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THE TREATMENT OF PEPTIC ULCER

A Review of the Literature

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A Review of the Literature

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HISTORY:- "The first description of the pathology of Gastric Ulcer was published by Baillie (2) in 1793 but in as much as it was not accompanied by any clinical data, it had little effect in stimulating interest in the condition. Abercrombie, in 1824, described much of the symptomatology of gastric ulcer but did not differentiate simple ulcer from ulcerated carcinoma. The credit of having first recognized the difference between ulcer of the stomach, carcinoma, and ordinary gastritis belongs to Cruveilhier, who, between 1829 and 1835, published accurate descriptions of the anatomy, the clinical course and the treatment of gastric ulcer. In 1839 Rokitansky described the anatomy of the condition, basing his description on 79 cases. At the time that Dr. W. H. Welch wrote his masterly account of "Simple Ulcer of the Stomach" for Peppers' System of Medicine, published in 1885, he found medical literature abounding in articles upon, this disease. In his article there were nine pages devoted to the medical treatment of gastric ulcer with a short paragraph on surgical treatment. At that time it was thought that the treatment was entirely medical but that cicatrization of the ulcer by no means always cured it in the clinical sense.

It was in the year 1881 that the surgical treatment of gastric ulcer and carcinoma began. Following their experiments on dogs, Gussenbauer and von Winiwarter, in 1876, had proposed pylorotomy. They are generally credited with

its introduction although John Jones of Philadelphia had anticipated them by a century and Merrem of Giessen by over half a century. Pean, in 1879, and Rydygier, in 1880, had successfully attempted the operation on human subjects. Billroth, in 1881, successfully removed a pyloric carcinoma, and his procedure of suturing the remaining portion of the stomach to the duodenum became known as the "Billroth I" method. In 1885 Billroth used gastro-enterostomy to restore continuity following gastric resection. This became known as the "Billroth II" method. In von Hacker's article describing this procedure, the suggestion was made of termino-lateral gastro-jejunostomy, which was subsequently first performed by Kronlein. A plastic operation on the pylorus was first performed by Heineke in 1886, followed independently by Mikulicz in 1887. Kocher's side-to-end gastro-duodenostomy following pylorotomy was reported in 1891. Lateral gastro-duodenostomy was suggested by Jaboulay in 1892 and the first report of its clinical application was made by Henle in 1898. This operation was the precursor of the gastro-pyloro-duodenostomy of Finney which was reported in 1902, now known as pyloroplasty. Dissatisfied with the disturbed physiology presented by the Billroth II Group of anastomoses and by their tendency to cause secondary ulceration, von Haberer, in 1922 and Finney in 1924, working independently, reported their experiences with Billroth I method modified into an end to end gastro-duodenostomy.

TREATMENT:- We have today all degrees and characters of opinion on treatment. Many of the surgeons still believe that when a diagnosis of gastric or duodenal ulcer is made, operation is practically called for or would sooner or later have to be done. Opposed to this is the medical man who thinks that the treatment should be medical primarily and only surgical in definite conditions such as perforation or marked complications. This great variety of prevailing treatment is due to the fact that as yet the etiology is undetermined. Unless the etiology of a disease is known it rarely is mastered. In attempting to formulate a rational type of treatment one must bear in mind that if you could collect all the people in the world who have active ulcers, against them there would be ten times as many who have healed lesions in their stomachs, people who never knew they had an ulcer--the autopsies prove this conclusively(1).

While reviewing the literature with respect to treatment of Peptic Ulcer I have been impressed with the idea that there is no specific treatment that can be laid down as "the" treatment for ulcers in general. However treatment can be prescribed, which, subject to modifications for individual cases, will and does give most gratifying results. With this in mind I have classified the treatment of Peptic Ulcer as follows:

- A.- Medical Treatment of the Ulcer.
- B.- Surgical Treatment of the Ulcer.
- C.- Treatment, both Medical and Surgical, of the Complications of Peptic Ulcer which are namely:

- (a) Hemorrhage
- (b) Perforation
- (c) Pyloric Stenosis
- (d) Hour Glass Contraction
- (e) Perigastric Adhesions and Abscess
- (f) Malignancy

A.- MEDICAL TREATMENT OF THE ULCER:- I present the following indications:

