THE [^]ROLE OF SURGERY IN THE TREATMENT OF CHRONIC PEPTIC ULCER.

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To anyone who has kept in close touch with the ebb and flow both of precept and practice in the treatment of peptic ulcer during the last quarter of a century or so, or who has the industry to browse on the enormous literature of the subject, it is significant to observe the unusual unanimity of opinion today among surgeons that these ulcers should not be treated by operative methods unless medical measures have failed, or in the presence of certain complications. It is emphasized that medical treatment should be thorough both in detail and duration, that it should meet with the full co-operation of the patient and that subsequently a dietetic régime should be followed for a considerable period of time. It is clear from my own experience that this teaching has had its effect, for the numbers of cases which reach the surgeon annually show a considerable fall from those of the early twenties, though there has been a tendency for the figures to rise again during the last year or two, though not to the peak levels which were reached about ten years ago. I personally have no quarrel with those who advocate medical treatment in the early stages of uncomplicated duodenal ulcer, and in certain small mobile gastric ulcers so long as these are in all respects typical of the innocent type of lesion, and I am fortunate in having medical colleagues who are scrupulous both in requesting and in acquiescing in a surgical opinion whenever any possibility arises that the lesion is unsuitable for further medical measures. One cannot, however, ignore the following facts which have emerged since medical treatment has become systematized in the treatment of these lesions:—

1. There has been a rise in the incidence of perforation and to a lesser extent of hæmatemesis as complications of peptic ulcer. These two crises have added considerably to the mortality of the condition—possibly this rise in mortality exceeds that which would ensue had routine surgical treatment been adopted primarily.
2. There has been a fall in the percentage of cases of gastric carcinoma which reach the surgeon in an operable stage. This is properly attributable, I believe, to the universality of the treatment of dyspeptic symptoms by exhibition of alkalies either without recourse to the only reliable diagnostic method, viz. skilled radiology, or sometimes in spite of the suspicious features which such an investigation frequently reveals.
3. The shorter the duration of the peptic ulcer the more amenable it is to treatment, medical or surgical. This indicates the necessity to set some time limit to the optimism of the physician, since undue prolongation of medical treatment, should it eventually prove a failure, must diminish the chance of cure by subsequent surgical procedures. It must not be forgotten, too, that there is an economic side to the problem. It is almost an impossibility for the heavy manual labourer to carry out the prolonged dietetic régime which must follow after the necessary medical treatment, not only because he cannot interrupt his work for the extra meals, etc., but more particularly that the diet allowable is inadequate for heavy labouring work.

4. Many other abdominal lesions, some of them of a grave nature often accompany peptic ulcer, consequently undue pertinacity in medical treatment may result in a more important condition being neglected. I recently operated on an elderly man who had had several courses of medical treatment for duodenal ulcer at a well-known clinic where, however, they had failed to detect that his symptoms were due rather to a gall bladder full of pus and stones than to his trivial ulcer. I have also twice found malignant neoplasms in the colon accompanying simple peptic ulcers. Both of these cases had been treated medically for several months without relief to the main symptoms which were indeed those of the obstructive colonic lesion.

From these preliminary generalizations it is necessary to pass to the specific problems presented by:—

1. Duodenal ulcer.
2. Gastric ulcer.
3. Recurrent ulcer—especially jejunal and anastomotic ulcers.

I. Duodenal Ulcer.

The rôle of surgery in duodenal ulcer is not only to relieve symptoms but to safeguard the patient against recurrence—whether in the duodenum itself or elsewhere in the gastro-duodenal area—and to prevent complications such as hæmorrhage, perforation and stenosis. It is also probable as judged from actuarial evidence that there is an increase in expectation of life in those who have been successfully operated on for duodenal ulcer. In this respect there is a distinction to be made from gastric ulcer in which operation either fails to confer any increase in the expectation of life or possibly results in a diminution thereof. Operation is also to be recommended with less reluctance if in addition a gastric ulcer complicates the case, for there is evidence that the double lesion is less likely to respond permanently to medical measures than is the single one. The combination of gastric and duodenal ulcer is not very rare accounting as it does for just over 8% of my series.

