THE CAUSE AND TREATMENT OF CERTAIN UNFAVORABLE AFTER-EFFECTS OF GASTRO-ENTEROSTOMY.*

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As a result of modern improvements in technic, the unfavorable complications, which were formerly not infrequent after gastro-enterostomy, have become more and more rare. It must, however, have been the experience of almost every surgeon that patients, upon whom a gastro-enterostomy had been performed, have at some later period complained of symptoms, which were often trivial in comparison with those of the condition for which the operation was carried out, but which were none the less sufficient to prevent the patient from regarding the result of the operation as entirely satisfactory. In the last few years I have been consulted by a considerable number of such patients, at intervals varying from a few weeks to several years after the operation, which had been performed for various conditions, but most commonly for duodenal ulcer. I have gradually come to recognize that the symptoms in a considerable proportion of the cases are due to a cause which has not hitherto been described, and in others are the result of a condition which has, up to now, only been incidentally referred to by Jonas,[2] in 1908. These two conditions, which I propose to discuss more fully in this paper, are in my experience considerably more common than is the recurrence of ulceration in the duodenum, the closure of the stoma or the formation of jejunal or gastrojejunal ulcer. They occur, of course, in only a small proportion of all the cases operated upon. I have seen about twenty cases, which have been operated upon by almost as many different sur-

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geons; they therefore represent a very small percentage of cases in the practice of each individual surgeon. They are, none the less, of considerable importance, as their recognition and treatment often results in the conversion of a comparatively unsuccessful case into a completely successful one.

1. *Too Rapid Drainage of the Stomach.*—The patient complains of a sensation of fulness, which occurs during each meal, and which may be so unpleasant that the amount of food taken is progressively diminished and a considerable loss of weight may finally occur. The sensation disappears rapidly, and the patient may find that by eating with extreme slowness he is able to prevent its occurrence. Many patients recognize that this sense of fulness is localized slightly lower than the position where the pain or discomfort, for which the operation was performed, was felt.

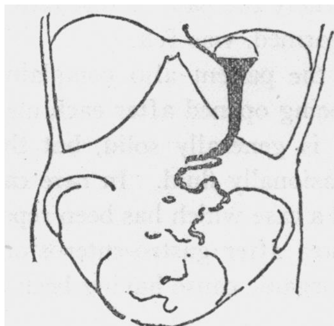
In some cases the patient also complains of slight diarrhœa, the bowels being opened after each meal; the first stool passed in the day is generally solid, but the later ones are unformed and occasionally fluid. In rare cases the diarrhœa may be severe, and a case which has been reported of a patient dying from diarrhœa after gastro-enterostomy was probably of this nature, no organic cause having been discovered at the autopsy.

In all patients suffering from this group of symptoms I have found with the X-rays that the stomach was small and hypertonic and that the passage of food out of it was extremely rapid, so that a meal, consisting of half a pint of porridge and milk mixed with two ounces of bismuth oxychloride or barium sulphate, left the stomach in less than an hour, and in one case in less than ten minutes after being taken, instead of requiring the normal three or four hours. If the patient is watched whilst he is taking the meal, the outflow from the stoma may indeed appear to be almost as rapid as the inflow from the œsophagus (Fig. 1). In all cases little or nothing passed through the pylorus, and sometimes the chyme even failed to reach the portion of the pyloric end of the stomach beyond the stoma. The rapidity of escape through the stoma

does not depend upon the condition of the pylorus, as I have seen more cases in which the pylorus was left patent at the operation than cases in which the pylorus was obstructed as a result of disease or by the surgeon in the course of the operation. Indeed, the most marked case I have ever seen was one in which the stomach was completely empty less than ten minutes after a bismuth meal was begun, and the pyloric passage had actually been widened by means of pyloroplasty at the second operation, which was performed on account of persistence of the symptoms before I saw the patient.

The rapid passage of the gastric contents through the stoma leads to distention of the proximal part of the jejunum in a way which never occurs normally, as the duodenum and end of the ileum are the only parts of the small intestine which are ever full under natural conditions. I believe this distention of the jejunum is the cause of the sense of fulness, as the experiments described in my Goulstonian Lectures proved that distention, which leads to stretching of the muscle-fibres, is the only adequate stimulus of visceral sensation. In confirmation of this, the situation of the sensation is found to be lower than that due to gastric distention, and corresponds to the upper limit of the situation of the pain felt when the small intestine is subjected to rapid distention. The patient sometimes finds that anything which increases the activity of

FIG. 1.



Five years after gastro-enterostomy for small duodenal ulcer, which did not produce obstruction.

the small intestine, such as exercise or a dose of castor-oil, though it may increase the discomfort, makes it disappear more rapidly than it would otherwise, doubtless because the distention of the jejunum lasts for a shorter period.

Confusion with the symptoms arising from a jejunal or gastrojejunal ulcer is prevented by the fact that the nature of the diet has a considerable influence on the latter, whereas, in this type of this post-operative indigestion, the quantity and not the quality of the food is alone of importance.

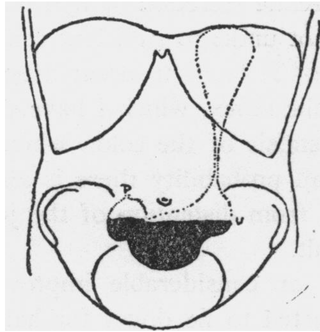
The diarrhœa is mainly due to the irritation of the bowels by the food, which escapes from the stomach too rapidly for efficient gastric digestion; owing to the absence of the normal stimulation of pancreatic secretion by hydrochloric acid in the duodenum it does not undergo sufficient compensatory digestion in the intestine. It tends to occur after meals owing to the normal gastrocolic reflex, which I have shown leads to an increase in the peristalsis of the colon whenever food enters the stomach.[1] In all probability there is also an enterocolic reflex, which arises from distention of the jejunum and produces the same result.