- a- From clinical experience it has been proven that 60% to 80% of all ulcers yield to medical treatment when adequate.(3)
- b- In their early ulcer history, so called fresh or recent ulcers, good judgement indicates medical treatment (8).
- c- Poor surgical risks.
- d- Ulcers with slight symptoms.
- e- Ulcers with out cicatrization.
- f- Ulcers in young individuals.
- g- Those who have the leisure and money to spend on what may turn out to be but temporary relief (9) (11).
- h- Those who on account of business or family reasons must put it off for a while.
- i- As a last resort when a properly done operation has failed to bring relief.
- j- No mortality from the treatment itself.(25)

As a preliminary to medical treatment the patient's general condition should be considered:

- a- A search for focal infections in the head, mouth, and throat and if found same should be removed or treated.

- b- Note whether there is a positive Kahn test.
- c- Consider the possible existence of an anemia.
- d- Hyperthyroidism should be looked for and corrected surgically (4).
- e- The environment of the patient will often determine whether the patient would be best off in bed for three or four weeks under strict routine or whether it would be better for the patient to be treated up and around.

In early medical treatment (4) the motor functions of the stomach and the theories of secretory activity of the gastric mucosa were not taken into consideration because they were practically unknown. As a result of our increased knowledge of gastric functions the treatment of peptic ulcer has at last been based upon sound physiological principles. Although the peptic ulcer means an anatomical defect with in the gastric or duodenal wall, that in itself is not the reason that brings the patient to the doctor. It is only when the function of the gastro-intestinal tract is disturbed that the patient becomes aware of the disturbance and the physician is able to diagnose the ulcer. Bearing in mind that it is disturbed function that must be treated it is necessary to understand something of the pathological physiology of this condition.

The fasting stomach is not absolutely quiet (6). Peristaltic waves appear at intervals of an hour to one and one-half hours. After a meal the peristaltic waves are greatly increased in frequency and strength. In peptic ulcer there is an interference with this orderly procedure. The irritation of the ulcer sets up an increased peristalsis and whenⁱⁿ the body of

the stomach, an inciscura is often seen on the opposite side. When the ulcer is at the pyloric region, spasm of the entire pylorus is often noted. With this increased peristalsis there results an increased motility of the entire gastro-intestinal tract. The gastric residue often found six hours after a meal, is due to the spasm of the pylorus. So called hypersecretion and hyperactivity are purely the result of this pyloric spasm or stenosis. The normal gastric secretion is not evacuated and hence accumulation in the stomach takes place. The normal regurgitation of the duodenal contents, which neutralize somewhat the gastric acidity, is not present, hence the higher acidity.

When an ulcer is in a visible situation the most important part of its cure is to maintain that part in a state of complete rest, to protect it from all kinds of irritation and to eliminate so far as possible all conditions that interfere with healing. Unfortunately the position of the lesion precludes the possibility of complete rest to the organ involved. We can however, decrease its action and give the organ a certain amount of rest thereby permitting the ulcer to heal, though slowly. As a means to this end there are several so called "Classical Treatments".

I. THE SMITHIES TREATMENT:

This treatment is based on a "physiologic rest method". (12) (13) The principles underlying his non-surgical treatment are:

- a- " The recognition that such ulcer is not a primary gastric ailment; treating it as such with out bearing in mind its systemic or constitutional origin offers

little hope of permanent improvement"

- b- "Recognition of the type of ulcer at hand."
- c- "The opinion that Gastric chemistry plays a comparatively insignificant role both in ulcer production and in delay in ulcer healing." "Ulcer dyspepsia is largely due to abnormal gastric spasms, peristalsis and intragastric tension."
- d- Recognition of the need of physiological rest and the natural tendency to heal should not be interfered with".

Dr. Smithie Claims this brings into the non-surgical treatment the principles for healing employed in surgery. A very brief outline of his method of treatment is as follows:

Rest in bed- one to three weeks- This aids in securing both mental and physical rest.

Physiological rest to the stomach, no food by mouth, no medicines, no gastric lavages. Keeping the stomach empty of food promotes healing by limiting local irritation and peristaltic movements. This is carried out three to seven days. Chewing of wax aids in keeping mouth clean and promotes flow of saliva and mucus.

Rectal feedings are given while fasting. When mouth feedings are commenced the nourishment should consist of carbohydrates, liquid form, warm and in small quantities which are given often.

