CHRONIC ULCERS OF THE STOMACH AND DUODENUM*

By William J. Mayo, M.D.
of Rochester, Minnesota

First Period: 1893 to 1900. Pyloric Obstruction.—The first case of pyloric obstruction in St. Mary's Hospital was operated on in 1893. This operation was a Heinicke-Mikulicz pyloroplasty. The second operation was a gastrojejunostomy with the Murphy button. From this time on, a gradually increasing number of such operations were performed in our clinic. However, only those cases with marked obstruction at the pyloric end of the stomach were operated on and at the time of the operation the obstruction was believed to be the result of gastric ulcer, although the exact location of the ulcer, whether in the pyloric end of the stomach or in the duodenum, was not determined.

Second Period: 1900 to 1906. Growth of Knowledge the Result of Surgical Observation.—During this period it was recognized that obstruction was a terminal condition and a study of the subject was commenced with a view to the earlier termination of a malady, which exposed the patient to serious dangers and more or less constant disability and distress. There was much discussion of mucous ulcers, erosions, and a variety of supposed lesions which was not the result of actual observations at the operating table, but of an attempt to furnish a pathologic basis for the symptoms complained of by the patient. This atmosphere of uncertainty gradually disappeared and patients were explored for symptomatic indications, but not operated on unless a pathologic basis for those symptoms could be demonstrated at the time of the operation. The Murphy button was gradually abandoned for the suture and the anterior method of gastrojejunostomy replaced to as great an extent as possible by the posterior.

Third Period: 1906 to 1914. Development and Improvement in Diagnosis.—The great value of the history and physical findings in diagnosis was emphasized. The relation of the clinical symptoms to the lesion was shown in the light of operative experience and the value of the purely laboratory examinations of gastric contents were found to have been over-estimated. The Röntgen ray gradually won

* Read before the International Society of Surgery, April, 1914.

first place in the diagnosis of these lesions and the necessity for the excision of gastric ulcers, because of the menace of cancer, was recognized.

Our Present Status.—Up to December 31, 1913, 1841 cases of acute and chronic ulcers of the stomach and duodenum had been operated on in St. Mary's Hospital. Of this number, 437 were females and 1384 were males. The early clinical view of a preponderance of females over males was thus shown to be in error. It is probable that a large number of these supposed ulcers in women were in reality the result of pyloric spasm due to cholelithiasis or some intestinal lesion which gave rise to the gastric disturbance.

In 636 of the 1841 cases, the ulcers were located in the stomach and, in 1205 they were located in the duodenum. It must be borne in mind that all of the early cases were supposed to be gastric and so classified. The percentage in the last 1000 accurately observed cases showed 73.8 per cent. duodenal and 25.2 per cent. gastric. Of the gastric, 29 per cent. were females and 71 per cent. males. Of the duodenal, 21 per cent. were females and 79 per cent. males.

In differentiating between an ulcer in the pyloric end of the stomach and one in the first portion of the duodenum, the situation of the pyloric veins is the determining factor. Just at the pylorus, from above and below, short, thick veins, usually 1 to 2 cm. in length, come into view from behind and pass forward. There is a distinct notch at the points of emergence of the veins. From these veins there usually extends an arching vein from each side, sometimes uniting, forming the pyloric vein, sometimes ending in a spray. This superficial pyloric vein is not so characteristic as the thick veins I have just described, but, when present, it is a ready means of differentiation.

The terminal three-fourths inch of the pyloric end of the stomach is not often involved in ulcer. The more common seat of gastric ulcer is along the lesser curvature, often saddle-shaped. The ulcer is more often on the posterior than the anterior wall. But whether situated anteriorly or posteriorly, a superficial ulcer at the point of contact often appears on the opposite wall, the "contact" ulcer. The gastric ulcer itself is, as a rule, clean cut, with a hard grayish-white base, and is round or oval in shape. Outside of its crater there often is a massive infiltration into the outer layers of the muscularis and peritoneum. Over this, very frequently, protective adhesions are found sometimes binding the seat of the ulcer to other organs, such as the pancreas or liver, a condition of incomplete or protected perforation. The indura-

tion is always very much more extensive than the actual crater and is not entirely dependent on the size of the ulcer. The situation of the ulcer, however, may be at any point in the wall of the stomach.