Complete relief or considerable improvement occurs if the patient is instructed to lie down for half an hour or an hour after each meal, as it is found with the X-rays that the stomach empties itself much less rapidly when this posture is assumed, the stoma no longer being in the most dependent position. In some cases it is better to lie on the right or less frequently on the left side, the best position being easily ascertained by watching the rate of evacuation with the X-rays. The patient should also be given some active preparation of pancreatic ferments, such as pankreon, at each meal, in order to compensate for the deficiency of the normal secretions. If the sense of fulness is still experienced, in spite of the treatment I have described, small doses of belladonna, which causes the involuntary muscle-fibres of the intestines to relax, and of codeine, which diminishes the excitability of the visceral nervous system, should be given half an hour before meals.

If all treatment fails to give relief and the patient's symptoms are severe, it might perhaps be necessary to perform an operation with the object of diminishing the size of the stoma, or, if the pylorus is not obstructed, of restoring its activity by completely closing the stoma. The interesting question also arises whether surgeons have not gone somewhat too far in their desire to obtain sufficient drainage, and whether it would not be advisable in the future to make a somewhat smaller stoma than has commonly been made in the last few years.

2. *Situation of the Stoma above the Upper Level of the Gastric Contents.*—In cases of extreme dilatation of the

FIG. 2.

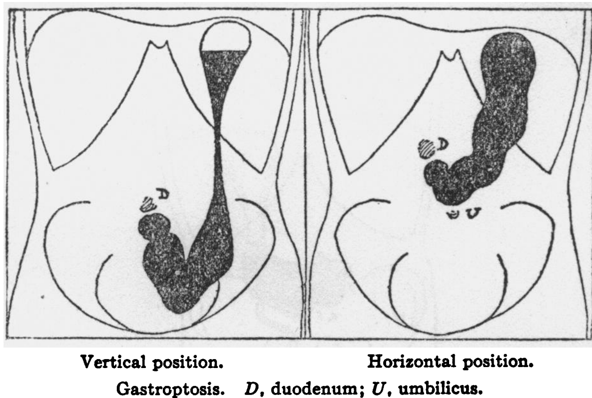


Pyloric obstruction due to duodenal ulcer; dilatation and hypertrophy of stomach. *P*, pylorus *U*, upper level of gastric contents.

stomach I have, on a number of occasions, observed that in the vertical position the whole of the gastric contents accumulate in the lowest part of the stomach in such a way that their upper limit is below the pylorus, and may not even reach the lesser curvature (Fig. 2). In such cases nothing at all can leave the pylorus, however strong peristalsis is, until the patient lies down. It is clear that in such cases an effective gastro-enterostomy must have the stoma so situated that it remains in the most dependent part of the stomach even when the vertical position is assumed. When the stomach is extremely dilated it must be exceedingly difficult to judge at an operation which will be the most dependent part when the vertical position is assumed, as, quite apart from any dilata-

tion, the influence of posture on the position of the stomach may be remarkably great (Fig. 3). Fortunately, the rest in bed and the strict diet after the operation are a great safeguard; whilst lying down the stomach drains quite satisfac-

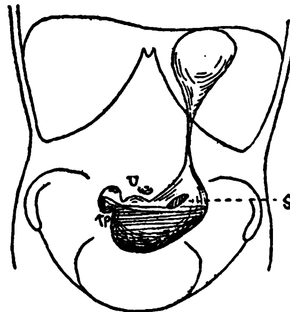
FIG. 3.



Vertical position. Horizontal position.
Gastroptosis. *D*, duodenum; *U*, umbilicus.

torily through the stoma, and consequently regains a great deal of its tone. I have, however, seen one case of dilated stomach due to simple pyloric obstruction, in which no im-

FIG. 4.

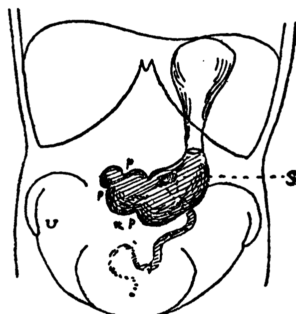


Gastro-enterostomy for pyloric obstruction. Stoma above the upper limit of the gastric contents in the vertical position. *U*, umbilicus; *P*, peristaltic waves; *S*, stoma.

provement resulted from operation, and in which we found that in the vertical position the upper limit of the gastric contents did not reach as high as the stoma or the pylorus (Fig. 4), but that on compressing the lower part of the abdo-

men the contents rose above the stoma and at once began to pass out of it (Fig. 5). By supplying the patient with an abdominal support and making him lie down for an hour after meals on his left side—the position in which I found that the drainage was most rapid—complete relief was eventually obtained. A somewhat similar case has been described by Jonas.

FIG. 5.



Same case as Fig. 4, with abdomen compressed so that the gastric contents can pass out of the stoma.

I believe that the notorious absence of success of gastro-enterostomy, when performed for severe atonic dilatation of the stomach without organic obstruction, must be due to a similar cause, drainage through the stoma being mechanically impossible.

REFERENCES.

[1] Hertz, A. F.: "Constipation and Allied Intestinal Disorders," Lond., 1909, p. 19.
[2] Jonas, S.: Archiv für Verdauungskrankhiten, 1908, xiv, p. 656.