

the first time following the operation. This complication following operation for pyonephrosis and perirenal abscess has been noted, but is, fortunately, very rare. The fistula forms independent of any injury to the peritoneum or bowel. I am certain that in our case no injury was done to either the peritoneum or bowel. The discharge of bowel contents through the wound did not occur until after a laxative had been given. The most probable explanation of this complication in our case would appear to be that the peritoneum overlying the abscess in the upper pole of the kidney became involved and the loop of bowel became adherent at this point. When the support was removed by drainage of the abscess, the peritoneum and bowel gave way before pressure.

2006 Columbia Road.

GASTRIC ULCER FROM OVERWORKING THE STOMACH

R. H. PIERSON, M.D.

Captain Medical Corps, United States Army
FORT GIBBON, ALASKA

It has been my fortune during the past few months to observe seven cases of gastric ulcer which originated under conditions which are not encountered in the experience of the ordinary practitioner and which throw light on the conditions that in some instances at least bring about this trouble. The cases occurred in practice in the town of Tanana, Alaska. This town is situated in the central portion of the territory on the Yukon River. All the cases of gastric ulcer were in men who had been living under conditions peculiar to the country and to a primitive mode of life. They were all strong, robust men who had endured lives of hardship with hard work of the camp and trail. During the same period in the practice of this community there were no other cases of gastrointestinal disease. Gastric ulcer appears to be about the only kind of digestive disturbance these men have.

Of course so small a number of cases is too few to form a basis for generalization or for conclusions as to the causes of gastric ulcer. These cases are of interest in demonstrating that some conditions will cause the stomach to ulcerate. They are also of interest in that when the conditions which had caused the development of the ulcer were corrected the symptoms promptly subsided in every case treated. No operative interference was required to effect a cure.

In all of these cases the clinical manifestations were typical. Three were of the hemorrhagic type. In two of them there were profuse and repeated hemorrhages from the stomach, of 500 c.c. or more. There is no reasonable doubt as to the correctness of the diagnoses.

All of the men were engaged in outdoor occupations. They were hunters, trappers and miners. One was a telegraph operator at an isolated station on the Yukon River. He had, however, lived under the same conditions as the other patients. His diet had been the same.

The conditions of life in Alaska are such that few but strong men remain in the country and none but strong men can follow the trail and live in the woods and camps for a long time. The diet is such as the country affords, with the addition of tea, coffee, some liquor and canned goods. The meat is mostly bacon, or canned meats, and game, the latter being plentiful; meat forms a large share of the food. Vegetables are few. The bread is either baking-powder biscuit or the "sour-dough" hot cakes.

From October until June there are no fresh vegetables. In some instances berries, put up with equal amounts of sugar, uncooked, were eaten as a preventive of scurvy. There was usually an attempt to keep potatoes unfrozen, which could be eaten as an antiscorbutic. Scurvy did not appear to be a factor in the cases which were treated for gastric ulcer, though it would seem that it might reasonably be taken into consideration as a contributing cause, especially in the hemorrhagic cases. The use of alcohol was carried to excess in but one case. The other men lived under conditions which made it very hard for them to get liquors. They were not hard drinkers, even when liquor could be easily obtained.

The essential factors which all these cases had in common were the following: 1. In all instances the food was rough. 2. There was a large proportion of nitrogenous food. 3. The cooking was poor. 4. Few green vegetables were used. 5. The meats eaten were either salt or dark meats, mostly game. 6. On account of the hard life which these men lived and the conditions of extreme cold they became accustomed to eat immense quantities of food which had a high caloric value.

These men needed a great amount of food to furnish energy for the strenuous physical exertion which their method of life necessitated as well as to maintain the heat of the body while they were exposed to the rigors of and extremely cold climate. The body called for an excessive amount of nourishment and the stomach had to furnish it. To furnish heat and muscular energy for the body the stomach was given coarse food, which was mostly nitrogenous and which was in some instances poorly cooked. Taking into consideration what the stomach had to do and what it had to do it with, it appears that the stomach deserves high credit for the way it attempted to do its work. One sample meal consisted of one duck, four potatoes and six baking-powder biscuits. A pound of beans and a pint of coffee is not an unusual simple meal for one of these men.