Dr. Smithie's opinion is that the acidity is controlled by the period of fasting; very little hydrochloric acid and pepsin being secreted after 48 hours of such treatment.

Thus frequent and disturbing gastric lavages and administrations of huge quantities of alkalies are unnecessary. He doubts if any medicine has a direct healing effect upon peptic ulcer.

This treatment is directed at the alkaline treatment of Dr. Sippy and perhaps is valuable in pulling us back from too rigid belief in Dr. Sippy's conclusions. However the criticism I have to offer in regard to the treatment of Dr. Smithie is that the results obtained were on a very select class of patients, being less than 60% of those who presented themselves with ulcer complaints- more than 40% having already been referred for surgical treatment. The author states in his article that his treatment probably would not show such good results in the average run of patients with the average practitioner in charge.

II. THE ALVAREZ TREATMENT:

This is an ambulatory treatment suggested by Dr. Alvarez, who thought it better to work out some simple form of procedure. One that would have some prospect of being used by the average physician and average patient. He states, "Better a fair one used than an excellent one not used". (9)

Considering the following are the important features of any treatment:

- a- "Rest in bed" b- "Frequent Feedings" c- "Alkalization"
- d- "Eradication of focal infections".

Dr. Alvarez believes the "Frequent Feedings" to be the most important. His instructions are that the patient is to have three good meals a day, chosen from a "Smooth Diet" list. The feeding of 6 oz. of a mixture of milk, cream, and eggs at 10:00

A. M. 2, 4, 8, and 10:00 P. M. and if awake, during the night, another glassful. If the patient has pain recurring each hour and one-half then the food should be taken each hour and one-quarter. The feeding of alkalies such as magnesia, bismuth, or soda is not necessarily essential. The advantage of such a type of treatment is that the average patient will keep up the same over a long period of time, years in fact, and this is of very great importance. The diagnostic value of such a type of treatment is also worth considering. Not infrequently one sees a patient with a typical history but a smooth cap, or a deformed cap with no definite history of ulcer. If this patient is put on two-hourly feedings and obtains prompt relief he almost certainly has a duodenal ulcer, because no other lesion of the digestive tract responds so characteristically.

Alvarez is opposed to the Sippy treatment stating that it calls for too much enthusiasm, faith, and training on the part of the physician, a hospital with excellent interns and a patient who has plenty of time and money to spend on his cure. As I see it his latter objection might have to be taken into consideration with a certain percentage of patients; but, certainly an individual posing as a Doctor could not excuse himself from the former objections.

III. THE SIPPY TREATMENT:

This treatment is based in general upon the principle of the practically complete neutralization of the acidity of the gastric juice thus protecting the ulcer from gastric corrosion until healing of ulcer takes place. Sippy (7) believes thoroughly in excess acidity causing the ulcer, or at

least causing its continuance.

The principles involved in the Sippy treatment are centered about the following fundamental questions:

- a- "What are the causes of peptic ulcer?"
- b- "What retards or prevents the healing of peptic ulcer?"
- c- "What can physicians or surgeons do to promote the development of granulation tissue essential to the healing and final cicatrization of peptic ulcer?"

"Malnutrition or necrosis of a part of the gastric or duodenal wall causes a loss of the normal resistance to peptic action of the gastric juice, digestion takes place and the resulting defect is ulcer. The digestive action of gastric juice being due to solvent action of pepsin on albuminous substances that have been properly permeated by hydrochloric acid. Pepsin being practically inert in alkaline and neutral media (?)."

The neutralization is affected by very large doses of alkalies, frequently administered and by hourly feedings of a mixture of equal parts milk and cream. If complete neutralization is not accomplished at first, as shown by the gastric contents aspirated from the patients stomach at night, more alkalies are administered. The Sippy treatment differs from other treatments in two respects: 1- The large amounts of alkalies frequently administered and 2- The very exact and specific timing, dosage, and administration of foods and alkalies. The chief cause of failure in this type of medical treatment is inattention to details of technic. In as much as this is a fault common to most practitioners perhaps it would be advisable to give in a brief resume the details of the Sippy treatment.

a- "Where the ulcer is of the non-obstructive type:" (7)

1- Rest:-

In bed for three weeks.

2- Diet:-

First three days- 3 oz. of a mixture of milk and cream,
equal parts, every hour from 7 A. M.
to 7 P.M.