Operative Procedures. The choice of operation in duodenal ulcer is a matter of the first importance and necessitates both sound judgment and wide experience. Controversy still rages as to the indications for any particular type of operation. The methods in vogue are:—

1. Short circuiting
 - (a) Gastro-jejunostomy, with or without pyloric occlusion.
 - (b) Gastro-duodenostomy.
2. Excision of the ulcer by knife or cautery.
3. Excision of the ulcer.
 - (a) combined with gastro-jejunostomy.
 - (b) combined with gastro-duodenostomy.
 - (c) combined with plastic operations on the pyloric sphincter.
4. Duodeno-gastrectomy, i.e. extirpation of the ulcer-bearing part of the duodenum with more or less of the stomach.
5. Duodenal exclusion.

The main controversy lies between those who regard some form of short-circuiting operation as best fulfilling the requirements and those who consider that it is necessary to extirpate the ulcer-bearing area of the duodenum together with enough of the stomach to reduce materially gastric acidity. The advantages claimed for simple anastomotic methods are:—

1. Low immediate mortality.
2. Satisfactory results in relief of symptoms

whereas the advocates of duodeno-gastric resection maintain that thereby the percentage of permanent cures is considerably higher than after anastomotic methods, while the tendency to jejunal and anastomotic ulcers is reduced by the more radical procedures. My own opinion based on over 1,300 operations for peptic ulcer is that while gastro-jejunostomy (posterior or anterior as may be indicated) is a satisfactory method

1. for elderly patients of both sexes and for younger women with a low gastric acidity.
2. for many cases of pyloric obstruction due to a cicatrized duodenal ulcer provided the gastric acidity is not grossly excessive.
3. for certain exceptional cases where technical difficulties preclude duodenal resection

it is not to be recommended as the routine method of treatment owing to the high incidence of anastomotic ulcers as a sequel. This incidence even in the best hands is approximately 4% and some experienced surgeons admit considerably higher figures. The advocates of gastro-jejunostomy claim that anastomotic ulcers are equally common after duodeno-gastric resection, but this is not borne out by my own experience. I have met with only one proved case of such an ulcer after duodeno-gastrectomy for duodenal ulcer, as against 71 jejunal gastro-jejunal and gastro-duodenal ulcers following various forms of conservative treatment. It is also urged that if the mortality of gastro-jejunostomy be added to that of any further operations necessitated by recurrent ulceration the total mortality figure is less than that of gastrectomy alone. This is, in my opinion, a fallacious conclusion and is based on the mortality figures for gastrectomy in general and not on the considerably lower figures which relate to duodeno-gastrectomy—an operation usually done on the younger and more robust type of patient with high gastric acidity, and not on the decrepid, half-starved, anæmic patient who is the subject of a large high-placed fixed gastric ulcer in whom the radical operation is necessarily dangerous. Increasing experience leads me to the conclusion that, with the exceptions quoted, the radical operation should be chosen whenever feasible. Feasibility certainly increases with familiarity, so that it becomes possible to mobilize large fixed ulcers and to invaginate safely relatively short duodenal stumps in cases which formerly would have been regarded as suited only to the short circuiting operation.

It is also a significant fact that in one case in my own series a gastric ulcer developed after gastro-jejunostomy for duodenal ulcer. A carcinoma of the stomach developed in another patient after the same type of operation and I know of a similar occurrence in a patient under the care of a colleague. I am not impressed by the results of gastro-duodenostomy for duodenal ulcer, whether performed by Finney's method or by Jaboulay's— in 81 such cases I have had

two anastomotic ulcers both ultimately fatal from hæmorrhage or perforation while the relief of symptoms was less satisfactory than after either gastro-jejunostomy or duodeno-gastrectomy.

Excision of the Ulcer by Knife or Cautery when the lesion is small and on the anterior wall, is indicated in those cases where the abdomen has been opened primarily for operation on the gall bladder or bile ducts and the duodenal ulcer is unexpectedly found. Such local operations appear to be exceptionally successful under such circumstances but are not to be recommended for routine purposes, though combined with gastro-jejunostomy in cases unsuited for more radical methods it has favourably appealed to me.

Excision of the Ulcer combined with Pyloroplasty. This operation of which there are numerous modifications differs only in detail from Finney's. It permits of the removal of anterior, and in favourable cases of posterior ulcers. The removal of a portion of the pyloric sphincter gives a free regurgitation of duodenal contents into the stomach without the danger of an anastomotic ulcer supervening in what is veritably an irremovable situation.