For a time the patients got along well. After a year or two there were usually symptoms of gastric ulcer. The histories usually gave the record of pain after eating. Indigestion and pain in the stomach would come on toward spring. The men found that they needed a change of food. They were no longer able to eat beans. There are a great many men who only reach this stage of the disease. They come to town where they can get eggs and raised bread and green vegetables. Some of them take warning from the premonitory symptoms and pay more attention to their diet. These men are suffering from the early symptoms of gastric ulcer. They cure themselves by changing their diet in response to the demands of Nature, which are manifested by cravings for certain foods that will be better suited to the stomach. After all, Nature is our best physician, and if we but obey her demands many of the diseases from which we suffer will be cured in their incipency.

The stomach is a willing and a faithful servant to most of us. When our bodies demand nourishment the stomach seldom complains. It seems to know when it is required to do its best because the body needs food or when food is simply being thrown into it for the satisfaction of an overindulged appetite. When the body needs food the stomach usually does its best to furnish nutrition. When unneeded food is placed in the stomach, the stomach resents the imposition and refuses to digest the food. Among city dwellers who overload their stomachs we get indigestion. Among frontiersmen who have to overtax their stomachs we find the stomachs doing their best to accommodate their activities to meet the demands of the

system. Such stomachs get to secrete a strong and excessively acid gastric juice. They digest almost any kind of food and enormous quantities of it. After a while they get to digest their own walls. It is a wonderful demonstration of the way in which Nature will attempt to meet demands which are made even though the demands are most unreasonable. When we consider the causes and see the results it is not surprising that these men suffer from gastric ulcer and not from simple indigestion. They never acquire gastroparesis or atony. They have ulceration, which is the disease of strong stomachs that have been overworked rather than weak stomachs that have been abused.

This conception of the etiology of gastric ulcer may not apply to cases which come to the observation of practitioners who have to deal with patients most of whom follow the sedentary occupations of city dwellers. The fact that the causes which have been described have resulted in gastric ulcer is not without interest or significance. It suggests a rational line of treatment.

The most valuable article on the subject of treatment of gastric ulcer which has come to my notice has been that by Dr. J. W. Weinstein.¹ The treatment used in my cases followed the principles which are outlined by him. It is a treatment which has for its object the correction of the perverted natural process. There has been in a case of gastric ulcer a hypertrophy of the hydrochloric and peptic-secreting glands. The glands have become abnormally active. The muscular tone of the stomach is usually below normal. The stomach is apt to be dilated, but not below the normal level. It quickly regains tone. At the end of a week's treatment there was no more dilatation. It is probable that the fact that the patients treated were strong men, otherwise sound, materially aided in securing prompt recovery with medical treatment alone. When Nature is given a fair chance she will work her own cures, which is fortunate for the medical profession as well as for many of our patients. A little assistance is often all that is required by Nature for the perfection of a cure.

TREATMENT

Following is a brief outline of the treatment employed:

1. Rest in bed. This is essential for the first week; without it prompt results will not be secured.
2. The amount of gastric secretion is diminished by the use of belladonna or atropin given before meals.
3. Bismuth in some form is used before meals to protect the stomach walls.
4. When there is hyperacidity or pain over the pyloric region from 15 to 20 grains of sodium bicarbonate are given (four or five soda mints). It is well to give 15 grains of bicarbonate half an hour after each meal for the first week whether or not there is pain and distention.
5. A saline aperient is used every morning. Sodium phosphate in hot water has been found satisfactory.
6. A cold pack is applied over the stomach every night. The patient wears it through the night and takes it off in the morning. It is quite possible that the pressure by this pack over the stomach is beneficial. It seems to give some relief to the patients. They have less flatulence.
7. The food is to be eaten slowly, well chewed and is of a moderate quantity. The stomach is never loaded.
8. The foods which are allowed are those which call for a minimum of hydrochloric digestion. It is best to

use foods which are largely digested in the intestine and which do not stimulate the functions of the stomach. The stomach is given a rest. Carbohydrate foods allowed are stale bread, crackers, shredded wheat biscuit, cereals with milk and little sugar, toast, corn-starch, tapioca. No nitrogenous food is permitted at first; later milk, then soft boiled or poached eggs, still later boiled fish. The fruits permitted are baked apples (pulp alone), ripe bananas (one at meal time), orange or grape juice in moderate quantities. The vegetables allowed are mashed potatoes, lettuce, asparagus tips, spinach or beet greens (tender leaves with salt and olive oil only as a seasoning). Butter and olive oil, weak tea or milk may be taken.