After three days- Soft egg added to 10:00 A. M. M-C
3 oz. cooked cereal to 3:00 P.M. M-C

After seven days- 3 oz. M-C ev. hr. 7 A. M. to 7 P.M.
Soft egg 10 A. M. Noon & 2 P.M.

3 oz. Cooked cereal 11 A. M. 1 & 3 P.M.

After fourth week patient leaves hospital and goes on
routine which is to be followed for one year. Details
of which are given below.

3- Alkaline medication:-

Powder No. 1

Heavy Calcined Magnesia Gr. X

Sodium Bicarbonate Gr. X

Powder No. 2

Calcium Carbonate Gr. X

Sodium Bicarbonate Gr. XXX

First three weeks powder No. 1 is given with M-C from
7 A. M. to 7 P. M. If stools become too frequent Powder
No. 2 is substituted for powder No. 1.

On the half hour between feedings from 7:30 A. M. to 7:30
P.M. powder No. 2 is given. Then every half hour to 9:30.

Olive oil or powder is given at 2:00 A. M.

4- Aspiration of Stomach:-

Two afternoons and three evenings each week until satisfied gastric secretion does not exceed 20 cc. If there is excessive secretion the powders are continued up to 11:00 P. M. Also M-C mixture may be given at 2:30 A. M.

5- Routine to be followed for one year:-

Three small meals daily consisting of a soft diet, the total bulk for each meal not exceeding 10 to 15 ozs.

After breakfast a powder every half hour for three doses.

10:00 A. M. Milk and cream mixture, three ounces.

10:30 A. M. Powder.

11:00 A. M. Milk and cream mixture, three ounces.

Noon- Lunch.

After lunch a powder every half hour for three doses.

3:00, 4:00, and 5:00 P. M. 3 oz. M-C Mixture.

3:30, 4:30, and 5:30 P. M. a powder.

6:00 P. M. Night meal which should be small.

After night meal a powder every half hour for four doses.

Now and then patient can take a regular meal to vary the monotony.

Patient must make arrangements to carry M-C mixture where ever he goes. All powders should be stopped for five days at end of 10th week, and at end of every six weeks thereafter.

b- "Where the ulcer is of the obstructive type:"

Sippy maintains much can be done for this type of case.

This is because the obstruction is often due to inflammatory

edema around the ulcer, not to an organic cicatrix, and can be relieved by treatment of the ulcer. The treatment of the obstructive type differs from that of the non-obstructive type only in that rest in bed is absolutely maintained and more alkalies are given. Enough alkalies are given to control the acidity and the treatment is continued at bed rest until progress is satisfactory or until it is evident that operation is necessary. Aspirations are however more necessary in this than in the non-obstructive type, it having been found advisable to empty the stomach of all remaining food and secretion at 10:30 P. M. thus removing the stimulus to an excessive night secretion.

Recently it has been shown that the intravenous injection of foreign protein, such as Typhoid vaccine, is an adjunct in the treatment of peptic ulcer. Five or six injections every five or six days are given. The relief from pain which followed was independent of gastric acidity. Following the injections the vascular supply in the region of the ulcer was increased, with a corresponding diminution in gastric tonus and contractions which is believed to be the causative factor in producing pain. (10)

IV. THE LENHARTZ TREATMENT:

This treatment advocates a high caloric intake from the beginning of treatment. Lenhartz also believed firmly in the binding power of egg albumin and other proteins for hydrochloric acid. (49)

Fogelson (16) in attempting to find an ideal

therapeutic agent for use in combating the irritative action of gastric juice in peptic ulcer, that is one that would neutralize or combine with the acid without materially stimulating or depressing gastric secretion, found that gastric mucin, prepared from hogs' stomachs, was very effective. It was found that mucin is only a mild excitant of gastric secretion. That it has a high combining power, two ounces being more than sufficient to combine with the acid secreted in response to the injection of 1 mg. of histamine. It was also found that one ounce of hog's gastric mucin given three times a day with each meal, plus a thirty grain tablet of mucin hourly throughout the day was sufficient to render a series of twelve patients, with classical histories and positive X-Rays, symptom free for a period of two to five months.

Harris (17) is of the opinion that ulcers result from gastro-intestinal infections due to a diet deficient in vitamin "B" & "C". He describes our population as "Sugar saturated, Vitamin starved Americans."