Duodenal Exclusion. This operation is claimed to permit of the healing of the original lesion with less risk of anastomotic ulceration. It is suitable for those massive ulcers which cannot be mobilized safely in order to permit of radical measures. Its disadvantage is that a blind portion of the pyloric end of the stomach remains *in situ* and defective drainage of this cul-de-sac is to be feared. My limited experience of this procedure does not endear it to me, as convalescence has been much longer than with other methods and relief less complete.

The Surgical Treatment of Duodenal Hæmorrhage.

Unfortunately this complication has in the past been treated too lightly. The mortality has been stated to be negligible whereas it is probably very little less serious than duodenal perforation as a cause of fatalities. I have already referred to the increased incidence of perforative lesions following non-operative treatment of duodenal ulcers but a similar, though less striking, rise of the death rate from hæmorrhage is also noticeable. It is proper to treat the majority of cases of severe duodenal hæmorrhage by medical measures combined with the use of continuous blood transfusions over long periods, when the hæmorrhage is persistent or rapidly recurrent. I have found little benefit from following the advice to wash out the stomach in such cases, as frequently there is little or no blood in the stomach itself, and if, in fact, there is a considerable quantity of clot, its removal by any form of tube-suction or irrigation is almost impossible. Surgical measures are certainly not advisable as a routine, yet it is within the experience of most gastric surgeons to have rejected operative treatment during a relatively quiescent period and for the patient to succumb suddenly within a few days from a massive recurrent hæmorrhage. It seems hardly possible to lay down definite rules but in most cases of repeated severe hæmorrhages in young adults operation should be undertaken, as also in other cases where the patient is obviously steadily losing ground. I have had successes in apparently hopeless moribund patients to set against failures. The operation should always be directed to the lesion itself—short-circuiting, infolding, cauterization and exclusion methods are far too often followed by recurrence of hæmorrhage, to warrant their employment except in altogether exceptional cases. I have usually relied on a rapid

resection of the affected part of the duodenum. In the process the open or temporarily occluded vessel from which the bleeding occurred is usually visualized and can be further controlled by under-running sutures. Blood transfusions should be maintained throughout the operation and often for days afterwards.

II. Gastric Ulcer.

The indications for surgery in gastric ulcer are dominated by the fact that it is virtually impossible to be certain that any gastric ulcer is innocent, although those which are small clearly cut and placed along the lesser curve above the incisura, are relatively free from suspicion. On the other hand, ulcers near the pylorus (clearly gastric and not duodenal) and those on the greater curvature or very high up on the lesser curvature, are always open to grave doubt. It is therefore advisable to treat gastric ulcers surgically unless they respond to medical treatment rapidly or if they recur quickly after conservative treatment. Surgical treatment is indicated in the presence of the following complications:—

- (a) Pyloric obstruction,
- (b) Hour-glass constriction,
- (c) Perforation into neighbouring viscera, etc.,
- (d) Massive size—it is said that nearly all ulcers greater than 1 inch in diameter are malignant though I have encountered many of much greater size which were quite innocent,
- (e) Duodenal ulcer, particularly if stenosis co-exists,
- (f) Diseases of the biliary ducts, appendix, etc.

The Operative Measures indicated in Gastric Ulcer.

1. Gastro-jejunostomy,
2. Excision of the ulcer by knife or cautery, combined with gastro-jejunostomy,
3. Excision combined with pyloroplasty,
4. Sleeve-resection,
5. Gastric exclusion,
6. Gastrectomy,
7. Jejunostomy.

1. **Gastro-jejunostomy.** The only advantage of this operation is its facility. The posterior operation is usually preferable but the anterior method gives comparable results especially when entero-anastomosis of the afferent and efferent jejunal segments is added to compensate for any tendency to stagnation in the longer jejunal loop which is necessary. It is said that anastomotic ulcers rarely occur after this operation performed for gastric ulcer, but I have seen more than one of these in the relatively small number of cases in which I have deemed it advisable to adopt this method. Ulcers often heal after gastro-jejunostomy even when the ulcer itself is well above the site of anastomosis, but the tendency to recurrence is much greater than after methods permitting removal of the ulcerated area. There is also the ever-present risk of malignant transformation (or extension) of the ulcer. In over 6% of cases of gastric ulcer considered to be innocent and treated by purely short-circuiting methods carcinomatous developments ensue.

