THE INTENSIVE ALKALINE TREATMENT OF GASTRIC ULCER.
By Hugh Maclean, M.D., D.Sc., F.R.C.P. 1

GASTRO-JEJUNOSTOMY VERSUS PARTIAL GASTRECTOMY IN THE TREATMENT OF GASTRIC ULCER.
By Heriart J. Paterson, C.B.E., M.C., M.D., F.R.C.S. ... ... ... 5

A CLINICAL LECTURE ON SOME POINTS ON THE DIAGNOSIS AND TREATMENT OF INFECTIONOUS DISEASES.
By John Wilkins, M.R.C.S., L.R.C.P. ... 8

THE INTENSIVE ALKALINE TREATMENT OF GASTRIC ULCER.

SUMMARY OF LECTURE DELIVERED
By Hugh Maclean, M.D., D.Sc., F.R.C.P.,
Professor of Medicine, University of London (St. Thomas's Hospital).

ON THE OCCASION OF THE VISIT ON AUGUST 2, 1927, OF CANADIAN POST-GRADUATES TO LONDON.
(UNDER THE AUSPICES OF THE FELLOWSHIP OF MEDICINE.)

Up till recently the treatment of gastric and duodenal ulceration has been on the whole unsatisfactory. The general plan of medical treatment adopted usually consisted in putting the patient to bed, regulating his diet and giving him small doses of sodium bicarbonate and bismuth carbonate at infrequent intervals. It must be confessed that this method very often ended in failure, and this failure was regarded as an indication for surgical interference. Surgery, however, did not always triumph in this field. Undoubtedly many patients were relieved or cured after an operation, but others continued to suffer: very often surgical treatment succeeded in giving complete relief from the symptoms for a period varying from three to nine months, but after that time the old discomfort was often once more in evidence and the patient suffered as much as before.

There is reason to believe that ulcers of the stomach and duodenum sometimes heal spontaneously, for, considering the large incidence of the condition, it is compara-
tively rarely that an old ulcer is seen in the post-mortem room in patients who were not suffering from definite symptoms of ulcer before death. The important question of surgical treatment will be discussed later by another lecturer, and for the present I should like to confine my remarks to a few points bearing on the medical aspect of treatment in this condition. It is a universally acknowledged fact that the most potent agents in the relief of gastric symptoms are alkalies. Without alkalies there would be an appalling amount of discomfort and suffering from gastric disturbance. Now, alkalies can only act directly by neutralizing the acid secretion of the stomach. I am aware that certain claims are sometimes advanced to the effect that alkalies act indirectly after absorption, and not directly in the stomach. Anyone who has suffered from dyspepsia can soon convince himself that the direct action of alkali in the stomach is the important one, for the relief afforded is sometimes almost instantaneous, and far too rapid to be accounted for by some indirect action of the alkali after absorption. Along with alkalies there are two other measures that are often useful. These are (a) judicious feeding with fat and oil, and (b) small doses of belladonna. Alkalies, fat and belladonna sum up the essential therapeutic treatment of the mass of functional and organic gastric disorders. Without these agents we should be in a sorry plight in our endeavours to relieve the symptoms of dyspepsia associated with ulceration and other conditions.

Now what is the effect on the gastric activity of all these bodies? The answer is that they all tend to render inactive the secretion of the stomach. Alkalies act directly in neutralizing the hydrochloric acid, while fats and belladonna tend to prevent secretion. No doubt belladonna possesses a secondary action as an anti-spasmodic, a property which is of great value in many patients. Since the exhibition of agents that inhibit the flow of, or neutralize the gastric juice, is the all-important medical method of dealing with gastric troubles, it stands to reason that gastric symptoms, whether functional or arising from ulceration, must be dependent to a great extent on the presence of hydrochloric acid and active gastric secretion. If this observation is true it is quite obvious that the rational method to deal with gastric and duodenal ulceration is to protect the stomach from the effects of gastric juice. How can this be done? Well, the surgeon does it by making an anastomosis between the small intestine and the stomach so that the alkaline pancreatic secretion constantly flows into the stomach. When the operation is successful from the patient’s point of view, the stomach is found to be continuously alkaline, or its normal acidity is much reduced. As early as 1907, Paterson in an excellent paper pointed out that in successful cases the patient’s stomach contents often remained alkaline after gastro-enterostomy, and that when this did not happen there was a tendency for the symptoms to persist. This statement has received ample verification since Paterson first made it, and there can be no doubt that the success or failure of a gastro-enterostomy depends to a large extent on the subsequent reaction of the gastric juice. It seems reasonable to infer that what the surgeon can do by mechanical means should, in this case, be possible by medical means. That this is so is certain. It can be done by giving alkalies. Why then, we might ask, has the old treatment of stomach disorders by means of alkalies been so disappointing? The answer is that the doses given were much too small. When large doses of alkalies are given to patients at short intervals so as to maintain the contents of the stomach alkaline for some weeks, it is really extraordinary how rapidly the symptoms of ulcer disappear. I have been trying this treatment for the last four years, and can say from experience that the results are quite dramatic. The use of large amounts of alkalies in gastric ulcer has been suggested from time to time
THE INTENSIVE ALKALINE TREATMENT OF GASTRIC ULCER

