

**My experience with the surgical treatment of gastric and duodenal ulcers /
[Hans Finsterer].**

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Finsterer, Hans, 1877-1955.

Publication/Creation

Knoxville : Acuff Clinic Bulletin, 1950.

Persistent URL

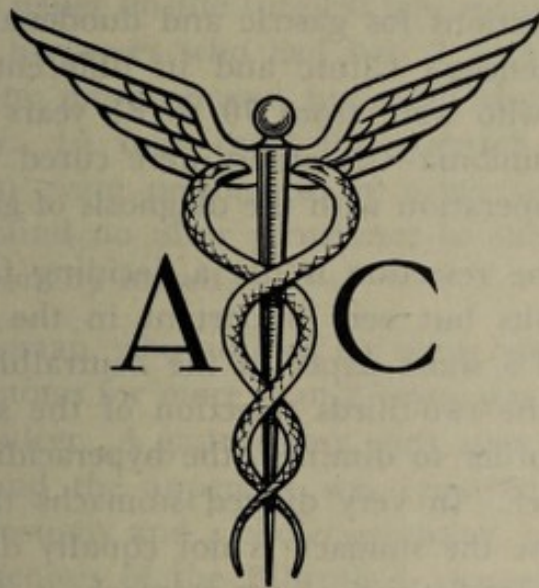
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ACUFF CLINIC

Bulletin



SUPPLEMENT TO FINSTERER EDITION

Vol. 1

APRIL

Supplement

MY EXPERIENCE WITH THE SURGICAL TREATMENT OF GASTRIC AND DUODENAL ULCERS*

by H. FINSTERER (Vienna)

DURING the last thirty years partial gastrectomy has been performed as the routine method by most surgeons. Only with old patients is gastro-enterostomy performed by many surgeons up to now, because they believe that the mortality of gastrectomy is too high.

If one operates on this old patient under local anesthesia and splanchnic anesthesia, which I have done since 1918, then the results can be as good as in the younger patient. During a period of 34 years among the 2472 resections for gastric and duodenal ulcer which were performed at Hochenegg's Clinic and in different private hospitals, I had 34 patients who were from 70 to 81 years of age. Only one patient died of pneumonia—the others were cured. 22 cases of gastric ulcer were sent for operation with the diagnosis of gastric cancer.

The extent of the resection is not a deciding factor in the immediate operative results but very important in the permanent results. In 1918 I published a short paper in the *Zentralblatt f. Chirurgie*, in which I suggested the two-thirds resection of the stomach in cases of duodenal ulcers in order to diminish the hyperacidity and in this way to prevent recurrence. In very dilated stomachs the 2/3 resection is not sufficient, because the stomach is not equally dilated but only the antrum, that is the distal third of the stomach, is dilated. In order to leave behind only the cardiac third of a very dilated stomach, 3/4 to 4/5 of the stomach must be removed. This very important fact is not fully evaluated by all surgeons.

The mortality with the Hofmeister-Finsterer method was until 1930 3.7 per cent; in 828 cases from 1930 to 1948, 1.8 per cent in 811 cases. The lowest mortality was achieved by the method of Billroth I (390 cases with 3 deaths equalling 0.7 per cent).

On my surgical ward in the Allgemeines Krankenhaus, Vienna, where the operations were performed by my assistants and by myself, the mortality was higher (3.9 per cent with 4973 resections), because from 1935 to 1938 the asepsis in an old operating room was not reliable, and toward the end of and after the war, the poor patients were in such bad physical condition that they could not stand the smallest complications.

*Paper read at the Knoxville Academy of Medicine, Knoxville, Tenn., Nov. 15, 1949.

The permanent results were satisfactory with the extensive resection and anastomosis by the Hofmeister-Finsterer method, as in 1933 the re-examination of cases who were operated on from 1912 to 1930 showed 98.7 per cent of 169 cases of gastric ulcers and 96.3 per cent of 403 duodenal ulcers absolutely cured and only 2 cases of gastro-jejunal ulcers had to be operated on. During the war, at re-examination the patient would not have admitted that he had no trouble at all as he would have had to go to the battle field.

In judging the permanent results, the physician should remember that complaints after gastric resection can be caused by other diseases such as appendicitis, cholecystitis, colitis and chronic constipation. In 1940 I published a paper on the surgical treatment of chronic constipation and reported five cases who had had 2 to 4 operations on their stomach without any improvement, but were absolutely cured after a left hemicolectomy. In four cases the stomach operations (among them gastrectomies) were performed by other surgeons. During the last operation, I found no ulcer recurrence in the stomach. The fifth case was operated on by myself.

A 56 year old woman, who suffered for many years from constipation and had ulcer symptoms for more than 2 years, was operated in October 1924 for duodenal ulcer. A gastrectomy with anastomosis after Billroth I was performed and the appendix was removed. In February 1925 I did a gastro-enterostomy and a cholecystectomy, because the x-ray had shown a relative stenosis of the Billroth I anastomosis with retention after five hours. The patient had pains which were attributed by the gastro-enterologists to a gastrojejunal ulcer, in spite of the fact that repeated examination showed an acidity. As the patient insisted on re-operation, I did a left side pararectal laparotomy, found no gastro-jejunal ulcer, but the symptoms of chronic colitis and did a left hemicolectomy. After this operation the patient had no gastric troubles, had spontaneous movement of the bowels every day, she gained 50 pounds body weight, had no trouble at all up to February 1939 when she left Vienna for New York City.

If a duodenal ulcer penetrating in the pancreas extends as far as the papilla, an ulcer resection is too dangerous. For such cases, I proposed in 1918 the resection for exclusion. The antrum is divided 3 finger breadths proximally to the pylorus, and after the excision of the mucosa is closed, then $\frac{2}{3}$ to $\frac{4}{5}$ of the stomach are resected and a Hofmeister-Finsterer anastomosis is performed. It is not necessary to remove the pylorus and to close the duodenum proximally to the

ulcer, as the permanent results do not depend on the removal of the pylorus, but on the extent of the gastrectomy in which $\frac{4}{5}$ of the very dilated stomach have to be removed. Besides this, the mortality with pylorotomy is higher. From 1916 up to 1948, I had among 51 cases 7 deaths, or 13 per cent, whereas in 121 cases in which the pylorus was not removed and the excluded antrum was closed, the mortality rate was 4.2 per cent (119 cases, 5 deaths).

The permanent results are satisfactory also in cases where the pylorus was left behind, as I had until 1925, 82.8 per cent permanent cures and 5 cases of gastro-jejunal ulcers among 64 re-examined patients. These 5 cases were operated in 1919 and 1920. At that time I resected the antrum only, because re-examination of patients who had had a $\frac{2}{3}$ gastrectomy showed total anacidity which I believed to be harmful. From 1926 - 1946 among 61 re-examined patients I had no gastro-jejunal ulcers and 92.6 per cent permanently cured cases. Therefore, it is not necessary to remove the pylorus in every case of resection for exclusion as was insisted on by Haberer and by other surgeons. It is not good for the patient to follow the advice of Fromme, given in 1939 at the surgical congress in Berlin, to excise the mucosa of the excluded antrum and to remove only half of the mostly, very dilated stomach, because after doing so, the frequency of a gastro-jejunal ulcer is high. I had to operate on 5 cases of gastro-jejunal ulcer which had been operated by other surgeons following the proposition of Fromme.

The gastric ulcer near the cardia is not inoperable as is believed by some surgeons, and it is not necessary to do a total gastrectomy. With an ulcer on the lesser curvature near the cardia, a curved resection is possible, and in cases without penetration of the ulcer into the pancreas, it can be finished by a gastro-duodenostomy according to the method Billroth I. This operation has good results as we have no deaths among 112 cases. In cases of an ulcer penetrating into the pancreas, a Hofmeister-Finsterer anastomosis is performed. This operation has a higher mortality with 45 deaths in 453 cases or 9.9 per cent. Among these cases there is a very interesting one:

A 67 year old man, who in 1918 was treated with x-ray by Professor Holzknecht for a cancer of the cardia and of the esophagus, was operated on by me in September 1922 for an ulcer on the lesser curvature near the cardia penetrating into the pancreas and combined with symptoms of cardiospasm. A curved resection with anastomosis Hofmeister-Finsterer type was performed. After ten days he could swallow everything, even hard bread. Two weeks later he had another attack of

cardiospasm, when I was absent for a surgical meeting. Instead of trying a medical treatment my assistant operated immediately and used for a Witzel fistula a rubber tube which was thick as a thumb. Since by this procedure the jejunum was totally obstructed, the patient vomited for 4 days until I came back and removed the rubber tube. Then the vomiting stopped, the patient could eat everything but lost the food through the jejunal fistula. Extraperitoneal closing of this fistula was of no success and another operation for doing a unilateral or bilateral exclusion of the fistula, which would have been very easy, was refused by the relatives and by the patient himself. The patient died after seven weeks from starvation.

