

curred at the same time as the urine was becoming more acid and had reached the zone of pathological acidity before digitalis diuresis set in.

CASE 6. A male of 53. For seven years has had increasing dyspnea. Three years ago began to notice swelling of the feet. For several years has had a good deal of anginoid pain. During the past three or four weeks swelling has greatly increased and now reaches the level of the lower abdomen.

Examination. Orthopneic, emaciated, skin pasty and pale. Heart, apex felt in fifth and sixth spaces, moderate enlargement. Sounds absolutely irregular, rapid, distant; second sounds sharp. At the apex there is a soft, blowing systolic murmur transmitted to the axilla. Many beats do not reach the wrist. Double hydrothorax and ascites. Wassermann negative. Blood-pressure systolic 145, diastolic 90.

Treatment consisted of soft solids and liquids limited as shown on the chart; magnesium sulphate, one dram each morning; theocin and digitalis. The patient made a very slow but distinct improvement in the course of a month in the ward. At the end of this time he was started on sodium bicarbonate, 8 grams daily; and sodium chloride 10 grams daily; and the fluid intake was kept at approximately 1000 c.cm. in the twenty-four hours. All other drugs were discontinued. This régime was continued six days. His urine, which on the day the experiment was begun, showed a normal acidity, became alkaline after 8 grams of sodium bicarbonate. The patient during these six days was taking a hypertonic salt solution by mouth and he was also receiving an amount of alkali which for the first two days was sufficient to keep the urine alkaline. The latter then became acid again. The reason for this is explained in the description of the next case. It will be noted that the patient's urinary output fell off day by day during the salt-alkali medication and what is still more significant that his edema increased to the extent of eight pounds in the six days. It is no less significant that the simple discontinuance of the salt-alkali régime without the addition of other medication was followed by a progressively increasing diuresis with loss of weight. It is further worthy of note that the largest twenty-four hour amount of urine passed by the patient during the 46 days in the hospital occurred on a day when the urinary acidity was very great, in fact, only very slightly less than the highest acidity ever observed by Palmer and Henderson.

CASE 7. A male, age 59. For 20 days has had increasing cough and dyspnea. For 10 days edema of the legs, no headache, nausea or vomiting.

Examination. Orthopneic; slightly cyanotic. Heart's apex in fifth space; moderate lateral enlargement of the area of cardiac dullness. Sounds rapid, poor quality, regular. At the apex is heard a soft systolic murmur, not transmitted. Both basal sounds are faint. Over the aortic area there is a low pitched systolic murmur. Blood-pressure systolic 155, diastolic 110. Radial artery is not thickened. No hydrothorax or ascites. Liver dullness fifth rib to 3 cm. below the costal margin in mid-clavicular line. Edge indistinctly felt. Marked soft edema of legs. Urine: albumen, slightest possible trace, rare hyaline cast.

Treatment consisted of soft solids, magnesium sulphate, one dram each morning, liquids limited as shown on the chart; Theocin, 5 grains, three times a day for four days.

Following the theocin the patient had a marked diuresis with disappearance of edema. He was then given sodium chloride, 10 grams daily, sodium bicarbonate 16 grams daily. An attempt was made to restrict the fluid intake to 1000 c.cm. in the twenty-four hours. This, however, failed for the following reasons: the patient was made very uncomfortable by the change in treatment. On the second day after he had been taking the alkali and sodium chloride he began to vomit and became very restless and the next day began to have periods of Cheyne-Stokes respiration in addition to the vomiting. On the fourth day the Cheyne-Stokes breathing was constant, the vomiting occurring about every two hours and the patient was so uncomfortable and manifestly so much worse than at entrance that the salt-alkali treatment had to be discontinued. During these four days the combination of the salts and the vomiting created so great a thirst that the fluid could not be restricted as was planned. The patient, however, actually absorbed much less water than the chart indicates because he often vomited immediately after drinking a glass of water. This case also lacks conviction for another reason, namely because the urine did not become alkaline. Nevertheless, the patient was receiving large amounts of alkali. The failure of the urine to become alkaline under these conditions is due to the fact that he was becoming sicker every day. As Palmer (*loc. cit.*) has shown, the degree of acidosis or in other words the amount of sodium bicarbonate required to make the urine alkaline, runs parallel in a general way with the clinical condition. Persons who are seriously sick for any reason whether they are or are not edematous show marked degrees of acidosis. Newburgh, Palmer, and Henderson have discussed the relation of edema to urinary acidity in another place. It is noteworthy that the theocin diuresis occurred at a time when the urinary acidity was distinctly above the average normal.

CANCER OF THE STOMACH.*

BY PHILEMON E. TRUESDALE, M.D., FALL RIVER, MASS.