Multiple ulcers are not frequently found at operation, which is contrary to the early views based on clinical observations and post-mortem findings in deaths due to acute ulcerative processes in the stomach. These processes were usually gastrotoxic in origin and not often the source of chronic ulcer. Multiple ulcers of the stomach and duodenum or separate ulcers of the stomach and duodenum exist in the same case in about 5 per cent. of the cases.

The character of ulcers of the duodenum differs in many respects from that of ulcers of the stomach. They are usually to be found in the upper two inches of the duodenum and more often in the anterior-superior wall. When found on the posterior wall, they are usually of the same character as when found in the stomach. A typical crater and the contact ulcer on the anterior wall may give rise to an independent induration. As a rule, the duodenal ulcer has its origin below the pylorus, but when it extends toward the stomach it usually stops short at the pylorus, which it may undermine. In exploring for ulcers of this description I have occasionally had difficulty in discovering the posterior ulcer because it was concealed underneath the projecting pyloric ring. The mucous membrane of the upper duodenum is thin and granular and ulcers confined to the anterior wall, if they take upon themselves the crater-like character of the gastric ulcer, will develop a localized mass over the site of the ulcer. Many times, however, no crater is found in the mucous membrane in duodenal ulcer, but rather a discolored, moth-eaten patch in the centre of which may be a dimple-like ulcer and outside of this a typical induration. It is probable that this variation from the ordinary type of gastric ulcer explains why duodenal ulcers have been so frequently overlooked at autopsy.

There is a variety of duodenal ulcer which sometimes occurs in the region of the papilla of the common duct, giving rise to attacks resembling gall-stone colic and profuse hemorrhages. The three cases I have had an opportunity to examine have all been seen post mortem; the patients dying from acute hemorrhage after prolonged symptoms resembling cholelithiasis.

Incomplete protected perforation of duodenal ulcer, giving rise to localized peritonitis covered by adhesions, is common. The observation of such patients operated on during an attack has shown a localized peritonitis in the vicinity of the ulcer which makes it probable that an

actual leakage had taken place but that the resistance of the peritoneal cavity was sufficient to care for the comparatively small amount of more or less sterile secretion which escaped. Occasionally this localized infection results in a phlegmon, sub-diaphragmatic or otherwise.

Indications for Operation.—In the early history of the disease long periods of remission may occur in which it would appear from the symptomless course that the ulcer had healed. Yet case after case operated on during the period of remission does not show the ulcer to be healed—thereby repeating the history of appendicitis and gall-stone disease inasmuch as the recovery from each attack is erroneously supposed to be a cure. Permanent healing of chronic ulcers of the stomach and duodenum by non-operative means must be of rather infrequent occurrence. That a large number of acute, subacute, and some chronic ulcers are cured permanently cannot be doubted, but if they fail to show permanency after a reasonable attempt at cure under ordinary conditions of life, the patients should be treated surgically, not only from the standpoint of the disability of the patient, but also from the standpoint of mortality. The patient with ulcer treated medically is in far greater danger of death from hemorrhage, perforation, obstruction or cancerous degeneration than he is from an operation. Those patients who can afford to carry on prolonged treatment are, of course, in better condition for non-operative therapy than is the working man who must earn his living and live on those things which he can obtain.

THE SURGICAL TREATMENT

Gastric Ulcer.—Gastrojejunostomy is the most generally useful operation for gastric ulcer and has a wide field of application. Especially is this true when there is obstruction in the vicinity of the pylorus. It may be said that the greater the obstruction within limits, the more immediate and permanent the results of gastrojejunostomy. It is probable that gastrojejunostomy is of value not only as an operation for drainage, but that it also changes the physiology of the stomach and brings a greater measure of relief than can be achieved without it. While posterior gastrojejunostomy is the operation of choice, in certain cases adhesions may prevent its use. In these cases the anterior operation has given good results. For those ulcers which lie in the body of the stomach and in which the gastrojejunostomy must be made beyond the point of ulceration the results are less favorable.

Because of the menace of cancer all ulcers of the stomach, without regard to their situation, should be excised if possible. In our expe-

rience local excision of the ulcer without gastrojejunostomy has sometimes failed to affect a cure. I believe, therefore, that, as a rule, gastrojejunostomy should be done in addition to excision.

When a resection in continuity of the stomach with end-to-end union has been made for chronic ulcer, the results have been excellent without gastrojejunostomy.

For posterior ulcers of the body of the stomach which have become adherent, especially to the pancreas, transgastric excision of the ulcer has been of service.