Blankinship and Oatway (18) in an effort to formulate an ulcer diet which furnishes the fundamental requisites with a minimum digestive effort suggest the following as being very effective: Milk 24 oz., Cream 8 oz., Strained orange juice 10 oz., sugar $\frac{2}{3}$ oz. This diet contains 32 gms. P, 77 gms. F, 96 gms. C, with a caloric value of 1205.

Crile (35) says that denervation for peptic ulcer is reserved for those exceedingly nervous individuals in whom recurrences would ensue after any type of operation.

B.- SURGICAL TREATMENT OF THE ULCER:- The following indications are presented:

- a- Failure of adequate medical treatment.
- b- Repeated hemorrhages as this type of ulcer invariably perforates sooner or later. (24)
- c- When perforation occurs. (11)
- d- When malignancy is thought to exist. (9) (19)
- e- The occurrence of alkalosis or pyloric obstruction while under medical management. (26)
- f- Occupational, Intellectual, financial and perhaps Marital status of the patient. For example an unmarried laborer who can not or will not keep up medical treatment.
- g- Deep penetrating and callous ulcers as these are difficult to heal under medical management. (5)
- h- Perigastric adhesions producing symptoms.

The surgery of gastric and duodenal ulcer is divided into operative procedures of greater magnitude, represented by partial gastrectomy, and those of lesser magnitude, represented by pyloroplasty and gastroenterostomy. In Europe the operation of choice seems to be partial gastrectomy with removal of the greater part of the ulcer vulnerable area-- the Magen Strasse. This reduces the amount of peptic digestion and removes the element of pyloric spasm or obstruction. (5) The patient must be in excellent condition for this type of operation and even then the mortality runs nearly twice as high as in gastroenterostomy. (26)

Of the lesser operative procedures, some surgeons Finney, Lahey, (26) prefer pyloroplasty believing this does away

with pylorospasm and by placing the outlet of the stomach in its anatomical and physiological position it is possible for alkaline contents of the duodenum to pass back into the stomach while gastric contents are still discharged into their natural receptacle, the duodenum. Pyloroplasty also enables the surgeon to excise the ulcer area. Patients as a rule do not suffer afterwards from vomiting due to regurgitation of bile. This type of operation, however, can be performed for duodenal ulcer only when the ulcer is located near the pylorus and when the adjacent bowel wall is comparatively normal (11). If the tissues are thick and inelastic they can not be approximated in the desired position without producing deformity and they can not be sutured without danger of leakage. The disadvantages of pyloroplasty are that the incision is made through septic and ulcerating tissues which may cause local or general infection, that the incision is made through scar tissue which may contract and cause obstruction, that the incision is so located that it may become adherent to the liver or abdominal wall and cause interference with the movements of the stomach, and finally secondary ulcers may develop along the suture line.

In this country the simpler operation of posterior-gastro-enterostomy seems to meet with greater favor. This operation consists of an effort to side-track the diseased area by making an anastomosis between the stomach and jejunum. The method is applicable in practically all cases because the tissues in the field of operation are normal. The effect on the stomach is both mechanical and chemical. The objections offered to the operation of gastro-enterostomy are that sometimes food escapes

too quickly from the stomach, causing bowel disturbances, that occasionally bile and pancreatic secretions enter the stomach in large quantities causing nausea and vomiting or the so called vicious cycle, and finally, that in a few cases an ulcer develops in the jejunum, at or near the anastomosis, due to the irritation of a mucous surface which has no immunity to the action of gastric juices. This complication can be made more infrequent by placing the opening at the bottom of the stomach, so there will be no retention, and by using cat gut instead of silk so there will be no unabsorbable sutures left as a possible source of irritation.

Four points in favor of gastro-enterostomy are:

- a- Simplicity: b- Applicability: c- Immediate Results:
- d- Ultimate Results: (27)

- a- Simplicity:

"This depends upon the ease with which an operation is performed and the soundness of the principles on which it is based. Gastro-enterostomy excels in these two respects as under ordinary circumstances the operation is simple and safe and its chief purpose is it affords rest to the stomach."

