Remarks

ON THE

SURGICAL TREATMENT OF GASTRO-DUODENAL ULCERATION.*

BY

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THE evolution of a gastric or duodenal ulcer is a calamity in a man's life. It attacks during the period of greatest vigour and usefulness. Intervals of complete freedom alternate with weeks of invalidism so that the patient's work is seriously interrupted, and with the passage of time the periods of relief become of less and less duration until persistent incapacity turns him into an encumbrance rather than a useful member of society. Physically he suffers from malnutrition, whilst mentally his fortitude is sapped by the continuously recurring pain. Added to all this there is the ever-present risk of a perforation into the general peritoneal cavity, a catastrophe which exacts a heavy toll. Working in a hospital it is difficult to form an estimate of the frequency of occurrence of gastric ulceration. But although we always have in the wards cases of this disease, I believe it is relatively rare; or perhaps it would be better to say that of all the cases of dyspepsia which consult the practitioner only a small percentage have an ulcer. This small proportion, however, must be recognized, that by treatment such patients may be saved from chronic invalidism.

THE CHOICE BETWEEN MEDICAL AND SURGICAL METHODS.

A most unfortunate controversy has been waged over this question of treatment, so that the impartial observer may be forgiven if he gets the impression that there is a real conflict between the teaching of surgery and medicine. When a patient in the early stages of the malady presents himself, the necessity of choosing between medical or surgical treatment never arises. Without exception, medical and dietetic measures should be instituted. Notwithstanding most thorough and painstaking medical treatment, some cases will prove refractory. Amongst these a very large proportion will be definitely cured by some operation. Critics sometimes point to the failures of surgery in this disease, and try to argue that patients would often be as well off without the administrations of the surgeon. Let us not forget, however, that surgery is only practised properly where medicine has failed, and that amongst such patients the number restored to complete health forms a very creditable percentage.

DETECTION OF CASES WHERE MEDICAL MEANS ALONE ARE LIKELY TO PROVE INEFFECTIVE.

Why are some ulcers resistant to the best medical treatment? The answer is bound up in part with the imperfectly understood question of the etiology, but also is concerned with the pathology of long-existing ulceration. Herein lies the secret of the possibility of curing gastric ulcers by surgical means. It is helpful to consider the elementary facts of gastric and duodenal ulcers. They only occur in those parts of the alimentary canal where active gastric juice has access, and even in this area there are selective sites for the ulcerative process. This is more pronounced in the stomach than in the duodenum. The pathologists tell us that histologically these ulcers show characters of their own, and there is no doubt that they are the result of a true digestive process occurring in a part of the stomach wall damaged in some other way.

Normal stomach wall is resistant to gastric digestion, and recent researches¹ have shown that this property is possessed by such other normal tissues as have been subjected to experiment. People have attempted to show that in gastric ulcer there is a lowering of the anti-peptic power of the stomach mucosa. This is not true, at least at the time when operation is usually performed. Wounds of the stomach heal quite readily. I have seen a

resection of the stomach *post mortem* nine days after operation, in which to the naked eye complete healing had taken place. We do not often get a chance of inspecting our cases so soon after operation, but we have no reason to doubt that the ordinary gastric operation heals as quickly. If this were not so, operating upon the stomach would be quite a futile procedure, for we should only substitute a much larger ulcer for the one we had removed. In the evolution of gastric ulcer there probably is a temporary loss of digestive-resisting power in the gastric mucosa, but some other factor is present which prevents the ulcer from healing when the resistance of the tissues to peptic assault returns once more to normal.

There would seem to be two reasons why a gastric ulcer refuses to heal. One is infection, the other is the presence of extensive surrounding fibrosis, set up by the extremely irritating gastric juice. Rosenow believes that all gastric ulcers are blood stream streptococcal infections which have their primary origin in diseased teeth, tonsils, or some other focus; whilst the Leeds school think that infection arrives by way of the lymph channels from the right iliac fossa. In the only three cases where I made an attempt, I obtained streptococci from within the tissues forming the margins of gastric ulcers. Infection undoubtedly plays its part in delaying or preventing healing, but it has by no means been proved to be the cause of the primary lesion. The widespread fibrosis around a gastric ulcer extends into neighbouring structures—the liver, pancreas, lesser omentum—converting such tissues into a rigid unyielding mass which cannot contract down. At this stage the ulcer is as incapable of healing as is a callous leg ulcer adherent to the tibia or a cavity in bone itself. The hindrance here is a mechanical one.