2. Excision of the Ulcer combined with Gastro-jejunostomy. Simple excision whether by knife or cautery is followed by recurrence in 50% of cases and therefore this method is inadmissible except in very special circumstances. Combined with gastro-jejunostomy excision gives good results whenever the lesion is relatively small and accessible so that after resection of the stomach wall there is a minimum of deformity. I have used this method for ulcers on the posterior wall, high up yet free of the lesser curvature, and for the rare anterior wall ulcers. The immediate results are good in the few cases I have dealt with in this way but recurrences are not negligible in number and the symptomatic relief is less than after gastrectomy. The wedge-excision combined with gastro-jejunostomy operation is a development of the excision operation which permits of the extirpation of larger ulcers especially those involving the lesser curvature. The method has a lower mortality than has partial gastrectomy even though it is technically often more difficult to carry out, but it must not be forgotten that it cannot be applied to the largest fixed ulcers. Recurrence of ulceration is more likely to supervene after the operation and I recently had to operate on a case of this type, nine years after the first intervention, in which a gastro-jejuno-colic fistula had developed in spite of the healthy appearance at the site of the original extirpation. It is claimed for this method that it gives about 90% of satisfactory end-results, a figure approximately equal to that for partial gastrectomy with the retro-colic jejunal loop. It is right to point out that these two operations are not necessarily feasible alternatives, though there are, nevertheless, many cases which can be treated in either way. I do not think that there is anything to choose between the mortality of gastrectomy applied to cases which could equally well have been dealt with by wedge excision and gastro-jejunostomy, since one is necessarily dealing with ulcers of moderate size which are fairly easily mobilized and which are not very near the cardia. My personal experience of the operation amounts to only 84 cases but I employ it less and less and prefer gastrectomy.

3. Excision combined with Pyloroplasty. The scope of this operation in gastric ulcer is extremely limited since it necessitates that the lesion should be near the pylorus and that the duodenum should be of the capacious type so as to admit of free drainage after the completion of the plastic operation. It is very rare to find a gastric ulcer thus conveniently placed for extirpation in association with pyloric reconstruction, and even in such unusual cases partial gastrectomy will give a better end-result unless contraindicated by the obesity or decrepitude of the patient.

4. Sleeve-resection is an attractive operation when applied to hour-glass constriction and is less open to criticism than other conservative operations because the ulcer at the site of narrowing very rarely shows a tendency to malignant changes. It has the advantage of leaving the stomach little altered in general outline, though this is a deceptive appearance, since all longitudinal and oblique muscle fibres have necessarily been divided as well as the nerves on the lesser curvature. As a consequence the motility of the stomach is often impaired, recurrent constriction and ulceration at the same site are not uncommon and thus the eventual results are inferior to those following some form of gastrectomy.

5. Gastric exclusion can be employed for certain types of gastric ulcer on similar grounds to those which are indicated in duodenal ulcer. It has the great advantage over jejunostomy in that it shields the ulcer from the action of the gastric

secretion from more or less of the stomach according to the actual site of the ulcer and the level at which the stomach wall is divided. It is however, not a minor operation and to this extent is inferior to jejunostomy for highly debilitated patients. It is frequently possible to extirpate the excluded part of the stomach including the ulcer at an interval of a few weeks or months, and in the meantime the inflammation about the ulcer and neighbouring stomach wall will have subsided so markedly that the resection becomes much simplified. It is an operation based on sound principles but clear indication must be present for its use.