"Cautery excision, because of its ease of performance, is another operation which stands out prominently. This is based on sound premises, namely, the effect of heat on infected and malignant tissue. In as much as it is now generally recognized that the best treatment for chronic gastric ulcer must include its radical removal combined with some procedure to insure symptomatic relief and prevent recurrence of the ulcer, it is fortunate that we have at hand such simple and effective measures as cautery excision plus gastro-enterostomy. Compared

with these procedures partial gastrectomy is primarily at a serious disadvantage for the chances of mishap during its performance are too many to warrant adoption of the operation by any but the most skilled and experienced surgeons." (28)

b- Applicability:

In the case of an ulcer which is extensively indurated or an adherent ulcer high on lesser curvature where resection is not advisable, excision unwarranted or even destruction by cautery not easily done, gastro-enterostomy is the operation of choice. There is this to be said of the wide applicability of the operation and the unusual possibilities of good results, and that is, it has naturally led to the abuse of the operation, being used when contra-indicated or when no ulcer existed.

c- Immediate Results:

A much lower mortality than partial gastrectomy.

d- Ultimate Results:

If patient remains cured a year the possibility of a permanent cure is very good. Quite often where a gastro-enterostomy fails to do the things expected of it, it would have done so had there been proper follow-up medical treatment instituted. Where there is a history of bleeding it is advisable to destroy the ulcer, or ulcers, thereby reducing the incidence of recurrent hemorrhages.

A. HEMORRHAGE

The indications for treatment in a case of gastric hemorrhage are based on several fundamental considerations (20):

- a- A clot or clots must be permitted and encouraged to form at the site of bleeding.
- b- The pressure of the blood in the vessels, lowered as a result of the hemorrhage, must not be raised so suddenly as to blow out the expectant clots.
- c- Shock must be combated but not over treated as too much stimulation often results in recurrent hemorrhage.
- d- The digestion of the edges of the exposed blood vessel would by the gastric juice must be prevented if possible.

Medical treatment of the first gastric hemorrhage is much the safest and best treatment (25). There is no time when patients are less well equipped to endure gastric operations. There is no time when the mortality of gastric operations will be higher than immediately after massive hemorrhages (26).

The patient must be put to bed. And it is suggested that the patient's mind be put at ease by explaining to him that hemorrhages are practically never fatal, but that their extent and tendency to recur depend on the patient's cooperation in resting quietly and in drinking sparingly. The movements of the stomach may be inhibited by the administration of morphine. For the coagulation of blood at the site of bleeding, coagulents such as horse serum or blood serum are recommended. Transfusions are helpful as also is the injection of ten to twenty cubic centimeters of whole human blood intramuscularly. Restoration of blood volume is a procedure regarding which a certain degree of caution

should be exercised. The better method is whole blood transfusion (21). Shock may often be prevented by giving the patient rest, morphine, a transfusion and keeping patient warm. Following hemorrhage nothing should be given by mouth for the first three days excepting a mild alkali such as calcium carbonate.(7) (23) (24) Beginning the third day the condition is treated medically as a non-obstructive type of ulcer. Repeated hemorrhages call for surgical treatment as these ulcers invariably perforate sooner or later (22) (24). Constant seepage, either microscopically or clinically, is an indication for abdominal section (14).

B. PERFORATION

Acute perforation furnishes one of the most important surgical emergencies (5). An operation should be done as soon as a diagnosis is made. A careful analysis of a large number of cases shows that the mortality is in direct proportion to the time which elapses between the perforation and operation (11). Medical treatment, from the time of the perforation up to the earliest possible surgical treatment, should consist of the administration of morphine hypodermically, rest to the patient, and hot compresses to the abdomen (14).

As regards the excision of the perforated duodenal ulcer, resection is not necessary in most cases as healing will take place just as well from simple suture. Resection might possibly be considered where there was a possibility of cicatricial contraction if the ulcer area remained (15).

C. PYLORIC STENOSIS

Many cases of pyloric obstruction occurring in patients during the acute stages of their ulcer are the result of edema and spasm at the pylorus(23). Mayo (36) states that obstruction, due to organic tissue narrowing, occurs in 10% of the cases and obstruction, due to spasm, occurs in 90% of the cases. In the former, surgery is definitely indicated, gastro-enterostomy being the operation of choice in this country. In the latter, careful hospital management is the procedure. These cases are judged in regard to medical treatment by the amount of gastric residue at the start and by the response to treatment. Those with residues of 50% or more, six hours after a barium meal, and those with considerable food residues, twelve hours after a motor meal, are usually surgical cases. Those cases with twenty four hour barium residue are practically always surgical. It is better not to prolong medical treatment over too long a period and unless six hour residues disappear in a few weeks, surgical treatment should be considered.