When the disease is not of recent origin is it possible to pick out those ulcers in which it is worth while to try medical treatment and those in which such treatment is certain to meet with failure? Sometimes this can be done with certainty by x-ray examination. The number of positive diagnoses of gastric ulcer which can be made by radiographic examination increases much with the skill and experience of the investigator. (Figs. 1 and 2.) But allowing

FIG. 1.

FIG. 2.

FIGS. 1 and 2.—Ulcer of lesser curvature, showing Haudek's diverticulum, spasm opposite the ulcer, and how the opaque material remains in the ulcer crater as the stomach empties.

for this, there are still some cases where an ulcer may be present and remain undetected. Assuming that the ulcer crater can be visualized, we are able to come to a pretty accurate conclusion as to whether surgery is called for or not. Only the smallest craters which have a spiked extremity and penetrate no further than the mucosa will heal over. I think it must be conceded from x-ray observations before and after medical treatment that a few ulcers with demonstrable craters will disappear. The chance of this happening is not a great one. When, however, the crater is of a certain size, and when the ulcer is adherent posteriorly, as can sometimes be demonstrated by the stomach shadow remaining fixed at this point on altering the posture of the patient, we can be certain that so much fibrosis has taken place around the ulcer that spontaneous healing is no longer possible. We shall not commit many errors if we make it a rule to operate upon every gastric ulcer in which a blunt-ended Haudek's diverticulum is demonstrable.

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FIG. 3.

FIG. 3.—Normal duodenum, showing filled cap and opaque material passing through second part.

FIG. 4.

FIG. 4.—Ulcer of anterior wall of duodenum; large penetrating ulcer on posterior wall; flattening of left border of cap and ulcer crater.

FIG. 5.—Two ulcers of duodenum; distortion of cap.

FIG. 6.

FIG. 6.—Ulcer of anterior wall and one on posterior wall of duodenum; distortion of cap. This patient also had a persistent fleck.

FIG. 7.

FIG. 7.—Ulcer of anterior wall and penetrating ulcer of posterior wall of duodenum; distortion of cap.

FIG. 8.

FIG. 8.—Ulcer of upper border of duodenum, showing fleck remaining in ulcer crater after first part of the duodenum had contracted.

FIG. 9.

FIG. 9.—Penetrating ulcer of duodenum which was drawn out into a diverticulum by fibrosis.

A most important question is this: Shall we decide against operative treatment whenever the x rays fail to reveal an ulcer in a suspected case? This is most difficult to answer. In some clinics abroad over 90 per cent. correct x-ray diagnoses are claimed, but my experience is that we in this country cannot reach such perfection—at least in hospital practice, where repeated re-examinations and serial methods are precluded by pecuniary reasons or want of time. Often, though the actual ulcer cannot be seen, because perhaps the crater, being plugged with mucus or food, admits no opaque material, collateral indirect evidence of an organic stomach lesion is obtained by x-ray examination—such, for example, as spasm of the pylorus or greater curvature. In such cases we are influenced above all by the clinical history, which may be so characteristic that no doubt can remain that we are dealing with an actual organic lesion.

THE PROBLEM IN DUODENAL ULCERATION.

The general pathology of duodenal ulcer is similar in every way to that of gastric ulcer, except that cancer never seems to be grafted into an ulcer in this situation. It occurs, of course, almost solely in the beginning of the duodenum, which physiologically may be regarded almost as part of the stomach. Nevertheless, there are special features about duodenal ulcers which render our attitude towards them a little different. On the whole they are of a smaller average size than the gastric ulcer, and they are much more often multiple. Indeed, observations made during resection of the duodenum indicate that it is the rule for two ulcers to be present. Just as in the case of the stomach, although small they are attended by very extensive fibrosis, which frequently surrounds the common bile duct and eats into the pancreas.

I have gained the impression, though it does not amount to a certainty, that ulcers of the duodenum can be more readily induced to heal than ulcers of the stomach. Perhaps this is due to the fact that they are of smaller size. I am not sure that it is wise to bank upon this impression, for we know how many of them resist treatment, and if they are allowed to enlarge and burrow into the pancreas removal by operation always becomes a formidable procedure and sometimes proves to be impossible, whilst the walls of the ulcer may have become so rigid that indirect surgical measures, such as gastro-jejunostomy, may be ineffective.