by many different medical men, but the method is often associated with the name of Sippy, who did much to introduce it in America. The point to remember is that half-measures are no use; the stomach must be kept alkaline at all costs if the method is to succeed. This, as a rule, can be easily accomplished during the daytime, though it is perhaps difficult to appreciate the very large amount of alkali that must be given to some patients. Regulation during the night is naturally more difficult. There is a general tendency for hyperchlorhydria in patients suffering from ulcer, and this condition must be overcome. Unfortunately, a good deal of misconception prevails at present as to what the term "hyperchlorhydria" signifies. In the sense in which I use the word I mean it to indicate a condition in which there is a definite tendency to secrete acid after digestion is finished, and often when there is no food in the stomach. Normally the secretion of gastric juice is regulated by the necessities of digestion, and when digestion is completed and the stomach empties, the secretion of acid practically ceases. It is not so, however, in many patients with gastric and duodenal ulcers. In these conditions free acid is secreted when there is no need for it, and when there is no food present in the stomach to

X-ray of stomach, taken on February 23, 1927. Patient was complaining of symptoms indicating the presence of an ulcer. The arrow in the photograph shows "a large penetrating lesser curvature ulcer." Patient began treatment on March 15, 1927.

X-ray taken on April 5, 1927, after three weeks' treatment in hospital as an in-patient. Report was "the ulcer is smaller and much less sensitive to palpation."

X-ray taken on May 14, 1927, after discharge from hospital. Report said "now no evidence of ulcer." Probably the ulcer had entirely disappeared some time before the photograph was taken, but the patient was not available at an earlier date.
combine with it. Under these circumstances it may do much harm, and will certainly tend to prevent an ulcer from healing. This hyperchlorhydria is not necessarily associated with an increased concentration of acid in the stomach. Indeed, in my experience, an increased percentage of acid is not very common in ulcer. Acid, however, is often present when it is not required, and it is this that does harm. Ulceration seems to interfere with the natural automatic regulation of stomach secretion, with the result that tissue that is not quite normal tends to be irritated and often to undergo a measure of digestion. All this can be prevented by inhibiting the action of the gastric secretion, and the easiest way to bring this about is to neutralize the hydrochloric acid. It is not of much importance what alkalis are used provided sufficient amounts are given. If the patient wakes up at night with any discomfort he must take a dose, and often special means have to be adopted to give alkaline to patients during the night.

It is impossible at the present time to discuss the treatment in detail. Suffice it to say that the symptoms usually disappear entirely within a month or so. For some time I have been following the effects of this treatment by X-ray examination of the stomach. The general result may be summed up in the statement that practically all uncomplicated ulcers disappear within from three to seven weeks. It does not matter how large the ulcer appears to be as seen on the X-ray photograph. Many of the so-called deep "penetrating" ulcers disappear in a few weeks. The X-ray photographs show a typical case where the ulcer has completely disappeared in six weeks. There can be little doubt that the future treatment of gastric and duodenal ulcer will lie more and more in the direction of intensive alkaline treatment, for the results obtained are really wonderful. My own experience of the matter extends over four years, so that it is now possible to say that in the great majority of patients there are few or no recurrences of any importance when instructions are carefully carried out by the patient.

The following are a few short details of the method employed in my wards at St. Thomas's Hospital. Full particulars may be found in my monograph on Gastric Diseases.1

1) When convenient, patient is put to bed for two to three weeks, but this is not essential in all cases.