D. HOUR-GLASS CONTRACTION

When there is inconsistency between roentgenogram, showing hour-glass contraction, and the symptoms of which the patient complains, it is advisable to try intensive medical treatment augmented by use of sedatives and atropine for a period of four or five days. Then recheck with roentgenogram. If contraction still persists it is usually organic in nature and surgery is the better treatment. When there are definite symptoms of indigestion, of the type pertaining to peptic ulcer,

which suggest disturbed mechanics or retention, the treatment is essentially surgical (33). MacLeod (31) is of the opinion that partial gastrectomy would probably be the procedure of choice if the condition of the patient permitted. However, due to the general gastric upset following this lesion, as a rule the condition of the patient is not any too good. Therefore a posterior gastro-enterostomy is the operation usually selected.

When treating a patient with hour-glass contraction of the stomach it should be remembered that approximately 85% of these cases are the result of ulcer while in the remaining 15% malignancy and syphilis must be considered(33).

E. PERIGASTRIC ADHESIONS AND ABSCESS.

There is some question as to whether peri-gastric adhesions form primarily as a result of a penetrating ulcer and are accordingly a protective mechanism, or whether they are the result of perforation(50). Hill (34) believes that peri-gastric adhesions are more apt to be a sequence in surgical treatment of perforation where there has been inadequate drainage. If symptoms are severe the treatment is surgical to free the restricting bands of tissue. In the case of subdiaphragmatic abscess, surgical drainage should be done by the transpleural route approach if possible (51). Abscesses pointing anteriorly or low in abdomen may be drained abdominally. The average mortality rate is approximately 30% with surgical drainage and 70% with out its use.

F. MALIGNANCY

Widely divergent views are held regarding the relation of gastric ulcer to cancer. Every one admits that an ulcer may become malignant; it is all a question of how often this occurs. In a review of 2,499 ulcer patients at the Mayo clinic (19) it was found that 90% were duodenal ulcers and 10% were gastric ulcers. Ulcer of the duodenum is very common while cancer of the duodenum is extremely rare (48). Thus it would appear that the number of cases, where there is a possibility of malignancy, should be limited to 10% of all peptic ulcer patients.

Cabot states (38) "The first known reference to carcinoma of the stomach developing on a preexisting ulcer was made by Cruvelhier in 1839, when he said that a simple ulcer of the stomach in people suffering from "Diathise Cancerense" might change into cancer. A review of 89 reports shows 74 authors believing less than 10% of gastric ulcers develop carcinomas while 15 authors believe the frequency to be over 50%." This shows that the tendency is recognized but the criteria on which opinions are based differ greatly. Cabot himself arrives at the conclusion that carcinomatous transformation of a peptic ulcer does not exceed 5%.

In typical cases with a long history of ulcer the gross appearance supports the view that the carcinoma is secondary but the errors arising from studies of the gross appearances are due to not considering the tendency of carcinoma

to ulcerate early. This ulceration, especially at the pylorus, may be so extensive as to nearly obliterate the carcinoma. Thus the resulting condition of ulceration with these small foci of carcinomatous tissue may be mistaken for an ulcer-cancer. To one pathologist the presence of isolated epithelial cells and atypical tubules in the neighborhood of an ulcer spells malignancy, while to another they are the result of distortion produced by the contracting fibrous tissue or merely part of the regenerative process. The consensus of opinion is that local migratory hyperplasia is not indicative of cancer(37). Ewing is of the opinion that cancerous transformation of peptic ulcer probably does not exceed an incidence of 5%.

MacCarthy (39) on the basis of his studies and interpretation of cellular pathology has estimated the proportion of ulcers which develop secondary carcinoma as 71%.

In 174 cases of cancer under the care of Lockwood (41) only 7% gave a suggestive history of ulcer while but 3% gave a definite ulcer history. He states "The late development of cancer on an old previous ulcer is rare in my experience".

Balfour (42) reports that in 799 cases operated on for gastric ulcer at the Mayo Clinic 33 or 4% died of cancer during a 7 year period.

Joslin states that of 213 patients treated medically or surgically 6% died of cancer (43).

Hemmeter in a series of 116 cases of ulcer of the stomach operated on, only one reacted with a secondary carcinoma(40). He is of the opinion that "One is not duty bound to establish as a therapeutic principle the resection

of gastric ulcer on account of any subsequent danger of cancer. While ulcer of the stomach may be a possible cause of malignancy it is a rare cause.