If an ulcer on the posterior stomach wall is extended as far as the cardia, a curved resection of the ulcer is not possible. In such cases one can do with good immediate and permanent results the Kelling-Madlener operation. With this procedure the distal half of the stomach is removed and an anastomosis after Billroth I is performed. In cases of a narrow duodenum or a second ulcer in the duodenum, at least $2/3$ of the stomach is resected and a Hofmeister-Finsterer anastomosis is performed. The ulcer which is left in the cardiac part will heal very quickly because the patient becomes anacid.

The immediate operative results are satisfactory as in cases in private hospitals I had no deaths. In the ward cases the mortality is relatively high (75 cases with 4 deaths, or 5.1 per cent), but the deaths were not in direct connection with the type of operation but with the poor condition of the ward patients during and after the war.

The permanent results are also satisfactory as Madlener had no failure in 29 cases, and in 27 cases the good results were stated 3 to 16 years after the operation.

My private cases have all remained cured from 5 to 20 years. My ward cases were followed up by my assistant, Dr. Winkler, who could state that 25 cases were free from any trouble for 3 to 7 years and two cases have occasional trouble from cardiospasm.

Therefore, one can conclude that Madlener's operation can be advised in the rare cases in which a curved resection is not possible and a total gastrectomy, which is proposed by some surgeons, not necessary. The only disadvantage is the possibility that, though there is no more ulcer, yet there may be a degenerated ulcer or primary cancer. In such occasions it is necessary to make a gastrotomy and to examine the stomach with the introduced finger (without rubber glove!) in order to determine

the quality of the borders of the ulcer, the fixation of the mucous membrane, et cetera. In doubtful cases I do Madlener's operation instead of a total gastrectomy, especially if the general condition of the patient does not indicate a total gastrectomy. I had four cases of uncertain diagnosis in which the general condition of the patient was not good. Two cases died after Madlener's operation (there was a cancer), but two cases, who probably would have died after total gastrectomy, were permanently cured. I have among my 136 cases of total gastrectomy only one case of a callous ulcer penetrating into the pancreas and spleen, who had had already an exploratory laparotomy performed for an inoperable cancer by another surgeon. Examining the stomach through a gastrotomy I was almost convinced that this must be a cancer. Therefore I did a total gastrectomy with splenectomy and resection of the tail of the pancreas. Microscopical examination showed only callous ulcer. The patient was cured, but he lost his stomach which makes possible secondary or pernicious anemia.

In cases of chronic gastritis with hypertrophy and stenosis of the pylorus, which were sent for operation with the diagnosis of chronic ulcer which could not be found even after gastrotomy and examination of the mucosa, I do now a gastric resection removing the pylorus and half of the stomach if I can do a Billroth I anastomosis. If I have to do a Hofmeister-Finsterer anastomosis, then I resect $2/3$ to $3/4$ of the mostly dilated stomach. The resection is only necessary if the patient has a hyperacidity. The operative results are good as I have had only one death among 143 gastrectomies, 0.7 per cent mortality.

On patients with anacidity and symptoms of stenosis, I do the gastroduodenostomy with severing of the pylorus, which operation was suggested by Finney in 1902, but is performed very rarely by most surgeons. I have used this operation in the different private hospitals in 73 cases without death. On my surgical ward this operation was performed in 89 cases with 3 fatalities. The permanent results are satisfactory as in re-examining the ward cases, we had 80 per cent free from any trouble. A woman who had vomited every day for more than six months gained 80 pounds in body weight after this operation.

In cases of acute perforation the routine method is the closing of the perforation and cleaning of the abdominal cavity. A gastroenterostomy is performed in addition only in cases of severe stenosis, but these patients are advised to come for radical operation after 4 to 6 weeks even if they do not have any trouble. I had to reoperate upon such a man who insisted that he was absolutely healthy as he could eat every-

thing. I found a big gastro-jejunal ulcer immediately before the perforation into the transverse colon. Through a typical resection of the stomach and jejunal loop, the patient was cured permanently. On three of my private patients who did not follow my advice, I had to operate for a big gastro-colic fistula.

If a chronic ulcer has perforated and if there is no progressive peritonitis, then a typical gastrectomy can be performed. As the patients are mostly admitted as emergency cases in public hospitals, the number of private operations is relatively small. If possible, I do a typical gastrectomy and I have had no deaths among 22 resections.

In my surgical ward we had, from 1935 to 1947, 90 resections with four deaths, or 4.4 per cent mortality. Since 1948 we have had 25 resections with no deaths. Most of the cases were operated on by my assistants as emergency operations.

A very important complication is the acute, profuse bleeding of a chronic ulcer. Until 1918 it was the generally adopted doctrine that in cases with acute, profuse bleeding surgical treatment was absolutely contra-indicated. Only if the bleeding comes back and medical treatment fails, the operation is relatively indicated. During the first World War, I had to operate upon soldiers who were treated by a well known gastro-enterologist, Dozent Dr. Zweig, for acute hemorrhage which could not be stopped by medical remedies. Only three out of 8 such cases could be cured through an operation. In a paper read in April 1918 before our medical Society, I suggested operation upon cases of acute, profuse bleeding from a chronic ulcer as soon as possible, and to avoid, in this case, the ether anesthesia because ether damages the liver and the organs which are already damaged by the anemia. I repeated my proposition of an early operation in several papers, but only few surgeons and almost no physicians accepted this proposition. Gordon-Taylor in London, however, became a convinced follower of the early operation for an acute profuse hemorrhage from a chronic ulcer.

It is the object of the early operation carried out in the first 24 to 48 hours to avoid lethal bleeding and fatalities due to perforation. There are internists who state that bleeding to death is so rare a happening that they have never experienced it in any one of their patients in the course of their long medical practice. These internists were lucky enough never to have a patient with a bleeding large vessel such as the pancreatico-duodenal artery squirting out of the base of a duodenal ulcer which had penetrated the pancreas, or otherwise they were able to transfer such a patient to a surgical service before death would occur

and after medical treatment had been fruitless. The postoperative death of such a patient is then listed on the surgical death toll rather than on the medical.

Fatal bleeding is not at all a rare occurrence even with strict and most accurate medicinal measures, no matter how often this may be asserted. Seidl was able to report on 25 fatalities due to hemorrhage observed at the Vienna City Hospital of Lainz within 1 year as shown on post mortem. Formerly a mortality of 1 to 5 per cent due to internal measures was compared with a 30-40 per cent surgical mortality. The inference was that surgical procedures led to a higher mortality rate than medical procedures. If one only considers the cases of acute bleeding and excludes in the percentage those cases of small hemorrhages and those with occult bleeding, then the mortality of medical treatment is much higher. Kalk thus had a 12 per cent fatality with the gastric ulcer and a 16 per cent mortality with acute bleeding duodenal ulcers. Chiesman's publication in the *Lancet* 1932 is of special interest and very instructive. In it he refers to 251 cases of acute hemorrhages which were admitted to the Medical Department of the St. Thomas Hospital in London, England, and which were exclusively treated by medical procedures. These cases had a 19.1 per cent mortality. Out of 189 cases where the hemorrhage stopped on the first day, only 2 cases died (1.05 per cent mortality). Out of 62 patients with a hemorrhage of over 24 hours or of quickly remittent bleeding, 46 died, which is equal to 74.1 per cent mortality. On post mortem examination a large eroded vessel was found at the bottom of a penetrating ulcer in 45 cases.

The bleeding of a minor vessel in the mucous membrane in the crater margin of an ulcer that had penetrated into the pancreas can be permanently checked by medical procedures such as hemistypics or blood transfusions, even in cases where the bleeding was most violent at the onset. If, however, a major vessel such as the pancreaticoduodenal or the left gastric artery squirts at the bottom of a penetrating ulcer, there may be thrombus formation which temporarily closes the opening of the vessel in the course of collapse with its ensuing decrease in blood pressure, and a coagulum will also fill the crater of the ulcer, both of which I have repeatedly observed at an early operation for acute hemorrhage. This is—let me say this once more—a transient hemostasis. The patient recovers gradually, especially when blood substitution therapy by intravenous blood-drip is instituted to fill the depleted system. The undiluted hyperacid gastric juice, upon admission to the duodenum, will gradually digest the thrombus, thus leading to a renewed and equally

strong bleeding. It is therefore mandatory to neutralize the gastric juice which is best done with Magnesium Oxide or Calcium Carbonate given at regular intervals in all those cases where immediate operation is not considered. The knowledge as to whether or not the severe bleeding associated with syncope is due to a minor marginal mucous membrane vessel or to a major vessel is only established through the recurrence of a major bleeding and is therefore quite uncertain in each case. A safe procedure is established only if an operation at the earliest possible date is performed in hemorrhages due to a chronic ulcer.