Foods not allowed are: stimulants of any kind; seasonings (other than salt or olive oil); meats; beef extracts; soups other than vegetable; salt or dried fish; any vegetable foods which have heavy fiber or husks; an excessive amount of sweets.

Tobacco cannot be used for the first ten days. After that time it can be used in moderation, but not chewed.

The treatment consists essentially in giving the stomach a rest and inhibiting the production of its secretion. This is accomplished by checking part of the secretion through the use of belladonna, by diminishing the activity of the secretion through the neutralizing action of its acid, by selection of foods which do not stimulate the gastric secretions and by diminishing the amount of food which is consumed. By the rest in bed the physiologic processes of the body are slowed up. The demand for food drops. A man who has been living an outdoor life with fairly active exercise in a cold climate will require from 4,500 to 6,000 calories of food to maintain the bodily heat and supply energy for his work. As soon as he is put to bed in a warm room the demand for fuel drops to from 1,600 to 2,000 caloric value. When, in addition to this relief of the stomach from the demands which have been made on it, the character of the food is changed so that it is easily digested and that most of it is digested in the intestine and not in the stomach, then in comparison with what it has been doing, the stomach is afforded an almost complete rest. This treatment is simple and rational. It has for the few cases treated proved itself to be extremely effective.

In the cases which were treated by this method there was no pain remaining at the end of the first week. When practicable the patient was required to remain in hospital for one week longer. At the end of that time the patients were ready to leave the hospital and complete the cure at home. In each case the nature of the trouble was carefully explained to the patient and he was given a typewritten letter of instructions for continuation of treatment, with diet lists of foods which were and which were not allowed. Thus far there have been no recurrences.

The results which have been obtained in the treatment of these few cases are unusual. It is not believed that such results will be obtained in treatment of persons who live in cities. We have had here exceptional material to work with. The men have all had excellent general constitutions. The results are interesting to the general practitioner as illustrating what cures can be accomplished under the most favorable circumstances and as demonstrating the soundness of the principles on which this method of the medicinal treatment for gastric ulcer is based.

The general practitioner has come to regard ulcer of the stomach as a disease which is not readily amenable to medicinal treatment. He is apt to turn his case over to the surgeon as soon as the diagnosis has been made.

1. Weinstein, J. W.: A New Method of Treatment of Ulcer of the Stomach, THE JOURNAL A. M. A., Sept. 28, 1912, p. 1151.

No greater injustice could be done the patient. He has a trouble which is probably quite submissive to suitable treatment which is systematically carried out. He cannot be simply given a pill and a bottle of pepsin and cured. The fault in treatment of gastric ulcer has been largely that the physician has, until this time, given only a haphazard treatment. When the patient comes to his office the physician usually gives him some sort of a digestive ferment or a bitter tonic. He may even make a stomach analysis or wash out the stomach as frequently as the patient has sufficient funds to pay for. There is seldom an inquiry made as to the patient's mode of life or any attempt to correct the gross errors in his regular habit and method of life.

We are too apt to regard the stomach as a mere receptacle for food and drugs. It has been too little respected. The stomach can almost think. It knows what kind of food is put into it and tries to furnish a different kind of digestive juice for each kind. It knows when it is being imposed on or when it is simply being made to do its share of the work which the other organs of the body are doing. As a usual thing the stomach is as faithful and as uncomplaining as a beast of burden. It may be scalded with hot drinks and chilled with ices. It may be heaped with rubbish and soaked with gallons of beer. It may be pickled with alcohol and blistered with pepper and mustard. It may be required to convert pounds of the roughest material into nourishment for the body and may perform the seemingly impossible task for several years without complaint. In the end the efforts which it makes to meet the unreasonable demands of its master are its own undoing. The overworked stomach, though about worn out, keeps on with its efforts to produce a strong digesting secretion. It does not need medicine or much if any treatment. It needs simply to be given relief and an opportunity to recuperate, when it will again be the docile and willing servant which it has always been.

