominal fluid was noted. Swallowing was difficult and only liquids and soft toast were taken. Patient vomited occasionally, but the vomitus was not bloody.

February 3, abdominal circumference thirty-five and one-half inches. Much discomfort, especially at night. Patient continued to grow weaker until he died February 10.

Autopsy (M. G. H., No. 1596).—Examination of body 18½ hours later, by Dr. Oscar Richardson, showed a well developed, emaciated old man. The peritoneal cavity was filled with thin brownish red fluid, but the peritoneum was smooth and glistening. The anterior margin of the right lobe of the liver lay 3 finger breadths below the costal margin in the right mamillary line. The right pleural cavity contained a slight amount, the left a considerable amount of brownish red fluid. The peribronchial lymph nodes were enlarged and on section showed here and there rather large areas of grayish yellow homogeneous tissue. Lungs, pericardium, heart and liver were not abnormal. The gall bladder, which was free from stones, was distended and was slightly distorted by adhesions about it, which bound it to the intestine. The common bile duct was free, but just above where it extended along the wall of the duodenum it was slightly dilated and where it coursed along the pancreas and in the wall of the thickened duodenum it was slightly narrowed. Pancreas, spleen, adrenals, kidneys, bladder, prostate, seminal vesicles and testes appeared normal.

The wall of the esophagus, beginning at a point about at the level of the bifurcation of the trachea, was moderately thickened along its course down to the stomach. The wall of the stomach was thickened and measured at the pyloric end, where it was thickest, about 1.5 cm. The wall of the duodenum for a distance of 4 or 5 cm. was similarly thickened. The stomach as a whole was thickened, and the thickening was diffuse in character, although a small portion (about size of end of thumb) of the cardia to the left of the esophageal orifice was of about normal thickness and character. On section the increase in the thickness of the wall of the esophagus, stomach and duodenum seemed to be principally in the region of the submucosa, where the tissue was homogeneous, firm, gray-white in color. The mucosa of the stomach in several places was slightly thickened and rounded up over the thickened submucosa.

The retroperitoneal lymph nodes along the aorta and pancreas were enlarged and on section their tissue was firm, grayish and homogeneous. The peritoneum along the lesser curvature showed grayish, thin, plaque-like areas. Cultures from heart showed *Streptococcus pyogenes*, from the liver *Streptococcus*, *Staphylococcus aureus* and *Bacillus coli*.

Anatomic Diagnosis.—Carcinoma of stomach with extension into the esophagus and into the duodenum; metastases in retroperitoneal and bronchial lymph nodes and in lung (microscopic); chronic pericholecystitis; ascites; hydrothorax; slight arteriosclerosis; streptococcus septicemia.

Microscopic Examination.—Portions of the esophagus, stomach and duodenum show a diffuse infiltration with cancer. All portions of the wall of these viscera are involved, but in general the submucosa shows the greatest degree of thickening. The tumor is in the form of scattered epithelial cells, here and there gathered in small masses and these are separated by a fair amount of rather edematous stroma. In the muscularis there are scattered cells as well as small cell

groups both within the muscle bundles and in the intervening connective tissue. The individual cells are of medium size and irregular shape. The nuclei are round, oval or of irregular shape, vesicular with finely divided chromatin and often a distinctly acidophilic rounded nucleolus. Mitotic figures are fairly frequent. Here and there is an occasional larger mass of epithelial cells, but these as a rule show no glandular arrangement. Rarely there is a distinct cell grouping; however, in form of tubular glands. The mucosa seems quite intact so far as tumor growth is concerned.

Sections from several lymph nodes show infiltration with the same type of epithelial cells. In one there are large cell masses and here the cells are more or less fused together so that cell outlines are indistinct. The general impression here, however, is that the cells tend to a flattened type. Still in the masses are fairly definite gland spaces, and in other lymph nodes is found a definite tubular type of atypical glands. The tumor for the most part is of the diffuse infiltrating type and only here and there suggests an origin from the squamous epithelium of the esophagus. A stomach origin with extension to esophagus and duodenum seems more probable in this case in consideration of macroscopic and microscopic appearances. A section of lung shows minute metastases, chiefly in the perivascular lymphatics. Here in many places the tumor is distinctly of tubular gland type.