It is the objective of the early operation to avoid the rupture of the bleeding ulcer. This danger is considerable in cases of bleeding ulcers situated in the anterior wall of the stomach or duodenum, whereas the penetrating posterior wall ulcers are more likely to bleed the patient to death. Hemorrhage and acute perforation are not all as rare as Behrend has stated. His statements were contradicted by Bennett who found at autopsy in 61 cases of a preceding hemorrhage a concomitant rupture of the bleeding ulcers in 25 cases. Kunz reported on nine cases with simultaneous hemorrhage and rupture of which only 3 were saved through surgery. Gordon-Taylor was able to save 4 out of 5 such cases through operation.

On my Surgical Department we had 10 cases of both severe bleeding and rupture out of which 6 were saved through surgical procedures. Let me cite one case which is of special interest because of a renewed and severe bleeding after 4 weeks.

A 57 year old patient was transferred to my Service from a medical ward on February 23, 1943, 6 hours after perforation of an acutely and profusely bleeding ulcer. There was peritonitis and a severe anemia (1 million red cells and a Hb. of 30 per cent), pulse 138, a board-like abdominal wall without a liver dullness on percussion. Immediate operation under local anesthesia aided by 25 cc of ether was performed. There was quite an amount of blood and of peritoneal exudate visible upon entering the abdominal cavity. Suction with Aubert's aspirator was instigated. The small and large intestines were filled with blood. There was a callous ulcer of the anterior duodenal wall with a lead pencil sized perforation mouth which was closed by a food particle. The over dilated stomach was emptied with the aspirator, the perforation was closed and then the abdominal wall was sutured. A Witzel fistula of the cecum was performed at once, and a blood transfusion, as well as the postoperative irrigation of the bowel through the cecum fistula in order to evacuate the blood, followed. Healing occurred. 3 weeks

later his considerable anemia was taken care of upon transfer to the medical ward. The patient sustained another severe nocturnal hemorrhage after he had been on the medical ward for 3 days. Immediate blood transfusion was instigated. On the next morning the internist considered this man to be moribund. In spite of this I urged the immediate transfer of this patient to my service. The blood count showed 1.1 mill. red cells and a Sahli of 20. The radial pulse was not palpable. Pending a donor, 1000 cc of Tutofusin were given by veinoclysis thus re-establishing the radial pulse. A midsize laparotomy in local anesthesia for the abdominal wall and mesenteric anesthesia with a 1/4 per cent novocaine solution was done. There were few adhesions and the stomach was empty whereas the small intestine and the colon were filled with blood. The anterior duodenal wall ulcer had a perfect suture line. There was, however, a large ulcer in the posterior wall of the duodenum which had penetrated into the pancreas. The ulcer crater was 1 cm deep and showed the eroded pancreaticoduodenal artery which was closed by a slightly adherent thrombus formation. The artery was closed by 2 stitches and the duodenum as well as half of the stomach were resected. The duodenum was closed according to Bsteh, a typical Hofmeister-Finsterer anastomosis was performed and suture of the abdominal wall terminated the operation. Postoperative blood transfusion and Homoseran was instituted. The bowel irrigation for blood evacuation was performed through the old cecum fistula. Healing occurred. The medical ward took care of his considerable anemia once again. There was a long period of recovery in which the patient gained 22 pounds. Since then the patient has been completely asymptomatic.

In bleeding ulcer the evacuation of blood from the bowel is of primary importance as its degeneration products are very toxic. Pauchet has therefore recommended cecostomy drainage in every case of acute bleeding caused by a peptic ulcer. As these cases of hemorrhages are operated on my Service under local anesthesia, there is no atonia, as seen in general anesthesia cases. The bowel is therefore emptied without cecostomy within 24 hours by irrigation with warm water of 40° centigrade (104°F.). In this case I have performed the cecum fistula because of the peritonitis in order to evacuate the paralytic bowel, and I consider it to have been a life saving procedure.

A mortality due to medical procedures of 1-5 per cent is compared with a surgical mortality of 38 per cent. These figures were given by Borszeky in 1908 referring to 86 operations because of acute hemorrhages which were reported in the literature. This comparison, however,

does not consider the fact that all these operations were belated ones which were only carried out after fruitless medical attempts to control hemorrhage. Furthermore, in most cases gastroenterostomy only was performed, a procedure which is apt to be hemostatic only in cases of flat ulcers or in cases of gastritis because of the permanent contraction of the gastric wall. Gastroenterostomy is of no value in callous and penetrating ulcers that are associated with the erosion of a major vessel at the bottom of an ulcer. If one compares the results of medical with surgical treatment, then only acute and profuse hemorrhages, and not occult bleedings on the medical side, should be weighed exclusively against the results achieved by an early operation. After having compiled the early operations which were reported in the literature up to 1943, I have found 6 fatalities out of 76 cases which is a 7.8 per cent mortality. According to Chiesman the mortality rate of exclusively medical procedures is 19 per cent. This is emphatic disproof of the assertion that achieved results with medical treatment would be superior to surgery.

In 1923 at a meeting of the Chicago Medical Society when I recommended the early operation at the soonest possible date in cases of acute hemorrhages, thus speaking of my personal experience, I was told in the ensuing discussion that in the United States the operative treatment was not necessary because of an adequate check on the hemorrhage by repeated blood transfusions and that a bleeding to death was therefore not to be feared. At that time I was unable to answer this statement as blood transfusions were introduced in Vienna only after my return in 1924. It is generally known that the blood transfusions are of a decisive value in restoring part of the blood which is lost through hemorrhage. There are, however, diverging viewpoints on the hemostatic effect by an increased hemocoagulation. Whereas many internists and also some surgeons overestimate the hemostatic effect and use transfusion in every case of bleeding ulcer with the view of checking the hemorrhage, there are others who see little in the way of hemostasis.

These controversial attitudes largely depend on the kind of the bleeding. Blood transfusions instigated for bleeding of flat ulcers or mucous membrane minor vessels situated on the border of a penetrating ulcer will meet with favorable results because the hemorrhage is not due to the arrosion of a major blood vessel. On the other hand very unsatisfactory results will ensue from transfusion for hemorrhage caused by major eroded arteries. Severe bleeding will recur in many instances after the breakdown of the thrombus material caused by the hyperacid gastric juice has taken place and which will eventually end

in death of the patient. It is therefore erroneous to believe that blood transfusions are substitutes for surgery and particularly for the early operation. It is only to control the depleted system and as a preoperative measure that blood transfusions are of great value.

The internists oppose early operation within 24 to 48 hours inasmuch as diagnosis is of debatable reliability when it comes to saying whether or not this is hemorrhage due to a chronic ulcer. In most cases the history and previous G.I. series substantiate the diagnosis. Bleeding out of an acute and flat ulcer often comes on the patient without preliminary stomach pains. In these cases expectant and hemostatic medication or a blood transfusion is justified. On a recurring hemorrhage a potential callous ulcer which had been asymptomatic so far has to be surmised and this, therefore, calls for an exploratory laparotomy to assert or to rule out chronic peptic ulcer.

On my surgical service we admitted 55 cases of acute hemorrhage between 1936 and 1946 on which we did not operate. 44 cases proved to be bleeding due to acute ulcers of gastritis. They were treated on a medical service or discharged after 1 weeks observation. One case apparently was due to a hemorrhage originating from a flat peptic jejunal ulcer which stopped bleeding almost immediately. 10 cases were due to bleedings of chronic ulcers which were brought under control on the first day so that the operation of the chronic ulcer was postponed. 3 moribund cases were transferred to our Service from the Medical Department for a late operation. 2 patients died preoperatively while preparations for a transfusion were made and the third case died at the beginning of the operation. All 3 cases showed erosions of major arteries on post mortem.

It is frequently pointed out that the differential diagnosis to a hemorrhage due to esophageal varices with cirrhosis of the liver is extremely difficult if concomitant epigastric discomfort is present. On the other hand there might be hemorrhage in coexistent asymptomatic peptic ulcer with liver cirrhosis.