The radiographer's diagnosis of duodenal ulcer is less certain than that of gastric ulcer and the classical symptoms are not always present, whilst hyperchlorhydria without duodenal ulcer may simulate the disease very strongly. It

therefore comes about that sometimes we open the abdomen only to find no trace of the expected ulcer. In some of these patients I feel sure that a posterior ulcer is present and overlooked. This is extremely easy to do. On several occasions I have only first become aware of the presence of a second duodenal ulcer behind when a resection operation has been begun and the viscus has been in process of separation. I have also seen *post mortem* an ulcer which could not be detected by the pathologist until the intestine had been actually opened. If an ulcer on the anterior wall of the duodenum is so small as to give no visual or tactile evidence of its presence from the outside, the prospect of cure occurring subsequently is likely to be fairly good; little harm, therefore, will probably arise from closing the abdomen without proceeding further. On the other hand, the ulcer may persist. One of my patients had been explored by a surgeon for duodenal ulcer eight years previously to admission. None could be found and his abdomen was closed. The symptoms had persisted. Operation revealed the presence of anterior and posterior ulcers, which were removed by excision of the duodenum. This case is a warning against operating too early after symptoms of duodenal ulceration have appeared. At this early stage an ulcer destined to persist and become callous may be quite undetectable from the outside.

As I have said, the radiographic diagnosis of duodenal ulcer is difficult. Visualization of the first part of the duodenum is not certain for two reasons: it may be hidden by the shadow of the stomach; the exposure may be made whilst the duodenal cap is contracted after expelling its contents, which it does every two or three minutes. Sometimes it will not fill very readily. There are ways of circumventing these difficulties, but it cannot invariably be done. The niche of the ulcer is less prominent and the notch not so distinctive. Going back over my cases with the radiographs, the striking thing is that there always appears to be some deviation from the normal picture whenever good visualization of the duodenal cap has been obtained. There is a spasmodic indrawing, a flattening of the left border, an asymmetrical pyloric canal, a niche, a persistent fleck remaining when the cap has contracted, an irregularity of outline of the cap which often defies precise classification, sometimes only evidence of obstruction to the outflow of chyme from the pylorus, on other occasions distinct hurry in the passage of food into the duodenum. I have made outline drawings of some of these appearances. (Figs. 3 to 9.) If before operation any reliance is to be placed upon irregularity of the duodenal shadow as a sign of duodenal

ulcer, it must be proved that the deformity is a real one, persisting in several films, and not a false shadow owing to imperfect filling. It is worth a surgeon's while to screen his own patients in collaboration with the radiographer. In this way he will obtain a better grasp of the value of radiographic diagnosis of duodenal ulcer.

THE VALUE OF TEST MEALS IN DIAGNOSIS.

It is important to consider of what use test meals are in the management of gastric ulcer. From the point of view of diagnosis very little help is to be obtained, but for the medical treatment they are of use. It enables the physician to carry out a rational régime varying in accordance with the quality of the gastric secretion. With this aspect I am not concerned here. Test meals are valuable, but rather as an aid to treatment than diagnosis.

CHOICE OF OPERATIVE PROCEDURE WHEN SURGICAL TREATMENT FOR GASTRIC ULCER HAS BEEN DECIDED UPON.

When patients requiring operative treatment have been selected, the path to be followed is even then not quite easy to choose. There are a bewildering number of methods and advocates of them all. Moreover, the inevitable statistics are quoted, and because they are not arrived at by the same methods of compilation they add to the confusion. When one observer, for instance, claims over 90 per cent. good results from gastro-jejunostomy for duodenal ulcer, whilst another, using an apparently identical technique, can scarcely attain to 60 per cent. success, there is obviously some radical difference in their manner of evaluation. Sleeve resection of the stomach is extolled by one surgeon and condemned by another. For the serious student of operative measures for gastric and duodenal ulcer there is only one course to follow: he must select those methods which appear to be based on sound knowledge, and, after trial, endeavour to form his own conclusions as to their relative worth and applicability. Gradually, with experience, and if we remain unbiased, conviction comes that this or that recourse is indicated in any given circumstances. To do this requires unremitting alertness to escape making false deductions. It is more useful to remember the failures or partial failures than the successes. From time to time it is well to read over again the cases which have come under observation. Treatment is best considered under headings.

A. Ulcer of the Lesser Curvature.

1. *Gastro-jejunostomy* (Fig. 10) alone is being discarded by nearly all operators. It cannot be denied that some patients have been cured by this operation, but it seems proved that the proportion cured is much too small for the operation to be retained as a method of choice. I have records of patients who have got no benefit from it, and when the abdomen was opened after several years the ulcer still persisted.

FIG. 10.—Gastro-jejunostomy.

FIG. 11.—Moynihan's operation for ulcer of lesser curvature.