In a careful search of the literature I have been unable to find a case with such extensive involvement of stomach, esophagus, and duodenum with diffuse carcinoma as occurred in this case. Extensive carcinoma of the stomach, however, is not very uncommon. In 791 collected cases, Welch¹ found that 61 (4.7 per cent.) involved the whole or greater part of the stomach. The nodular, ulcerating type of carcinoma, however, which may be very large and infiltrate much of the stomach wall, is to be distinguished from the diffusely infiltrating type which causes a very uniform thickening of the stomach wall with little or no ulceration of the mucous membrane and Welch's figures include both types. The latter type constitutes a distinct group of tumors of the stomach and they are not very common. At the Boston City Hospital in 27 autopsied cases of gastric carcinoma there have been none, and in fifty-six autopsied cases of the same condition at the Massachusetts General Hospital two cases of such diffuse carcinoma. Of the latter one case is the one reported above. The other (M. G. H., No. 531) occurred in a man, 44 years old. The stomach in this case was small; its wall generally thickened. The mucous membrane showed no ulceration. Microscopic examination showed in the submucosa and muscularis scattered epithelial cells, singly and in small groups.

Welch² has reported one case in which the stomach was shrunk to the size and shape of a kidney, with thickening of all coats and without ulceration of the mucosa. A second case reported by him was similar, though the primary growth was in the ovaries.

Hektoen³ described two cases, one very typical of this group, with no ulceration of the mucosa, the other with an ulcerated mucosa and perhaps not quite so typical, but still belonging to this group.

Perry and Shaw⁴ have collected all of the cases of cancer of the stomach, primary or secondary, autopsied at Guy's Hospital from 1826 to 1900. Among these have been included some few cases of sarcoma and the total number of cases is 306. Of these fifteen were diffuse carcinomata involving the entire, or almost the entire, stomach. Of these, Cases 17 and 297, probably

also Case 194, showed diffuse carcinoma of the stomach with extension into the esophagus. However, there was no extension into the duodenum in either of these cases.

Graves⁵ and Cadd⁶ each report one typical case belonging to this group. Doubtless other cases have been reported, but the reports are not easily accessible. Among the older writers undoubtedly some of the cases diagnosed fibrosis of the stomach were in reality cases of diffuse carcinoma without ulceration. In most of the reported cases the stomach was very greatly shrunk-en as well as thickened. Marked shrinkage, however, had not occurred in the case reported here by me.

DISCUSSION.

DR. ARTHUR D. HIRSCHFELDER, Baltimore, asked Dr. Christian whether or not in this case there was the usual anacidity of the stomach, and if there were any disturbances in the pancreatic secretion. He also asked if there was imperfect meat digestion or absence of secretion or any evidence of results of it.

DR. HENRY A. CHRISTIAN, Boston, stated that the case showed the usual picture of cancer of the stomach, with reduced acidity. There was nothing especial in connection with the pancreas. The tumor did not extend down far enough to block the duct from the pancreas. The stools were examined, but did not show anything to suggest pancreatic disturbance, and there was no histologic evidence in the pancreas to suggest any such disturbance. There was some acidity of the stomach, but no free hydrochloric acid. In other words, the case was clinically like any other case of cancer of the stomach, except for the absence of a palpable tumor. The most prominent feature was the moderate degree of obstruction of the esophagus by the upper portion of the tumor.

THE DIAGNOSIS OF KIDNEY INSUFFICIENCY AND THE TREATMENT OF UREMIA.*

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I do not believe that uremia is caused by diseased kidneys alone, but that it is largely due to disturbances of the liver. The liver makes bile and glycogen, and stores the latter and iron. It also makes urea out of ammonium salts, which probably reach the liver in combination with sarcosylactic acid or as lactate of ammonium. Extirpation of the liver in animals almost entirely prevents the formation of urea, which excretion is replaced by the ammonium salts and perhaps by leucin and tyrosin, and death soon occurs, generally preceded by convulsions. The liver has a controlling action on toxins, alkaloids and strong drugs, and it is this organ that allows a larger dose of a drug to be tolerated by the stomach than when given hypodermatically. In other words, the liver is our Pasteur filter, and the blood leaves it standardized. If any disease or condition interferes with liver function the system is poisoned by its inability to care for the waste products of its own metabolism, urea is diminished, and ammonium carbamate remains in the blood. The liver cells prepare the decomposition metabolic products for kidney excretion, and if they do not prepare them perfectly, the kidneys are irritated and disturbed by their effort to excrete substances that are not chemically perfect for such excretion. Hence malfunction of the liver will sooner or later cause irritation, chronic inflammation, and pathologic kidneys.

1. *Pepper's System of Medicine*, ii, 561, 1885.
2. *Johns Hopkins Hosp. Bull.*, 1893, iv, 98.
3. *THE JOURNAL A. M. A.*, 1898, xxx, 1384.
4. *Guy's Hospital Reports*, 1904, lviii, 121.

5. *Practitioner*, 1905, lxxv, 172.
6. *Brit. Med. Jour.*, 1906, i, 1343.

* Read at the Annual Meeting of the Connecticut Medical Society, at Hartford, May 22-23, 1907.