30 years ago I had to operate on a 60 year old tavern keeper (an alcoholic) who had gastric hemorrhages and on whom the house physician had urged the operation. I presumed that the hemorrhage was due to varices, especially in view of the fact that a diagnosis of liver cirrhosis had previously been established and that the man never complained about trouble of the stomach. A repeated hemorrhage at a short interval necessitated an exploratory laparotomy within 12 hours under local anesthesia. The findings were a shrinking high grade liver

cirrhosis, enormously dilated veins on the outer aspect of the stomach and a callous gastric ulcer which had penetrated the lesser omentum and which was visible from the outside. Both the stomach and the small intestine were filled with blood. A curved resection was done followed by a Hofmeister-Finsterer anastomosis. Uneventful recovery and healing by primary intention ensued. The patient felt fine during the following 6 years when an acute cerebral vascular accident ended his life.

As the specimen of the resection showed a large, eroded vein at the ulcer bottom, this patient would have bled himself to death just as he would have done with esophageal varices in view of the high grade obstructive liver cirrhosis. Therefore differential diagnosis is quite a problem both prior to and during the operation if there is coexistent cirrhosis of the liver. In those cases where the ulcer does not show from the outside of the stomach and where there is high grade cirrhosis of the liver, the assumption of varices as the etiology of the hemorrhage is easily made. Gastrotomy carried out in all of those cases is the only means of protecting oneself from an erroneous diagnosis. The palpating bare finger (wearing no gloves) will, on careful examination of the stomach as well as of the duodenum, certainly not miss a callous or penetrating ulcer even if it be located on the posterior wall.

We have had 2 fatalities due to hemorrhage of a peptic ulcer with coexistent cirrhosis of the liver. On the exploratory laparotomy we contented ourselves with the diagnosis of hemorrhage due to varicosity without inspecting the stomach from the inside. On post mortem there was a duodenal ulcer that had penetrated into the pancreas in the case of a 51 year old woman who also had a highly advanced cirrhosis of the liver. There was an erosion of the pancreaticoduodenal artery present. The second case was that of a 68 year old man who had ascites due to his cirrhosis and 3 ulcers in the cardia area with an erosion of a branch of the left gastric artery which bled this patient to death. These two cases who were brought to the hospital right after the onset of the hemorrhage could have been easily saved if we had done a gastrotomy and an ensuing early gastrectomy.

Bleeding of an esophageal varix is a rare occurrence in my own material. We only had 6 such cases on my Service as compared to 137 acute hemorrhages due to ulcer which were operated on and 55 non-operative cases of acute hemorrhages. In 3 cases exploratory laparotomy was performed because of an uncertain diagnosis, and the other cases were not operated on because a diagnosis of hemorrhage due to a varix was made. The post mortem showed all 6 cases to be hemorrhages

caused by liver cirrhosis.

The indication for the operation does not merely depend upon the diagnosis of bleeding due to a chronic peptic ulcer, but it rests also with the personal inclination of both the surgeon and the internist as to whether conservative or early surgical procedures are to be followed. Those who follow the conservative line have an easy indication at first; namely, to treat every patient by medical procedures or even with a blood transfusion, no matter how long the patient was treated for his chronic ulcer previously, or in a case of a hemorrhage without preceding gastric discomfort. It is only when the hemorrhage is not adequately controlled by internal procedures or if it is recurrent in type, that the important and often unanswerable question arises whether there is an erosion of a major vessel at the bottom of a penetrating ulcer. This ulcer is only amenable to surgery, which is, however, likely to be less successful as time goes on. The other question is whether the bleeding is due to a minor vessel at the margin of a penetrating ulcer. This latter potentiality may be successfully mastered by continuous medical treatment even in seemingly hopeless cases where even a minor surgical operation might prove too much for the patient.

For those who prefer early operation the indication is at first quite a problem, as treatment depends on the etiology of the bleeding. The diagnosis of a hemorrhage due to a chronic ulcer calls for the immediate operation, whereas bleeding due to an acute ulcer or due to a gastritis only requires medical treatment which may be coupled with a blood transfusion. Exploratory laparotomy in these cases is indicated whenever the bleeding recurs and when the anemia increases, despite supportive blood therapy, in order to rule out an asymptomatic and chronic peptic ulcer. Exploratory laparotomy is indicated even more in patients over 60 years of age whosometimes have completely asymptomatic ulcers of the lesser curvature, for they are apt to bleed to death even with erosions of very small mucous membrane vessels, owing to the arteriosclerosis which is present.

It is a matter of course that the indication also depends on external circumstances. Only if complete asepsis is available in a hospital and if an experienced gastric surgeon is present, will the internist advise the patient to have surgery performed. Patients who live in rural areas far away from hospital facilities will have to put up with conservative treatment in cases where transportation over long distances would be too hazardous.

In order to evaluate the degree of anemia caused by the hemorrhage,

the R.B.C. of the first day cannot be relied upon, as time has to elapse until fluid resorbed from the body tissues dilutes the blood. I am therefore unable to agree with Aitken who only accepts a hemorrhage to be severe if there are 2 million erythrocytes. This count usually would occur on the second and third day rather than on the first day. I have seen several patients on whom I operated early to have had an extremely severe bleeding of an eroded pancreatico-duodenal artery, and who had started out with a severe collapse and syncope and who had vomited up to one liter of blood having the small and large intestine filled with blood and without palpable radial pulse, to have a nearly normal R.B.C. or a 3 million red count. This R.B.C. of 3 million was often encountered in Austria in and after 1945 in people who have had no bleeding at all. These R.B.C. values may be seen in impoverished urban populations of large cities even now. It is therefore more important to go by the frequency of the pulse and blood pressure values in the evaluation of whether hemorrhage is severe or not. In a severe bleeding the pulse, which can hardly be felt at all in collapse, will remain fast even after syncope. The blood pressure that showed normal or increased readings prior to operation will be far below normal in severe hemorrhage. This will progress to still lower readings associated with a greater pulse frequency if the bleeding persists.

In the surgical approach of the acute hemorrhage caused by peptic ulcer, the main object is first to control the bleeding permanently by ligating the eroded vessel, second, to replace the lost amount of blood, and third, to evacuate the blood in the bowel in the postoperative care of the patient in order to counteract the toxic catabolism of the blood constituents. Therefore gastroenterostomy seems to be completely devoid of value, although it was a procedure which was almost universally practiced 30 years ago. I also performed gastroenterostomy in the first years of my surgical practice. I met with one fatality out of 7 early operations because of a hemorrhage due to an eroded pancreatic vessel and I had 3 fatalities out of 7 late operations. In cases of an acute hemorrhage due to a duodenal ulcer, which is not resectable owing to its anatomical position and extent, I perform instead of the resection for exclusion, the pyloric exclusion by ligating the antrum proximally to the pylorus, and then I do a posterior gastroenterostomy. Furthermore, I put a large gauze tampon on the duodenum which bulges the abdominal wall. By a pressure dressing the anterior wall of the duodenum is thus pressed against the posterior wall and against the penetrating ulcer which helps in checking the bleeding by direct compres-

sion. In order to avoid harm to the pancreas, this dressing should be loosened within 12 to 24 hours. I used this method on rare occasions during my early years when I had but little experience in the resection of the penetrating duodenal ulcer. I had no fatality in 3 early operations and 4 fatalities among 14 late operations with this procedure. In those cases where a gastric ulcer penetrates into the lesser omentum, Witzel recommended to put stitches around the afferent coronary gastric arteries which I myself have carried out in 3 cases. This is an indirect hemostyptic procedure because the anastomosis with the coronary arteries of the greater curvature may lead to further bleeding. In such cases the excision of the bleeding ulcer is better performed and the defect may be closed through a longitudinal suture line. The excision may be done in patients where a typical resection is not feasible because of their poor general condition and if the gastric ulcer has not penetrated into the pancreas. Out of 6 early operations I had 1 fatality due to pneumonia in a 66 year old man. Out of 5 late operations I have had 3 fatalities.

In most cases the typical radical operation, namely the two third gastrectomy with removal of the bleeding ulcer, was carried out. This procedure rid the patient of his bleeding as well as of his ulcer pains. Results are necessarily dependent on the length of time of the bleeding, and second, on the degree of anemia. Results are satisfactory when early operation within 24 to 48 hours is performed. Out of 86 operations in private hospitals I only had 2 fatalities, that is, a 2.3 per cent mortality.