THE problem of dealing with cancer is huge and growing. The census reports for Great-Britain show that while population in that country doubled between 1850 and 1905 cancer mortality increased six times. In Germany there are 15,000 deaths annually from cancer. In the United States the mortality rate from the disease has risen steadily from 9 per one hundred thousand of living in 1850 to 77 in 1909. There were 75,000 registered deaths from cancer in the United States in 1909 and a conservative estimate placed the number of those with the disease and still surviving at 225,000.

Nearly one-half of all cancers in the human have their origin in the stomach, and it is only rarely cured in this location. Up to the present day surgical treatment presents the only hope to the patient with cancer of the stomach. The fact that cancer is primarily a local disease

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and permanently curable if widely excised in its incipency should be made common knowledge. It should also be more generally recognized that cancer of the stomach is always primary in this organ as well as the fact that it often becomes engrafted upon ulcer. The frequency of this occurrence varies according to different observers, from 20% to 70%. Dr. Graham, who is an internist at Rochester, Minn., from a recent study states that 50% of cancer cases have ulcer history. There are many who are inclined to deride the theory of the growth of cancer on ulcer, or at least to minimize its frequency. There can be no disputing the fact, however, that 80% of stomach ulcers originate in the antrum and approximately the same percentage of cancers begins in this region. This evidence may not be conclusive, but it is sufficiently suggestive to stimulate the surgeon to excise ulcer and to feel that when he has done this he has done something to prevent cancer.

From a casual investigation it is clear that in many hospitals today patients with early cancer of the stomach are handled in two camps, medical and surgical. The results of the procrastinations of the internists are delivered at the door of the operating room and the bad results of the surgeon return to the internist. The feeling of disappointment is reciprocal and reaches a degree which places an opprobrium upon surgery and absolutely inhibits progress. Such is the tendency of an afflicted relationship. The interests and efforts of the internist and surgeon should be more closely allied. It is safe to predict that the future will see them cooperate, while they now too often compete.

Ten years ago cancer of the stomach was generally considered a medical disease. Today it is surgical until it has reached the inoperable stage. The factor of paramount importance then is its early recognition.

While the symptomatology does not come strictly within the scope of this paper, it is a part of the treatment picture and cannot be ignored. Unfortunately, and not infrequently, we find patients with cancer of the stomach who have had no early distinctive symptoms of the disease. This is especially true when the growth has involved the fundus or the middle portion of the lesser curvature. The real surgical problem in these cases if they are inoperable is to prove it without an exploratory laparotomy and without the loss of valuable time. The stage of the disease and the general condition of the patient should be given careful study before an operation is undertaken. The size and position of a tumor is important, but not in the same proportion as its rapidity of growth and its tendency to early metastasis. A cancer of the stomach may be scarcely large enough to be felt, and yet there may be metastasis involving the adjacent or remote lymph zones. Operation with a hope of cure is not feasible in the presence of secondaries in the

liver, mediastinum, the long bones and usually, but not always, in the transverse colon. Resection of the stomach and part of the transverse colon has been successfully done. A supraclavicular glandular enlargement usually means metastasis, as does also an indurated nodule in one or both ovaries or occupying the pelvic shelf, a fold of peritoneum upon which gravitating cancer cells become implanted. These are sign posts contraindicating radical operation, a disregard for which, on the part of surgeons has invited the prejudice of fair minded medical men.

Patients that have drifted or that have been nursed and allowed to drift into the inoperable stage should not be exposed to the risks of major surgery. The results are liable to be disappointing to the patient and his friends, and the status of a rational treatment will inevitably fall into disrepute.

Surgery of the stomach for cancer may be considered for convenience in three divisions: first, the exploratory; second, the palliative procedures; third, the radical operation.

The exploratory operation may be done with two purposes in view: first, to establish the diagnosis; second, in the presence of a palpable tumor to determine its operability. What must be the rôle of exploratory laparotomy in the search for cancer of the stomach? That it is too infrequently done is obvious from the large number of inoperable cases that come to surgeons. There is too often more reluctance on the part of the surgeon to do this operation, and vastly more on the part of the patient and his physician to have it done for suspected cancer than to prove a palpable cancer inoperable. This is natural but it is not good judgment. We are now in a stronger position than ever to size up the inoperable cases without opening the abdomen, but we have advanced very little in our ability to discover the early cases. If an individual is fortunate enough to have his carcinoma begin right at the pylorus he will demand operation for partial obstruction at an early stage, and I take pride in stating that our internists in this section are alive to their responsibilities in these cases.