2) The powder used consists of heavy magnesium carbonate and bismuth carbonate, with a little sodium bicarbonate. Along with this "magnesia cream" is often given. If the bowels are too loose the amount of magnesia in the powder may be reduced so that more bismuth is given. On the other hand, if there is a tendency to constipation, more magnesia should be given. The following is the composition of the average powder:

Sodium bicarbonate ... ... \( \frac{3}{8} \) ss.
Magnesium carbonate (heavy) ... \( \frac{2}{3} \) oz.
Bismuth carbonate ... \( \frac{3}{4} \) oz.

(3) The patient is put on a milk diet (3 pints per day) and takes a teaspoonful of the powder every two hours during the day. At bedtime he takes a double dose. One or two doses of the powder are always kept ready by his bedside, so that he may take some alkali at once if he wakes up in the night. The powder is best taken in a little water or milk. If there is any pain or discomfort between doses the powder is increased in frequency.

(4) After eight days or so the patient is gradually put on to such food as toast and butter, cream, custards, and lightly boiled eggs. The powder is gradually decreased until in about three weeks he is taking it only three times a day. During this time the food is gradually increased. The powder is taken three times a day for three weeks more;

1"Modern Methods in the Diagnosis and Treatment of Gastric Disease," 1926. Constable & Co., London.
it is then reduced to twice a day. After this, the powder is left off during the day, but a dose is taken at bedtime. This is continued for several months, and some patients take this nightly dose indefinitely.

(5) The patient is told to smoke as little as possible. Directions as to food are given, and he is warned that if any symptoms appear he is to go on to milk for a day or two and take the powder three or four times a day for a few days.

This short sketch of the intensive alkaline treatment of gastric ulceration merely tends to indicate the general nature of the method, and the results of the treatment. There is little doubt that the plan yields results hitherto unknown in the medical treatment of gastric and duodenal ulcer.

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SUMMARY OF LECTURE DELIVERED

By HERBERT J. PATERSON,
C.B.E., M.C., M.D., F.R.C.S.,
Senior Surgeon, London Temperance Hospital.

ON THE OCCASION OF THE VISIT, ON AUGUST 2, 1927,
OF THE CANADIAN POST-GRADUATES TO LONDON.

(Under the Auspices of The Fellowship of Medicine.)

To some it may appear to be old-fashioned and out of date to suggest gastro-jejunostomy for the treatment of gastric ulcer. By many it is considered an obsolete operation, and to a considerable extent it has been supplanted by partial gastrectomy. My reason for choosing this subject is that I am still firmly convinced that in the majority of cases gastro-jejunostomy is a thoroughly satisfactory treatment both for gastric and duodenal ulcers, provided it is properly performed and that prolonged and appropriate after-treatment is carried out. When I say properly performed, I mean not only that the surgical technique should be correct, but that the operation should be performed for definite recognizable ulcers. While it is probably true that no operation in surgery has added more to the sum of human happiness than gastro-jejunostomy, it is equally true that in a great many cases it has brought discredit on surgery owing to its failure to relieve the patient, either because it has been performed without proper indication, or because the after-treatment has been defective.

Let us consider for a moment some of the arguments which are put forward in favour of partial gastrectomy. First, that it is a more certain cure. This has still to be proved. The operation of partial gastrectomy in the treatment of gastric ulcer is on trial, but the interval which has elapsed since it became a fashion is not long enough for us to judge as to the permanency of the cures. It is already certain that partial gastrectomy is not infallible. It is also certain that the mortality-rate is higher. I am well aware that in the hands of a few experts the death-rate may be but little higher than that of gastro-jejunostomy; nevertheless, few will be prepared to deny that partial gastrectomy is a more severe operation than gastro-jejunostomy, and that it is necessarily attended with a higher mortality.

If all the deaths and failures following gastro-jejunostomy were added together, I doubt whether they would even approximate the number of patients who die as the direct result of partial gastrectomy, apart altogether from the failures. I shudder to contemplate the probable mortality-rate if gastrectomy became the operation of choice in all cases by all operators.

Secondly, it is alleged some 60 per cent. of chronic gastric ulcers show malignant changes, and therefore that all gastric ulcers should be removed. The teaching that the common fate of a gastric ulcer is to become
The Intensive Alkaline Treatment of Gastric Ulcer

Hugh Maclean

doi: 10.1136/pgmj.3.25.1

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