An 80 year old man on whom I had intended to perform gastroenterostomy only, because of a peptic ulcer of the stomach that had lasted for the past 40 years and because of the fact that this man only weighed 34 Kilos (with a normal height) caused by incessant vomiting, was subject to a severe collapse during the night prior to operation. The doctor in charge took it for an episode of heart failure. On the next morning I found that the stomach was enormously dilated with fluid. Gastric section revealed blood. The pulse was 130 and barely palpable. I decided on immediate operation (29 May 1922) using mesenterial anesthesia with a 1/ % novocaine solution. The stomach extended into the true pelvis and was filled with blood. 4 liters of bloody fluid were evacuated by puncture. There was a large ulcer of the lesser curvature that had penetrated into the lesser omentum, and there was a second ulcer in the duodenum. The resection of the duodenum and of half of the stomach was comparatively easy. An anastomosis according to Hofmeister-Finsterer was performed, a rubber drain was inserted and the abdominal wall was closed. A postoperative blood transfusion was

given. The postoperative pulse was 136 on the first day, 100 and 80 on the second and third day respectively. There was at first an uneventful course. On the eighth day, however, when the patient had been out of bed for 3 days, a bilateral pneumonia developed and death occurred on the 10th day. There was no autopsy.

A 48 year old man, who had been sick with the stomach for 6 years, had a severe hemorrhage 3 months ago, and 3 days ago he had a considerable rise in temperature (la Grippe). He vomited bright red blood for 24 hours; furthermore, he had melaena and a severe syncope. This patient was transferred to Vienna to a private hospital on the next morning because the hematemesis had recurred. The pulse was 126 and barely palpable. There was a considerable anemia with 3 million erythrocytes and a hemoglobin of 35%. An immediate operation was performed under local anesthesia and splanchnic anesthesia with a 1/4 per cent novocaine solution. There was an ulcer of the posterior wall of the duodenum that had penetrated into the pancreas, and there was another ulcer of the anterior wall of the duodenum which was on the point of rupture. The small and large intestines were filled with blood. On resection a violently squirting erosion of the pancreatico-duodenal artery was found at the bottom of a penetrating duodenal ulcer. The thrombus formation which had closed its mouth had loosened. The artery was ligated and a typical 2/3 gastrectomy was performed. Normal postoperative course. The pulse reverted to normal on the 3rd day but there was a considerable febrile bronchitis. A bilateral pneumonia involving the left and then the right lobe followed which terminated fatally on the 17th day. No postmortem was done.

The results with the resection, which I mainly performed myself, were not as satisfactory on my surgical ward; nevertheless, the mortality is not higher than with normal gastrectomies for peptic ulcers. I had 95 resections with 4 fatalities (4.2 per cent mortality). 2 patients died of pneumonia, one patient died of peritonitis because one fixation suture of the mesocolon slit had cut through the anterior wall of the stomach and finally, one patient died of a considerable syphilitic aortitis and of an adhesive ileus.

The fact that the 181 early operations were necessitated by severe hemorrhages is not only substantiated by their history of dizziness, blacking out or syncopes, but also by the operative report which stated that there were erosions of the main branch of the pancreatico-duodenal artery at the bottom of a penetrating ulcer in 28 cases, erosions of the left gastric artery in 2 cases, of the splenic artery in 1 case and erosions

of the middle colic artery in 2 cases of peptic ulcers of the jejunum. In spite of the severe hemorrhage, a blood transfusion was only needed in 25 cases and was given in most cases postoperatively after the hemorrhage had definitely been controlled.

The late operations do not present good results as is shown by 31 fatalities out of 143 cases (20.1 per cent mortality). It must be added, however, that out of 64 patients who had been operated on during World War I at the Garnisonspital Nr. 2 or at various private hospitals, there were 6 cases out of 15 fatalities that had nothing to do with either the acute hemorrhage or the operation. Namely:

An officer who was operated on during World War I died 3 weeks later of a severe dysentery which was discovered at the post mortem.—1 fatality was due to a diabetic coma prior to the Insulin era.—1 patient died of uremia due to hypertrophy of the prostate.—1 case died of septicemia secondary to a gangrenous appendicitis with abscess formation, where the abscess was drained only.—2 cases were due to an open perforation into the abdominal cavity in the course of the medical treatment. Fatal peritonitis ensued.

Even in deducting the above-mentioned 6 fatalities, the mortality of the late operations in the private hospitals is 15.5 per cent (58 gastrectomies with 9 fatalities).

On my surgical ward 16 patients died out of 79 gastrectomies (20.2 per cent mortality).

The main reason for death in those patients who had a late operation is to be found in the parenchymatous degeneration of the organs due to the prolonged anemia. Even repeated blood transfusions could not make up for that. 6 cases also had pneumonia besides their anemia despite the use of local anesthesia only. This was due to the adverse circumstances under which these patients had to be handled. They were wheeled through a courtyard in the winter. 4 cases had an incipient peritonitis as shown at autopsy due to hemolytic streptococci secondary to a suppurative tonsillitis. 2 cases showed a far advanced atheromatosis of the aorta, syphilitic in origin. One of those 2 cases was that of an officer who died in World War I and who had been treated for 19 years because of tabes dorsalis.

A 69 year old woman died 12 days postoperatively because of pulmonary embolism. A 57 year old woman who, 14 days after operation had been retransferred for postoperative care of her anemia to the 1st Medical Ward, after her wound had healed by primary intention, died

6 weeks later. The autopsy disclosed a pyopneumothorax on the right which had gone unrecognized and untreated.

Results of the late operation are not satisfactory, although they have improved slightly since blood transfusions were started in 1924. Nevertheless, results are by far better than those which continued internal treatment without operation could ever have achieved. We know from Chiesman's very important publication that those cases with a bleeding exceeding 24 hours, or those with a recurrent bleeding, show a mortality of over 50 per cent, in his own statistics even 74 per cent. The surgeon therefore has to try the operation, in spite of the poor prognosis of the late operation, in every case of a patient who is transferred to his service by the internist because the bleeding could not be brought under control. These patients would be lost without an operation. I myself have never, even in a single case, declined the operation, even if the patient was apparently moribund. I still recall the words of Guasenbauer who was a distinguished pupil of Billroth and which I heard 50 years ago as a young medical student: "He who saves only 1 out of 10 patients who are lost without an operation has accomplished a great deed."

The next case is a proof of the fact that even very old and seemingly hopeless patients may give the surgeon full success.

An 85 year old general, on whom I had performed a posterior gastroenterostomy because of a peptic ulcer of the stomach 30 years ago when I was an assistant at the Hochenegg Clinic, had been repeatedly treated for gastric discomfort. 5 years previously he had a severe gastric hematemesis. For the past year he had increasing gastric pains and 2 weeks ago another hematemesis originating from an established peptic ulcer of the jejunum. Despite good medical care in a sanitarium and repeated blood transfusions, the bleeding had recurred 3 times. Finally he had a severe anemia (2 million red cells and 30 per cent Sahli). The patient himself asked for the operation because of his pains and the increasing weakness. His attending physician tried to dissuade him because of his age and his poor general status. When I was called as a consultant, I immediately decided on the operation which was a matter of life and death for the patient. This patient also has had a permanent catheter for several years because of a hypertrophy of the prostate.

On 11 March 1943 I did the operation. The patient had a preoperative blood transfusion. Mid-size laparotomy in local anesthesia of the abdominal wall and a mesenterial anesthesia with a 1/4 per cent Novocaine solution was done. There was a large and penetrating peptic ulcer of the jejunum, the bottom of which was formed by the mesocolon

and by the transverse colon. The ulcer was just about to rupture into the transverse colon. I resected half of the stomach and the anastomotic loop and I left the bottom of ulcer on the mesocolon and transverse colon. I closed the duodenum in a typical way and made an end to end anastomosis of the jejunum. Distally I made an end to side Hofmeister-Finsterer anastomosis. The ulcer bottom was separated from the free abdominal cavity through omentum tissue. One rubber drain was inserted and the abdominal wall was sutured. A blood transfusion followed the operation and a repeat transfusion was done on the next day. There was a completely uneventful course as far as the abdomen was concerned. He had a severe bronchitis and pains due to the hypertrophy of the prostate. 3 weeks later the patient was discharged as cured.

I am convinced that the satisfactory results achieved by early gastrectomy are due to the exact control of the bleeding as well as to the lack of a deep ether anesthesia. It is very important to prevent any further damage through ether anesthesia to those patients who already are considerably weakened by their severe anemia. These operations are therefore carried out invariably under local anesthesia of the abdominal wall and a 1/4 per cent Novocaine mesenteric anesthesia. Because of the fall in blood pressure, splanchnic anesthesia is only done in exceptional cases of old patients, where the use of ether even in negligible quantities would be prohibitive because of their chronic bronchitis.