2. *Resection of the pyloric segment of the stomach, including the sphincter, with implantation of the cut end of stomach into the jejunum.* This operation is often referred to as the Polya operation, but the method of Moynihan is by far the best. (Fig. 11.) It is being performed very extensively just now, and the reports of the results are, on the whole, very satisfactory. It is in most cases a fairly simple operation to do, though in certain circumstances there may be great difficulties to overcome. On several

occasions, when examining the portion of alimentary canal removed, I have received rather a shock in realizing what a physiologically destructive operation had been performed for the size of the pathological lesion. Moreover, to short-circuit all the chyme directly into the jejunum without any of it passing through the duodenum would seem to be a procedure very disturbing to digestion. I have therefore given up this operation except in exceptional circumstances.

3. *Wedge resection of the lesser curvature* (Fig. 12). This operation is usually combined with gastro-jejunostomy, and very good results are claimed by certain surgeons. It is not very widely practised. There are strong objections on experimental grounds, for it has been found in animals to be very upsetting to the normal motility of the stomach.

FIG. 12.—V-resection for lesser curvature ulcer.

FIG. 13.—Sleeve resection for lesser curvature ulcer.

4. *Sleeve resection of the stomach* (Fig. 13). A ring-shaped segment of the stomach is removed which includes the ulcer. End-to-end anastomosis of the stomach is then performed. When the ulcer is some distance from the pylorus this operation has given me very good results. Some surgeons have condemned the procedure. Extended experience may lead me to change my opinion on this matter, but I have not up to the present had a failure of which I know. The operation is sound on physiological grounds, and motility is not interfered with as after wedge-shaped resection. I believe it is the method of choice for such ulcers.

5. *Resection of the ulcer-bearing area of the stomach, including the pyloric sphincter, with axial anastomosis of the stomach to the duodenum.* This procedure goes under the name of the Billroth I method, as it was practised by that surgeon, though it was abandoned by him owing to its high mortality from peritonitis due to leakage. (Figs. 14 and 15.) It is particularly adapted to cases of ulcer on the lesser curvature near the pyloric end. The duodenum is cut across close to the pyloric sphincter and the stomach proximal to the ulcer. An axial junction is made, the open end of the stomach being partially sutured to reduce its size to that of the duodenum. The Billroth I operation was given up because of leakage at the dangerous angle, and only recently has it been tried again. I have performed it more than twenty times and had no trouble following. I believe such immunity depends solely upon care in suturing, and perhaps care in ensuring that the

FIG. 14.

FIG. 15.

Figs. 14 and 15.—Resection of ulcer near pylorus by the Billroth I method.

blood supply of the cut edges to be anastomosed is free. It is an operation which appeals strongly on physiological grounds, for, when completed, the appearance of the stomach passing into the duodenum approaches very nearly the normal. Subsequent x-ray examination in my patients has shown good motor function to be present. I believe it to be the method of choice in gastric ulcers on the lesser curvature near the pylorus.

B. Pyloric Ulcers.

There is a choice between two methods—the indirect one of gastro-jejunostomy, and the direct method of excision by the Billroth I procedure. It is here especially that good results have followed gastro-jejunostomy in the treatment of gastric ulcer, and there is much to be said for the performance of such a simple procedure, especially as, when the ulcer is surrounded by much fibrosis, pylorotomy may become technically very difficult. When the risk is not too great, however, better results are to be expected from the Billroth I method, as being much less disturbing to normal physiology and eliminating the possibility of gastro-jejunal ulceration. Bland-Sutton in a Hunterian Lecture recommended this course, and it is a policy which I have adopted for the last two years.