Einhorn, Rehfuss, Smithies, Soper, Friedenwald, and Alvarez give varying instances ranging from 1% to 5% (44).

Mallory(47) "We have ulcerating cancers but I have never seen a cancer originating in peptic ulcer, that is, a chronic ulcer with cancerous nests in the border or base".

From the foregoing articles my conclusion of the ulcer-cancer question is that benign gastric ulcer is an entity. The ulcer is free from malignant change through out its course. It behaves as a simple ulcer clinically lending itself in some instances to those complications to which all ulcers are subject to. It would therefore not seem altogether necessary to treat all gastric ulcers surgically with the idea that a large number probably would turn to cancer. For if this were done the cases lost at operation might easily be greater than the cases lost by cancer. A patient who is under observation of a competent internist and radiologist is not apt to have a malignant condition over looked. If after three or four weeks of adequate medical treatment there is not the desired improvement then, bearing in mind the possibility of a 5% malignancy, it would be advisable to recommend surgery with possible resection. In those patients who have had an ulcer and in later years develop a cancer, who knows whether it came from the ulcer or started independently of it? Nobody.

A REVIEW OF 100 CASES OF PEPTIC ULCER
ENTERING THE UNIVERSITY HOSPITAL.

Number of cases receiving medical treatment only-----	61%
Number of these showing improvement -----	54
Number of these showing no improvement -----	7
Number of cases with no complications receiving surgical treatment only -----	5%
Number of these showing improvement -----	2
Number of these showing no improvement -----	1
Number of these who died -----	2
Number of cases with complications, treated Surgically--	15%
Number of these with perforations -----	12
Of whom 5 died.	
Number of these with para-gastric adhesions ---	1
Number of these with stenosis -----	1
Number of these with subdiaphragmatic abscess--	1
All of whom improved.	
Number receiving surgical treatment plus medical-----	13%
Number of these showing improvement-----	13
Number of cases receiving no treatment at all due to sudden death, leaving hospital too soon, or refusal of treatment -----	6%
	100%
Number of females with peptic ulcer -----	12%
Number of males with peptic ulcer -----	88%
Of the 33 cases treated surgically there were 16 Gastro- enterostomies, 12 perforations sutured, 2 resection plus gastro-enterostomy, 2 were drained, and 1 appendectomy.	

Number of cases diagnosed as ulcer ----- 87%

Number of these confirmed by X-Ray ---- 39

Number of these confirmed by operation- 19

Number of these confirmed by autopsy -- 6

Number of these not confirmed ----- 23

87

However all 23 improved on medical treatment.

Number of cases diagnosed as carcinoma----- 7%

Number of these confirmed by X-Ray----- 5

1 of which proved to be Ca at autopsy

1 of which proved to be ulcer at autopsy

1 of which proved to be ulcer at operation

2 of which improved on medical treatment

Number of these with negative X-Ray---- 2

1 of which improved on medical treatment

1 of which did not improve on med. Treatment.

Number of cases not diagnosed definitely ----- 2%

Number of cases having diagnosis changed to Gall

Bladder Disease ----- 3%

Number of cases having diagnosis changed to

Appendicitis ----- 1%

100%

Number of cases which were fatal -----14

Those surgically treated ----- 8

Those medically treated ----- 4

Those not treated at all ----- 2

SUMMARY

1. Treatment must be modified to fit the individual case.
2. Uncomplicated ulcers should be treated by adequate medical treatment before surgery is considered.
3. Of the various medical treatments this may be said of the Sippy treatment, "It works in practice".
4. Almost any doctor can stop an attack of ulcer, it is what we do in remissions that counts the most, educating the patient being of utmost importance; A foolish diabetic patient does not keep well, neither does a foolish ulcer patient.
5. With respect to surgery: Gastrectomy carries a much higher mortality, while gastro-enterostomy has a much wider field of usage. Both gastro-enterostomy and pyloroplasty have their advantages and disadvantages and neither should be employed to the exclusion of the other. Operations must fit not only lesions but also individuals in terms of ease of performance, condition of patient and risk of mortality.
6. Considering the question of malignancy: We do know that carcinoma occurs in the stomach but whether carcinoma has any relation to ulcer is quite problematical.

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