The group of acute and profuse gastric hemorrhages has to be separated from those patients with a severe secondary anemia, which is due to repeated and minor bleedings. The latter group has an absolute indication for operation, a fact which has been established over 50 years. Up to 30 years ago gastroenterostomy was done in practically all of those cases, as indicated by Kronlein in 1906, as the method of choice. When I was assistant at Hocheng's Clinic, I also performed gastroenterostomy 35 years ago. I had 1 fatality out of 5 patients through an erosion of the splenic artery 6 days postoperatively. Ever since 1918 I have performed a typical gastrectomy in those cases of secondary anemia. I was able to publish a paper in 1942 on 65 cases with a severe anemia (1-1.5 mill. red cells, 20-30% Sahli) out of which 4 died (= 6.1 per cent mortality).

A 36 year old man died of pulmonary embolism.—A 62 year old woman died of her severe anemia after 3 days in spite of repeated blood transfusions.—A 70 year old woman who died after 19 days showed on post mortem a severe anemia and also an acute mitral endocarditis as

well as bilateral pleuritis.—A 36 year old man died of a well defined pancreatitis after resection of a penetrating duodenal ulcer.

Operations necessitated by severe secondary anemias have grown rare during the past 10 years, as those patients are sent to surgery earlier now. The results of those cases are nearly equal with the normal gastrectomy for ulcers.

Gordon-Taylor, who is a fullhearted follower of the early operation, has concluded his address, delivered to the Mid-Staffordshire Medical Society on Oct. 8th and published in the *Lancet* 1935 with the sentences: "Finsterer's 'first forty-eight hours' is still the optimum period for surgical attack in hematemesis, and the golden age of gastric surgery will have been attained only when all cases of hemorrhage from chronic ulcer come to operation within that space of time.

"Let there be no procrastination, for delay is fraught with peril; early enterprise is the prelude to success."

The most important complication of the gastric ulcer is, according to my own experience, the malignant degeneration. The frequency of carcinomatous degeneration is being highly underestimated, and it is not generally recognized that prognosis of such a carcinomatous peptic ulcer is much worse than that of primary carcinoma. I have pointed out this fact on many occasions, and for the last time I have spoken to that effect in a conference, held at the Royal Society of Medicine in London on 10th Nov. 1938, where the title of an honorary member was conferred upon me.

Carcinoma formation of a peptic ulcer of the duodenum is practically not seen. The internists state that malignancy would only occur in approximately 1 per cent of peptic ulcers of the stomach and would therefore not play any part in the decision for surgery. It can only be a matter of conjecture in how many cases a peptic ulcer of the stomach develops into malignancy, and this cannot be expressed in percentage figures. For this reason all positive peptic ulcers of the stomach should be firmly established, which is, however, hardly possible at all in view of the difficulties in arriving at a correct diagnosis. If one is to rely on the ulcer-carcinoma figures evidenced by histologic examination of surgical specimens this will be a controversial issue because of the different indications for operation by the various surgeons. A surgeon who will only resect flat ulcers and who only performs gastroenterostomy, especially in old patients, with stenosing and penetrating prepyloric ulcers, will have a smaller percentage of ulcer-carcinomas than the surgeon who

will also resect these severe ulcers which particularly tend to malignancy. I have been exclusively performing gastrectomy in those latter cases for the past 20 years and have therefore a comparatively high percentage of malignant peptic ulcers. I was able to publish 532 resection cases up to 1938 who had been sent to operation as peptic ulcers of the stomach and who had among them 141 secondary malignancies (ulcer-carcinomas)—20.9 per cent. Even after deduction of 45 cases of ulcer-carcinoma, where the diagnosis was made on the basis of the history (repeated ulcer niches on G.I. series) and on the microscopic findings of converging folds of the surrounding mucosa, and where the histological examination failed to reveal the ulcer because of abundant carcinomatous growth invading the entire ulcer bottom, the frequency of the ulcer carcinoma would still be 15.2 per cent.

The diagnosis of ulcer carcinoma was only made by such experienced pathologists as Stoerck, Sternberg, Maresch and Chiari and never by myself. Konjetzny contended that the high percentage of ulcer carcinoma in my own material would be explained by 2 facts: first, that exulcerated primary carcinomas were held for ulcer carcinomas, and second, that cases of healing ulcers with atypical epithelial proliferations had been erroneously declared to be incipient carcinomas. The diagnosis of an incipient ulcer carcinoma is an extremely difficult one in some cases. Sternberg had doubted the diagnosis of ulcer carcinoma in 2 cases which Professor Stoerck had demonstrated at the Vienna Medical Society. The further course, however, proved Stoerck to be right, as both patients died 12 and 15 months later respectively because of liver metastases. There was no other primary carcinoma found at their autopsy. In the beginning of the malignant degeneration, it is very difficult to find the area of malignancy because one can not examine any one ulcer in serial sections and it is therefore left to chance as to whether or not the malignant area is hit upon.

On 13 February 1937 I performed a typical gastrectomy in a 44 year old patient from London, England, because of a 3 year old callous ulcer of the stomach which had been repeatedly treated by medical procedures. Professor Chiari found a normal peptic ulcer of the stomach under the microscope. One lymph gland, however, showed carcinomatous tissue. He asked me if the patient did not have carcinoma of the pancreas because he had been unable to find any malignancy in the peptic ulcer. I told him that the patient did not have carcinoma of the pancreas, so that carcinoma was looked for in 11 further sections and then the incipient malignant degeneration was finally found. The patient did well post-

operatively, gained in weight and was free of pains for 1 year. Then he became jaundiced and died 15 months after the operation at the London Cancer Hospital. On post mortem metastases of the liver were found, but no primary carcinoma.

It is of some interest to note that the attending physicians were opposed to the operation according to this patient's statements, among them the well known gastroenterologist Hurst. The patient was in favor of the operation because a relative of his, who also was a doctor, was freed of his pains after I had done a gastrectomy on him in Vienna. Had this man come to operation only 6 months earlier, he would have had a permanent cure.

A follow up examination of the healed cases of ulcer carcinoma and primary cancer in 1938, the data of which were read at the Royal Society of Medicine in London, disclosed 58 cases which were free of recurrence over 5 years, out of 187 gastrectomies performed up to 1933 because of a primary carcinoma. This is 31%. 73 cases who had combined resections of the stomach and parts of the pancreas, liver or of the colon, which have a higher mortality, had 19 cases of permanent cures—26%. Therefore 260 cases of primary carcinoma had 77 permanent cures—29.6%.

The ulcer carcinoma had a permanent cure rate of 24 out of 99 patients. In group I where the diagnosis of a beginning malignancy had been made only after histological examination, only 18 out of 35 cases (51.4%) were permanently cured. This is an early operation for carcinoma at the earliest possible date, which is not at all possible in the primary carcinoma because the clinical diagnosis can't be made prior to operation. Therefore one would expect at least a cure rate of 80 per cent in this first group of ulcer-carcinoma. Group II comprises those cases where the diagnosis of malignancy in the peptic ulcer was already established during operation and where the larger omentum and the entire tributary lymphatic tissues were removed as in normal operations for cancer. In this group only 4 cases out of 27 were permanently cured—14.8 per cent. Group III comprises those cases where the diagnosis of ulcer carcinoma was made because of the formerly proved ulcer (G.I. series) and second because of the converging pattern of the mucosal folds around the ulcer in the resection specimen. Stoerck had already drawn my attention to this mucosal pattern 25 years previously. The histologic examination in this group was unable to detect the ulcer origin of the carcinoma because the highly advanced neoplastic growth had proliferated into the entire ulcer bottom. The group I cases were operated on as peptic ulcers of the stomach

without removal of the larger omentum and with a normal gastrectomy. Groups II and III with the diagnosis ulcer-cancer underwent subtotal gastrectomy with removal of the larger omentum and lymphatic tissue, as is usually done in radical gastrectomy for primary carcinoma. In spite of this, only 6 out of 64 cases that had radical operation (9.3 per cent) were permanently cured, whereas out of 260 radical gastrectomies because of a primary carcinoma, 77 cases (29.6 per cent) remained free of recurrence for over 5 years.

The poor prognosis of the ulcer carcinoma was pointed out by Hayem in 1901 when he said that carcinomas with free hydrochloric acid would have a graver prognosis than those with anacidity. This goes well with our present time experiences on the ulcer carcinoma and the primary carcinoma. Hartmann of the Mayo Clinic reported on a similar experience in 1924: out of 41 gastrectomies for carcinomas with free hydrochloric acid 22 per cent, and out of 39 carcinomas without free hydrochloric acid 45 per cent had remained free of recurrence after 5 years. Bloomfield of the Mayo Clinic in 1935 reported on 68 cases of ulcer carcinoma on which the diagnosis had only been made by histological examination. 36 patients died on recurrences—72.7 per cent.