C. The Treatment of Duodenal Ulcers.

This problem has not been so satisfactorily solved. There is a difference of opinion as to the value of indirect measures, and the technique necessary to employ direct methods is rather difficult to carry out. The authorities of weight in this country, and some in America, claim very satisfactory results from gastro-jejunostomy in a high percentage of patients, and in this they differ strongly from the majority of Continental surgeons. It is always so very difficult to make accurate deductions from medical statistics, where many significant factors are too variable and uncontrollable for scientific exactitude. The divergence of opinion is undoubtedly related to these irremediable facts. I do not think it possible to dogmatize on the operative treatment of duodenal ulcer in the present state of knowledge. It must be admitted, without reserve, that simple gastro-jejunostomy has cured many patients, yet, the pathology of such ulcers being so similar to that of gastric ulcers, which are acknowledged to be exceedingly resistant to indirect measures, the assertion that the proportion of failures is of moderate size cannot be thrust on one side without further consideration. Future experience must settle this question, and for this it is necessary to give direct measures a fair trial. This is being done in the Surgical Unit of St. Mary's Hospital, where we are making it a routine to resect the duodenum in every case where it seems practicable without undue risk. During 1923 and 1924 down to the date of writing this, 28 duodenal ulcers have been operated upon. This is not a large number, but regard has to be had for the teaching of general surgery, and it is undesirable that the number of cases of any particular disease at one time in the wards should be too great. Of these 28 cases, 10 had simple gastro-jejunostomy performed, sometimes with infolding of the ulcer, once with perforation of the ulcer base with a cautery; 18 cases have had duodenectomy carried out. The immediate results of the latter procedure have been uniformly successful in all but one patient, who died on the eleventh day, when the *post-mortem* examination revealed astonishing healing of the operation site but cardiac muscle degeneration. It is much too small a series as yet from which to make deductions, and time alone will demonstrate whether the results are lasting. The operation is one of the most tedious in surgery, and requires great care to avoid damage to the pancreas and its duct or the common bile duct. After resection of the affected part of the duodenum the stomach in nearly all cases is joined axially to the duodenum so that physiological relations are more nearly restored. A striking fact has emerged from these 18 cases: it is that in a very large proportion there are two ulcers, and the second has several times been discovered only when the stomach has been cut across and access has been obtained to the posterior aspect of the duodenum.

CONCLUSIONS.

1. The primary treatment of gastric and duodenal ulceration is always medical.
2. Surgery is indicated when medical treatment has failed, or in recent cases when a large ulcer crater is demonstrable by x rays.
3. It is probably true to say that medical measures can be continued with advantage longer in the case of duodenal than gastric ulceration.

4. For ulcer of the lesser curvature away from the pylorus, sleeve resection is the operation of choice.

5. For ulcers of the lesser curvature close to the pylorus or ulcers at the pylorus, excision of the affected portion of the stomach, including the sphincter, followed by axial union, is best.

6. For cicatrized pylorus following a healed ulcer pylorotomy is preferable, but gastro-jejunostomy gives very good results.

7. For ulcer of the duodenum it is not decided yet whether resection of the duodenum with its attending increased risks gives results so much better than gastro-jejunostomy that it should replace the short-circuit operation.

REFERENCE.

1 L. R. Dragstedt and A. M. Vaughan: *Arch. Surg.*, 1924, 8, p. 791.

THE TREATMENT OF INFANTILE PARALYSIS:

WITH

A PLEA FOR THE REORGANIZATION OF OUR HOSPITAL SYSTEM.*

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The subject of poliomyelitis is of much scientific and practical importance, for it is one which should bring pathologist, neurologist, and surgeon into close touch with the general practitioner. Further, it is a good example of one of many administrative problems the consideration of which may serve to shock the spirit of complacent satisfaction with our present hospital system.

PATHOLOGY.

Until recently, poliomyelitis had only occurred in the form of scattered sporadic cases, and any information as to the essential nature of the disease was derived from autopsies on late cases. Such information simply pointed to the destruction of motor cells in the anterior horns of the spinal cord, and it was assumed, therefore, that there was an essential destructive process affecting these structures alone. But the occurrence of the disease in an epidemic form both in Scandinavia and in America has given the opportunity for more accurate investigation, not only of human cases, fatal in the early stages of the disease, but also by means of animal experiment. Certain species of monkeys can be inoculated with the disease, and in these animals it often runs a fatal course. It has been abundantly established that the disease is a definite myelitis of patchy distribution. Vascular engorgement followed by round-celled infiltration of the cord is the primary lesion, and it is probable that the destruction of the nerve cells is only a secondary consequence of the inflammation.

That the disease is not confined to the anterior horns is shown clinically by the fact that in the early stages of the disease there is marked hypersensitiveness of the skin, pointing to affection of the nerve roots and their ganglia. The conception of the disease as one of diffuse inflammation has much more than a theoretical interest, because it affords a rational basis for the treatment by absolute rest in its early period.

CLINICAL STAGES OF THE DISEASE.

It is easy to distinguish three well marked stages in the disease. The first or active stage corresponds to the period of inflammatory infection of the cord. It is marked by general malaise, a febrile temperature, and paralysis with hyperaesthesia of wide distribution. This lasts for a period varying from a few days to a few weeks. The second or quiescent stage is one of convalescence from the constitutional illness. The temperature is normal and the tenderness and hyperaesthesia have passed away. The paralysis, which was extensive in the stage of onset, gradually disappears in the majority of muscles originally affected, but this recovery of motor function will depend

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