The surgical treatment of gastric ulcer has been successful in many cases. It is particularly so in the cases of chronic flat ulcer. In this type there are apt to be the most adhesions and other anomalies which need mechanical correction. In the small, deep, perforating ulcers which are frequently of the hemorrhagic type there has been less success from operative treatment. It is just this type of ulcer which is most quickly cured by readjustment of the diet and habits of the patient to natural physiologic laws. There is great hope of success in the rational treatment of gastric ulcer. It is well known that attacks of this disease come and go. It can be demonstrated that in most cases the attacks come as a result of definite causes and that spontaneous cures result when the patient responds to natural laws.

Absence of Hydrochloric Acid After Test Meal.—It is unwise to rely on a single negative result or even a series of negative results in the estimation of HCl unless the evacuation of the stomach is carried out at varying periods after a test meal. This is illustrated in the case reported by T. Gillman Moorhead (*Dublin Jour. Med. Sc.*, Oct. 1, 1913) in a woman aged 50, suffering from pain in the stomach, flatulence, vomiting and loss of weight. A test meal of the usual Ewald type removed an hour after taking showed no HCl. Several other examinations an hour after taking the meal showed the same results. In another test in which the removal of the meal was delayed until two hours after taking, HCl was found present in considerable quantities. Subsequent tests after longer intervals also showed HCl. Moorhead calls attention to the importance of this in case cancer is suspected on account of the absence of HCl in the stomach contents after a test meal.

NOTES IN THE STUDY OF POTASSIUM MERCURIC-IODID

DOUGLAS MACFARLAN, M.D.

PHILADELPHIA

To attempt to add still further to the host of antiseptics may seem a useless endeavor. The field has already been well covered and the relative values and merits so well established that the most fastidious can now be readily satisfied. Of late years it has largely been a matter of the complementary qualities, rather than the germicidal powers, that has determined the choice of antiseptics. Indeed, at times the comparative antiseptic values seem ignored in the consideration of the less important qualities. But naturally the distinctive merit of all antiseptics should be first of all in antiseptic powers.

For this alone, then, potassium mercuric-iodid has a claim for marked consideration. No other antiseptic can justly claim such great power in great dilutions and none is of so remarkably low toxicity for its strength.

PREPARATION

Potassium mercuric-iodid has been described in New and Nonofficial Remedies.¹ Red mercuric iodid is readily soluble in alcohol or water on the addition of approximately twice its weight of potassium iodid. A new salt is formed, potassium mercuric-iodid, K_2HgI_4 . Thus this salt is formed from 1 grain of mercuric iodid and $2\frac{1}{3}$ grains of potassium iodid on the addition of a few cubic centimeters of water. If not enough potassium iodid has been used the resultant light-yellow solution, though apparently clear, will deposit after a few hours a yellow sediment of the crystals of potassium mercuric-iodid. To have the ideal solution, sufficient potassium iodid should be added to give a perfectly colorless liquid, and only distilled water should be used in making it.

Boullay² states that a concentrated solution of potassium iodid will dissolve mercuric iodid in the ratio of 3 molecules of the mercuric salt for every 2 of the potassium salt. From such a solution, however, the crystals of potassium mercuric-iodid are prone to separate out, and often the red iodid itself comes down again. For practical purposes it is better to use the clear solution, the strength of which may be recognized from the amount of red mercuric iodid used. The small amount of potassium iodid, especially when dilutions are made, is an indifferent factor. Thus the formula of a 1 per cent. solution of mercuric iodid in potassium iodid would be:

Mercuric iodid	1 gm.
Potassium iodid	4 gm.
Distilled water	100 c.c.

This solution will be found quite permanent and may be kept for months without change. The liquid is clear, of metallic taste and very irritating to the mucous membranes. In dilutions which it is safe to use it shows no tendency to coagulate albumins; but it is incompatible with the organic alkaloids, with which it produces insoluble precipitates. On account of this property it has been used as a qualitative and quantitative test for the alkaloids.³

1. New and Nonofficial Remedies, 1913, p. 196. See also U. S. Dispensatory, ed. 19, p. 1800.

2. Boullay: *Ann. de chim. et phys.*, xxxiv, 345.

3. F. F. Mayer and F. L. Winkler's Tests, *Am. Jour. Pharm.*, 1886, p. 579; 1887, p. 1.