Because of the poor prognosis of the ulcer carcinoma, the gastric ulcer should be radically operated before its malignant degeneration. This demand was put forward by Chamberlain in 1927, backed up by a statistician of the Moynihan Clinic. He gave the following reason for it: 9.5 per cent of the conservatively treated ulcers would die of carcinoma whereas the mortality of gastrectomy for ulcer would be 3% only. The results of gastrectomy for carcinoma can only be improved through operation at the earliest possible date. This implies the exploratory laparotomy in all doubtful cases with a bimanual exploration of the stomach after gastrotomy in order to detect an incipient carcinoma which was not traceable by X-ray or gastroscopy. The peptic ulcer of the stomach that does not heal after 6 months of careful medical treatment, or recurs quickly after healing, should be treated by surgery. This is of particular importance in members of families with a carcinoma history who are known to have a particular carcinoma disposition. I have put into practice for many years this demand for early operation, but I have been unable to convince the attending physicians and the internists of the necessity for operation in those cases.

Walton had stated in 1931, that in England 20 per cent of all gastric carcinomas would originate from a peptic ulcer, and Hurst found that in England 16,000 people die every year of carcinoma of the stomach.

Through a radical operation for peptic ulcer of the stomach carried out in time, at least 3,000 fatalities due to carcinoma of the stomach could be avoided in England every year. This applies to other countries as well with only slightly different figures. Only close collaboration of internists and surgeons can ever achieve this goal.

The gastro-jejunal ulcer (g.j.u.) which occurs after gastroenterostomy can only be cured permanently if at least a $2/3$ gastrectomy is performed, and cases of considerable dilatation of the stomach even require up to a $4/5$ gastrectomy. The anastomotic loop has to be removed in those cases where the ulcer lies in the jejunum at the base of the mesentery opposite the mouth of gastroenterostomy. In marginal ulcers the anastomotic loop will be severed from the stomach, and its longitudinal mouth, which shouldn't be too large however, will be closed by a transverse suture line. The mortality of the radical operation for gastro-jejunal ulcer is greater (35 fatalities—11.9%, out of 293 cases) than the normal gastrectomy mortality for peptic ulcer of the stomach. Mortality is lower, however, in cases of g.j.u. after a previous gastroenterostomy (8 per cent) than with a gastro-jejunal ulcer after gastrectomy (23 per cent). The highest mortality is seen in cases of acute hemorrhage, perforation or gastro-colic fistula, as 20 out of 49 patients, 40.8 per cent, have died. The inference is to operate on patients with g.j.u. before such complications arise.

Because of the high mortality rate of the radical operation, Dragstedt, Mandl, et cetera, have advised vagotomy in the past years for the treatment of g.j.u. Paul Huber pledged himself in favor of the typical radical operation for g.j.u. after gastroenterostomy because the patients would be permanently cured with this method. In cases of g.j.u. after resection, vagotomy should be given preference, because it has a lower mortality than the radical operation. He used the patient material of the 1st surgical Clinic (v. Eiselsberg, Ranzi, Schonbauer) for his point of view. I have had but little experience with vagotomy, as I have used it in 6 cases of g.j.u. only. The pains stopped abruptly, the hyperacidity went down and those patients were achlorhydric even after the insulin test had been done. This is good proof that vagotomy was complete. Permanent results are not available as yet, because these operations were only done a year ago. It is important, however, that the acid values have returned to the same figures as preoperatively, and that on X-ray the ulcer was demonstrable again although pains are not as bad up to now as they used to be. I concur in Huber's statements in cases of g.j.u. after gastroenterostomy was performed; namely, that the typical resection

should be carried out. In cases of g.j.u. after a resection, a vagotomy should be tried because of the high mortality of radical operation, which latter should be done, however, when vagotomy fails.

As far as permanent results are concerned, I wish to say that according to my figures which I had compiled for a conference in Paris, France, in 1933, the best results were achieved with the 2/3 up to 4/5 gastrectomy and the Hofmeister-Finsterer anastomosis. Out of 55 such patients 50 (90.9 per cent) were completely cured and free of pains for more than 3-15 years. 5 cases were considerably improved and there was not one single patient who was not cured. Results achieved with a smaller gastrectomy and with the Billroth I or Haberer anastomosis are not as satisfactory. Out of 22 only 18 cases, or 81.8 per cent, were completely cured, 1 case was improved and three cases were uncured. They had a recurrent duodenal ulcer, and on a repeat operation these 3 patients had a subtotal gastrectomy with the Hofmeister-Finsterer anastomosis and were permanently cured.

Results of the 2/3 gastrectomy with a Y-shaped anastomosis after Roux are worst of all. Out of 21 cases only 7 were freed of their pains, 1 case was improved and 13 cases, 61.9 per cent, were not cured. Out of these, 6 patients were re-operated because of a g.j.u. They had a radical operation where another small part of the stomach was removed and after an end to end anastomosis of the jejunum, a Hofmeister-Finsterer anastomosis was performed and the patients were permanently cured thereafter. In 7 cases the diagnosis of recurrent ulcer was established by their pains, by recurrent bleedings and through a positive x-ray finding. The frequent occurrence of a g.j.u. is to be explained by the fact that because of the Y-shaped anastomosis, the gastric juice can't be neutralized at once upon admission in the jejunal loop. This is readily done with the Hofmeister-Finsterer anastomosis. With the Y-shaped anastomosis, however, the buffering of the acid gastric juice is effected only at the mouth of the afferent jejunal loop. That's why the g.j.u. extends right to that mouth of the afferent loop. A permanent cure with the Y-shaped anastomosis is only possible in cases where there is permanent achlorhydria which does not necessitate buffering. This is only achieved by a subtotal resection where a 10 cm long strip of the fundus only will be left. The two following cases show that even the Y-shaped anastomosis can bring about permanent cure if a large enough gastrectomy is performed.

In 1919 I operated on 2 brothers with the respective ages of 46 and 44, because of a g.j.u. after gastroenterostomy. I resected in splachnic

anesthesia the old duodenal ulcer with half of the dilated stomach as well as the anastomotic loop. I closed the duodenum blindly and did a Y-shaped anastomosis. 6 weeks later both siblings had heartburn, pains and hematemesis. Repeated medical treatment was of no avail and finally even 0.5 G.m. of Morphine were not able to cope with the pain. Both were re-operated in July and September 1921 in splanchnic anesthesia. There was a large g.j.u. present that penetrated into the pancreas and into the mesentery of the anastomotic loop and reached right up to the mouth of the afferent jejunal loop. The anastomotic loop was resected and the bottom of the ulcer was left in place; a subtotal gastrectomy was done and about 1/5 of the stomach was left over and a Y-shaped anastomosis was performed. Also in the patient who was 46 years of age, the transverse colon had to be resected in 2 stages and the colostomy was closed 3 months later. Healing by primary intention with a normal postoperative course followed. 3 weeks later on both brothers Morphine medication was discontinued without any particular difficulty. They had no discomfort since their last operation and were able to eat everything and to perform normal working activities. They gained 15 to 20 kgs. respectively. Complete achlorhydria even with separate HCl determination at intervals was present. One brother died of a carcinoma of the prostate at 63, 17 years after the operation. The other brother is still actively working as a carpenter although he is 73 now and has no discomfort of any kind.

I warned my colleagues at the surgical Congress in Berlin in 1924 on the use of the Y-shaped anastomosis because of the experiences I had had with it. All the same, this anastomosis is still performed as I was able to ascertain in radical operations for g.j.u. after Y-shaped anastomosis used in the previous operation by other colleagues. Let me say this: the Y-shaped anastomosis, if used at all, requires a subtotal gastrectomy. A 2/3 gastrectomy is inadequate.

One would be prone to admit a special disposition as etiology for the repeated recurrences of ulcers in those cases where these recurrences occur time and again in the course of several operations on the stomach. Mandl termed these cases, more than 25 years ago, as "surgically incurable ulcers." I have pointed out repeatedly in various papers the fact that this term is not correct, because even these patients can be satisfactorily cured by renewed surgery which, however, has to omit some previous errors. They should rather be termed as "ulcers not healed by surgery."