6. Partial gastrectomy is, in my opinion, the operation of choice for all gastric ulcers whenever it can be done without undue risk to the patient, or without the sacrifice of so large a segment of the stomach as to be out of all proportion to the size of the lesion. Whenever there is a doubt as to these two criteria then a local excision, or a wedge excision with gastro-jejunostomy should be preferred. The great virtue of partial gastrectomy, especially when performed with a retro-colic jejunal loop is the high percentage of cases of complete relief and the negligible risk of anastomotic ulceration. To this can be added the diminished chance of the development of carcinoma owing to the wide margin of gastric wall which can be removed beyond the site of the ulcer in nearly all cases. Concerning the best type of resection there seems much difference of opinion, but I have found almost uniformly good results from the method by which the side of the jejunum (brought through the meso-colon if adequate space is available) is anastomosed to the cut end of the stomach, the proximal jejunum being approximated to the lesser curvature. The advantages of this method over the Billroth II type of gastrectomy are perfectly clear—an unnecessary line of sutures to close the cut end of the stomach is obviated, and, what is more important, a satisfactory anastomosis is possible, however short the gastric stump. In Billroth's method, the new sub-terminal anastomosis is often extremely difficult to achieve and of inadequate size. There is little to be said in favour of the Billroth I operation for gastric ulcer. At best it can only be used for ulcers low down on the lesser curvature or near the pylorus, and, while the danger of leakage can be almost entirely obviated by proper technique, the stomach which has thereby acquired an appearance of anatomical reconstruction does not, in my opinion, function satisfactorily. The mobility of the stomach is impaired and ulceration often recurs, not to mention the inadequacy of the resection, should the ulcer already have undergone malignant changes, which is specially liable to be the case in ulcers near the pylorus. This is not the place to discuss in great detail the technique of partial gastrectomy but it is perhaps worth while to mention that the straightforward end-to-side anastomosis gives results in every way as good as those claimed for the so-called valvular anastomosis of Finsterer, in which a septum is provided at the upper part of the anastomosis which, it is suggested, directs the gastric contents into the distal jejunal limb. Such so-called valves are incapable of true valvular function and merely complicate unnecessarily the operative procedures. I do not find any appreciable advantage in the use of local anæsthesia for these operations except in special circumstances, usually dictated by the presence of co-existing pulmonary disease. I appreciate the fact that with leisurely methods of operating a general anæsthetic is less safe than a local anæsthetic. In other words, general anæsthesia combined with rapid operating is as safe or safer than local anæsthesia under the reverse condition. Complete gastrectomy is never necessary for peptic ulcer,

for, however high up the ulcer may lie it is always possible to conserve a portion of the fundus of the stomach, making the line of gastric section vertical or oblique so that, whereas the lesser curvature may have been completely or nearly completely extirpated, there is enough stomach wall left to permit of a satisfactory anastomosis. The mortality of partial gastrectomy is appreciably higher than that associated with short-circuiting methods, but if consideration be given to the added safeguard which it affords against malignant disease developing at or near the site of the ulcer, it is probably true that in the long run there is little to choose between the methods so far as mortality is concerned. Partial gastrectomy is preferable to short-circuiting operations in the freedom which it affords from recurrent ulceration, hæmorrhage and perforation, and also in the greater proportion of cases which are permanently relieved of all symptoms.

7. Jejunostomy. This is a method of treatment of gastric ulcer for those patients in extremely bad condition from prolonged malnutrition, repeated hæmorrhages, the presence of intercurrent diseases of a grave nature or for dealing with the largest and most fixed ulcers high up in the fundus. It, therefore, has a place which cannot be taken by gastric exclusion, which is suitable only for ulcers placed low enough to admit of gastric transection proximal to them. The disadvantage of jejunostomy is the prolonged and irksome régime necessitated by jejunal feeding and the difficulty of providing a well-balanced diet for an unlimited time under these conditions. Excellent results are, however, to be obtained in some cases particularly in the relief of symptoms, but there is some evidence that an indwelling duodenal tube can be made to serve the same purpose, thus obviating the operation and the complications which the latter introduces when, finally, radical surgical measures have to be instituted.

III. Jejunal, Gastro-Jejunal, and Recurrent Ulcers generally.

In these cases the indication, as for peptic ulcers of the primary type, is for medical treatment so long as this gives relief associated with clear evidence of the healing of the lesion. It is unwise to persevere with medical treatment if, in addition to the ulcer, there is a definite fistulous communication between jejunum and colon, or between the latter and the site of anastomosis, as I have never seen such a case heal spontaneously.