In *hour-glass* stomachs gastrogastrostomy is a desirable operation, although resection in continuity when it can be done has given good results. In some cases, gastrojejunostomy fulfills the indications admirably.

When the ulcer occupies the pyloric end of the stomach, the pylorectomy of Rodman gives excellent results, both immediate and remote.

In those ulcers of the body of the stomach that cannot be excised and in which gastrojejunostomy cannot be done, temporary jejunostomy is distinctly useful, especially in cases in which a differential diagnosis between malignant and simple ulcer cannot be established. The procedure gives prolonged rest to the stomach and maintains good nutrition. Jejunal feeding may be maintained for several months with distinct advantage.

Ulcer of the Duodenum.—Gastrojejunostomy is a most satisfactory operation in all those cases of ulcer of the duodenum in which there is actual or potential obstruction. We have followed Moynihan in infolding the ulcer with fine silk and placing one or two sutures in such manner as to block the pylorus to prevent food entering the ulcer-area during the healing period. This blockage by suture cannot be expected to be permanent, but in connection with the permanent obstruction produced by healing of the ulcer it usually answers the purpose. If there be neither actual nor potential obstruction, this blockage should be accomplished by more efficient means. We have used the fascia-closure of Wilms and the omental strip-closure of Kolb, in each case applying the living tissue to the groove previously made by the suture-blockage. Several of these patients were re-examined some time after the operation and the pylorus was found blocked.

At the present time we are excising a considerable percentage of duodenal ulcers when they are situated so that it may be readily done. In our earlier cases simple excision was practised and a certain percentage of them failed to obtain complete relief. It was found neces-

sary to make thorough provision for drainage at the pylorus after excision either by the Heinicke-Mikulicz pyloroplasty or, what we have found still better, the gastroduodenostomy of Finney, which lends itself admirably to the excision of the duodenal ulcer.

Results of Operation.—Duodenal and gastric ulcers at the pyloric end of the stomach yield equally good results following operation. The greater the distance of the gastric ulcer from the pylorus the greater the technical difficulties in its operative relief, the greater the mortality and, on account of the deformities which may be occasioned, the less certain the cure. But taking the patients as they come, at least 95 per cent. of those with gastric ulcer will be cured or greatly relieved by operation. The operative mortality in the gastric ulcers, counting all cases dying in the hospital without regard to length of time thereafter nor cause of death, was 3.8 per cent. This includes acute perforations, acute hemorrhages and all types of operations, resections, etc. The results in duodenal ulcer are extraordinarily good, 98 per cent. of the patients either being cured or greatly relieved by the operation. The mortality of this group was only 1.5 per cent.

Recurrence of Ulcer.—In a small percentage of the cases of both gastric and duodenal ulcers there has been a definite recurrence of symptoms and in which it would appear an actual redevelopment of the original ulcer had taken place. A small number of these patients have been reoperated on in our clinic and in each instance the source of trouble proved to be a gastrojejunal ulcer in the suture-line of the original gastrojejunostomy, as a rule due to the sloughing of the continuous sutures of silk or linen which had been used in the gastrojejunostomy. The symptoms were quite like those the patient was suffering from at the time of the primary operation, showing that the same disturbance may come from suture-ulceration as that manifested by the original lesion. We have, therefore, abandoned continuous silk sutures in gastrojejunostomy, now using interrupted musculoperitoneal sutures of fine silk with continuous chromic catgut for the inner rows.

Occasionally, fixation of the pyloric end of the stomach in the adhesions about an ulcer has continued to give rise to such pain and distress as to lead to the belief that the ulcer had recurred or, at least, to the idea that the operation was a failure. In these cases the unilateral pyloric exclusion of von Eiselsberg as a secondary operation has given permanent relief.

Finney: *Johns Hopkins Hosp. Bull.*, July, 1912, pp. 155–161.
Heinicke: Inaug. Dissert., Furth, 1886.
Kolb: *Münch. med. Wochenschr.*, October 28, 1913, p. 2400.
Mayo, W. J.: ANNALS OF SURGERY, December, 1910, lii, pp. 797–800.
Mikulicz: *Archiv für klin. Chir.*, xxvii, p. 79.
Moynihan: *Trans. Amer. Surg. Assoc.*, 1903, xxi, pp. 135–207.
Rodman: *Trans. Amer. Surg. Assoc.*, 1902, xx, pp. 186–187.
Wilms: Personal communication, *The Lancet*, November 15, 1913, p. 623.