In 1941 I published a paper in which I referred to 23 patients who had had 3 to 6 operations for a recurrent g.j.u. without permanent

relief of their symptoms. The last but one operation I had carried out only in 7 out of these 23 patients (6 gastrectomies with a Y-shaped anastomosis and 1 enteroanastomosis). In these 23 exclusively male patients, a Y-shaped anastomosis had caused the repeated recurrences in 12 cases. I had done 6 of these at the time when a radical operation was done for g.j.u. In 5 cases there was an enteroanastomosis through which bile and duodenal juice were drained partly which allowed only for a partial buffering of the acid gastric juice upon admission to the jejunum. 6 recurrences were caused by too small a gastrectomy. In the last operation of this group I had to remove 10-15 cm on the lesser curvature and 15-25 cm on the greater curvature in order to have the normal cardiac third of the stomach left in place. Mortality of these rather complicated operations was comparatively high (4 fatalities out of 24 operations—one patient I had operated twice). The permanent results, however, were excellent, as 18 out of 19 patients who were discharged from the hospital were completely free of symptoms. 1 patient had no gastric discomfort but suffered considerably from a major ventral hernia. 4 patients of this group had been operated on 6 to 10 years ago and 6 patients 6 to 18 years ago so that the term of permanent cure is amply justified.

One of those patients who got a permanent cure, a 39 year old man who lived in Czechoslovakia, is of some interest. He had been subject to gastric surgery 6 times since January of 1930. 2 gastrectomies were among those surgical procedures. On his 7th operation I had to remove 10 cm on the lesser and 15 cm on the greater curvatures of the still large gastric stump. His afferent loop was kinked and partially obstructed because the mesocolon was shrunk so that I had to add an enteroanastomosis to the typical end to side anastomosis. Postoperatively the patient had a chlorhydria and was asymptomatic for some time, but then he had pains, heartburn and nocturnal discomfort which caused him to take medicines every 2 hours. The gastric analysis showed a 20/40 quota. On 24 April 1935 his 8th operation was done, as medical treatment had been fruitless. The abdominal wall was opened under local anesthesia, 7 cc of Sodium Pentothal were given i.v. for the severance of adhesions. Splanchnic anesthesia followed with Pantocaine. I found a fist-sized, immobile, ulcer mass to the left of the vertebral column, which penetrated into the mesocolon and transverse colon and which was situated above the enteroanastomosis. After I had loosened the anastomotic loop of the ulcer bottom, there was a 4 by 2 cm large hole in the jejunum which I closed temporarily. I resected the anastomotic loop together with the enteroanastomosis and made an end to end anastomosis

of the jejunum. A strip of 2 fingerbreadths was removed from the stomach. Then I made an end to side anastomosis and fixed the mesocolon slit to the stump of the stomach both of which were quite complicated procedures. I did a cholecystectomy because of a chronic cholecystitis and sutured the abdomen, but I did not do a radical operation for the very large ventral hernia. Healing by primary intention took place, the patient recovered, gained weight and felt quite all right for 6 years. No further news of him is available since then as this patient lives in Czechoslovakia.

A 33 year old clerk had 4 gastric operations done by 4 different surgeons before I saw him.

1.) A posterior gastroenterostomy.

2.) Because of a g.j.u. the posterior gastroenterostomy was discontinued and replaced by anterior gastroenterostomy with an enteroanastomosis. A recurrence followed very soon.

3.) Resection of the antrum and removal of the anterior gastroenterostomy whereas the enteroanastomosis was left in place and an end to side anastomosis was done proximally to the enteroanastomosis. After this operation quite a period ensued which was free of discomfort, pain and vomiting.

4.) The operation revealed a large and not movable ulcer tumor at the end to side anastomosis. In order to cope with the stenosis, the blindly closed end of the efferent loop of the old enteroanastomosis is implanted end to side into the posterior wall of the stomach which resulted in a Y-shaped anastomosis. There was no more vomiting, but heartburn persisted. 4 months later diarrhea and vomiting of fecal material occurred because of a gastro-jejuno-colic fistula. A rapid loss of weight of 44 pounds ensued. The heartburn then stopped and heavy meals were well tolerated by the patient.

5.) The operation took place on 13 Nov. 1924 in splanchnic anesthesia. A large stump of the stomach was imbedded in adhesions. The old g.j.u. had healed but on the last gastroenterostomy there was a large ulcerative mass which had perforated into the transverse colon. Part of the colon was resected and a side to side anastomosis was performed. The anastomotic loop together with the enteroanastomosis was resected. An end to end anastomosis of the jejunal loop was performed and the gastric stump was further curtailed (10 cm on the lesser and 15 cm on the greater curvature). A Hofmeister-Finsterer anastomosis, a rubber drain and a suture line of the abdomen terminated this operation. The spe-

cimen showed a gastro-jejuno-colic fistula of 2 fingerbreadths. Healing by primary intention occurred. The patient quickly regained 40 pounds and feels completely all right. He can tolerate any diet. 4 years later he had an exacerbation of his old pulmonary Tbc (this patient was a heavy smoker), and he had to be admitted to Chvostek's Clinic because of laryngeal tuberculosis where he died on 29 December 1928. The post mortem showed a pulmonary and laryngeal tuberculosis. There were no fresh changes in his stomach.

A 56 year old butcher who had gastric discomfort for the past 25 years had his first operation which consisted of a posterior gastroenterostomy. His second surgery was done because of a g.j.u. The gastroenterostomy was discontinued and the stomach and jejunum were closed. Third operation: exclusion of the pylorus according to v. Eiselsberg. The fourth operation was done because of a huge stenosing ulcerative mass at the site of the anastomosis. An anterior gastroenterostomy with an enteroanastomosis was done. Fifth operation: because of a g.j.u. with an anterior gastroenterostomy where the g.j.u. had penetrated into the anterior abdominal wall, a resection of the excluded pylorus was performed and also 2/3 of the stomach and the anastomotic loop were removed. A Y-shaped anastomosis was performed. Soon afterwards pains and hematemesis recurred. This patient even made a suicidal attempt at night because of the unbearable pains. The sixth operation consisted in the severance of the adhesions.

I performed the seventh operation on 2 December 1938. I operated in local anesthesia of the abdominal wall and used Nitrous Oxide gas anesthesia for the severance of the considerable adhesions which had formed. Then I gave splanchnic anesthesia with Pantocaine and no further general anesthesia was needed. There was an ulcer that had penetrated into the anterior abdominal wall at the site of the anterior gastroenterostomy. A fist-sized ulcer crater was found after the loop had been severed from the anterior abdominal wall, by the liver, pancreas and by the colon. There was a 2 cm long gastro-jejuno-colic fistula. I closed the anastomotic loop temporarily and did 3 transverse suture lines on the opening in the transverse colon. As a typical end to side anastomosis was not possible because of considerable shrinking of the mesocolon, I did a subtotal gastrectomy (12 cm on the lesser and 15 cm on the greater curvature) of the stump, which extended up to the cardia. Then I performed an anterior gastroenterostomy with an enteroanastomosis which I separated from the ulcer bottom by omentum tissue. I put 1 rubber drain and 2 gauze strips in, lest the colon suture lines cause trouble,

and then I closed the abdomen. In spite of the difficult and long operation the patient never went into shock and his pulse was 100 post-operatively and 88 on the next day. On the 6th day a colon fistula formed which in the beginning drained most of the feces. Otherwise the patient felt well. 3 weeks later the patient was discharged to his home country with a fecal fistula. 6 weeks later the fistula closed spontaneously. 6 months later this patient presented himself as cured and entirely asymptomatic. He had a considerable weight gain and could tolerate any diet. During the war the patient repeatedly came to Vienna from his native Syria. He never had gastric discomfort and was able to eat anything. After the war his general status deteriorated and he became anemic. The available treatment was poor in his rural community. According to his son-in-law the patient died 9 years after my operation on 20 May 1947 with the symptoms of a high grade arteriosclerosis and anemia.

This last case shows the drawbacks of subtotal resection for ulcer; namely, the occurrence of a severe anemia. Because of the fact that I had to perform an anterior gastroenterostomy with enteroanastomosis because of shrinkage of the mesocolon, the subtotal gastrectomy was necessary in order to establish permanent achlorhydria in that patient. Otherwise he would have suffered with another recurrence of ulcer.

In the surgical treatment of the peptic ulcer of the stomach and of the duodenum with its complications, the large gastrectomy which I recommended in 1918 has been proved. In it $2/3$ of the normal stomach and $3/4$ to $4/5$ of the very dilated stomach have to be removed. During the last years the mortality of this operation has considerably decreased. In my own material I had a 1.8 per cent mortality. Plenk of Linz (Upper Austria) claims to have an 0.8 per cent mortality within the past $2\frac{1}{2}$ years (3 fatalities out of 368 resections). The mortality of the ulcer resection is not to any degree higher (in Plenk's cases it is even lower) than the mortality of the vagus resection, which is said to be 1.7 per cent according to Plenk and Zechmann, as compiled on cases described in the literature. Therefore, vagotomy will only be considered the method of choice if it should prove to have as good permanent results as the large gastrectomy. This important question, however, will only be answered after sufficient time for observation will have elapsed.

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