When it is clear that medical measures have failed (and delay in recognizing the fact may be followed by the appearance of a jejuno-colic fistula) the problem which has to be faced is two-fold. The jejunal or anastomotic ulcer must be cured and any fistula closed, and, in addition, the lesion for which the original gastro-jejunosomy was performed must not be allowed to recur. This completely invalidates the facile suggestion made so frequently that it is only necessary to undo the anastomosis and to restore the status quo in order to cure the condition. This ignores the fact known to all experienced gastric surgeons that such ulcers unless of trivial size, have interfered so much with the tissues at, or near, the anastomosis, that it is impossible to restore the two viscera to normal. Induration, cicatrization and ulceration have so modified the tissues that it is essential to do more than merely detach the viscera and resuture the gaps. So far as the stomach is concerned sufficient tissue can be excised from the neighbourhood of the anastomosis to permit of a reasonably satisfactory gastric function subsequently, but the gap in the jejunum is usually treated by excision of the damaged segment with end-to-end anastomosis if, as should be the case, a sufficiently long jejunal

loop is available. Fortunately the no-loop anastomosis is no longer favoured by most surgeons. When, however, this restoration of stomach and jejunum has been completed there is nothing whatever to prevent recurrence of the gastric or duodenal ulcer for which operation was originally undertaken. It is this fact which indicates the necessity to complete the operation, not by resuture of the stomach, but, after resection and end to end anastomosis of the jejunal gap, to carry out the steps necessary for partial gastrectomy, so that the ulcer-bearing area of duodenum or stomach, together with the site of anastomosis, are both extirpated. This is followed by anastomosis of the stomach to the jejunum distal to the original site of union. It is well to perform an ante-colic anastomosis if there is a short meso-colon (and this is often present following the cicatricial changes associated with the complication) as the close proximity of the new union to the colic wall is undesirable.

If a *gastro-jejuno-colic fistula* complicates the jejunal ulcer it is often sufficient to separate the colon from the inflammatory mass and to suture the defect in its wall and then to complete the operation in the way described above. The two-stage method by which the affected portion of the colon is "excluded" and at a later date a partial gastrectomy is carried out, is suitable only when the fistula cannot be closed simply, i.e., without colic resection.

The surgeon's responsibility does not cease when the necessary operative treatment is concluded. Not only must he be alive to the possibility of immediate complications but also those comprised under the term *sequelæ*.

IMMEDIATE COMPLICATIONS.

Of the immediate complications of operation for peptic ulcer the following are the most important:—

1. Duodenal fistula.
2. Hæmorrhage.
3. Gastro-intestinal obstruction.

Duodenal fistula, although rare, may follow especially in patients who have been debilitated by want of rest, starvation and anæmia. The rate of healing under these conditions may be slower than the survival time of the catgut used for the sutures so that leakage may supervene at the end of a week or ten days. It is best treated by continuous suction drainage from the wound combined with jejunostomy for feeding purposes.

Hæmorrhage is usually reactionary and due to errors of technique. If considerable, it is far better to re-open the abdomen at once, providing for continuous blood transfusion meanwhile, and to incise the gastric wall, seeking and under-running the bleeding points from the mucous aspect of the suture line.

Gastro-intestinal obstruction is the commonest post-operative complication. In a minor degree it may be due to oedema at the site of the new stoma, particularly in pyloroplasty or gastro-duodenostomy, in which case it responds to gastric lavage and the withholding of gastric feeding for a day or two. The serious cases are usually due, in my experience, to interference with the afferent or efferent segments of the jejunal loop, frequently at the meso-colic level. Much can be done to prevent these obstructions by attaching the meso-colon to the gastric wall so

that the anastomosis lies in the greater sac of the peritoneum, by carrying out entero-anastomosis between the segments as a part of the original operation, and by proper mobilization of the ligament of Treitz. When the obstruction unhappily develops after operation and persists, it is usually necessary to carry out an entero-anastomosis unless the obstruction can be shown to be due to some relatively simple cause which can be dealt with by simple mobilization of an adherent coil of jejunum, etc.

SEQUELÆ.

The later complications of operation for peptic ulcer are largely preventable by a careful dietetic and hygienic régime during the ensuing six to twelve months. The treatment of recurrent ulceration has already come under review but anæmia of the secondary type is sometimes a troublesome feature and, although I have seen it very infrequently, except after complete gastrectomy, the possibility of it indicates that (1) caution should be exercised in the extent of stomach removed and (2) as conservative an attitude as the condition justifies should be followed. Some surgeons claim that the Billroth I operation and Schoemaker's modification of this are less likely to result in severe anæmia, but it is not in connexion with lesions amenable to these two operations that post-operative anæmia is likely to arise, but rather with the ulcer high on the lower curvature which prompts a too extensive gastrectomy.

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