In connection with pyloric obstruction it is important to remember that the first stage of obstruction is not due to the cancer *per se*, but to the pericancerous inflammation and engorged vessels aggravated by the increasing impact of stomach contents. Under these circumstances conservative treatment yields results immediately good but ultimately disastrous. And the more expert the treatment the sooner will the acute inflammatory process at the pylorus subside; the longer the respite and the more hopelessly advanced will the tumor be found when it is large enough to be defined by palpation. I have learned that patients often prefer medical treatment when they need surgery most and cry out for surgery when medical treatment only is indicated. This is especially true of cancer pa-

tients. Cancer of the stomach too often begins away from the pylorus and becomes extensive before encroaching upon its lumen.

Chemistry and the microscope applied in an examination of the gastric contents may or may not be of value. We have learned not to expect too much from gastric chemistry, and we probably have not always made good use of the microscope. I recall one case in which the diagnosis was established by a microscopic examination of the residue from the stomach contents. The diagnosis had been in doubt for several months. Dr. Macrae made vigorous massage in the region of the epigastrium; then searched for tumor cells and found them, yet the condition was then inoperable. Blood, leucocytes, sarcini and tumor cells are not always to be found in early cases, and like free HCl, their presence or absence may be common to malignant or benign stenosis. A bismuth picture or the fluoroscope may or may not demonstrate an early neoplasm. The x-ray will occasionally indicate the presence of a tumor which cannot be felt, but very rarely will it reveal the presence of a very small growth or one which has not produced fairly typical symptoms. At present the x-ray is of value but its function is mainly confirmatory. Meanwhile, the personal history, more important in cancer of the stomach than in any other region, must furnish the evidence for or against exploratory laparotomy.

The cancer age, progressive loss of weight with loss of appetite and impaired digestion, pallor with an expression of impending trouble, especially following upon a history of ulcer, even in the absence of a palpable tumor, chemistry or x-ray proof, should be sufficient evidence upon which to expose the stomach for direct examination.

In private practice I have made it a rule to charge little more than an examination fee for opening the abdomen only, and I believe that this consideration is expected, and if always exercised would remove one objection to this procedure.

Exploratory laparotomy, however, has other inconveniences and will probably never be submitted to with any more equanimity than it has already. The strongest arguments in its favor are: first, that exploratory laparotomy is the only known method for the early diagnosis of most cases of gastric cancer while in the curable stage; and secondly, that this disease if not removed, always terminates fatally.

Until recently the operation usually employed as a palliative measure was gastro-enterostomy, and rarely gastrostomy. Neither of these operations has ever been found to afford much relief and now, with the risk of a much higher mortality, surgeons generally are advocating removal of the tumor mass plus the anastomosis. The presence of a large bleeding and sloughing surface in the stomach makes a sad picture, even with a gastro-enterostomy. Palliative surgery for cancer of the stomach has

a place, but it is not large. The decision in favor of extreme measures, as they usually should be, involves not only a keen sense of discrimination but exceptional operative ability as well.

The radical operation for cancer of the stomach consists of partial gastrectomy and gastro-enterostomy. The same principles of technic should apply here as for an operation for cancer in other regions. Wide margins of healthy tissue should be included. A complete excision of the lymphatic zones draining the infected area should be made. The presence of enlarged glands in the immediate vicinity of the tumor does not always indicate metastasis, and should not influence the surgeon to abandon the situation as inoperable. Not infrequently these glands are found to be merely inflammatory and free from cancer cells. Visceral metastasis or involvement of the peritoneum with ascites are contraindications to any operation.

The mortality from excision and anastomosis, according to the Mayos' statistics, is about 10%. A patient has 36% chances of living three years and 25% chances of living five years. These figures are the result of an analysis of their cases, which could be traced, and undoubtedly include many bad risks. They are convincing, stimulating and indicate even greater possibilities.

SOME RELATIONSHIPS BETWEEN ORTHOPEDIC SURGERY AND INTERNAL MEDICINE.

BY H. W. MARSHALL, M.D., BOSTON.

In treatment of joint conditions orthopedists must study causes that act to produce pathological changes as well as correct existing articular defects by surgical operations and mechanical appliances.

And it is the task of orthopedists even more than of medical internists to pick out from the large mass of data pertaining to internal medicine such bits of knowledge as have bearing upon health and disease of joints.

The fact that the former accept responsibilities of directing treatments of patients as well as acting as consultants, makes their attitude an important one toward medical procedures which often are necessarily involved. And such questions as the following arise,—Shall patients be subjected to operations and to wearing corrective or supportive apparatus with only casual attention being paid to the vascular conditions among which are found the primary causes so frequently for articular disturbances?

It is perfectly true that patients can recover completely, although very little attention is paid in some instances to anything except surgical