

RECURRENT PERFORATION OF PEPTIC ULCERS

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THE recurrence of an acute perforation of a duodenal ulcer in one of my patients led to the following questions. How frequently does this accident occur? Could any form of treatment have been used at the first operation that would have prevented the second perforation? Standard works on the subject were consulted but failed to give an answer to these questions. A partial review of the literature was made. The reports of 4,813 cases of perforated peptic ulcer were studied. A brief résumé of the data collected is here presented.

CASE REPORT.*—E. N., No. 35,279, a forty-five-year-old white railroad foreman, was admitted to the hospital May 24, 1930, with a complaint of severe upper abdominal pain of fourteen hours' duration.

Present Illness.—For the past fifteen years the patient has had intermittent periods of epigastric distress coming on two hours after meals, associated with gaseous eructation, burning and nausea. This has been relieved by food, soda or enemata. There have been no vomiting or hæmatemesis. Three months before admission he had a bilateral herniotomy done in Cleveland without alteration in digestive symptoms.

Twenty-four hours before admission he was given a barium breakfast for gastrointestinal röntgenograms. He remained in the physician's office the greater part of the day for study. He was told that the X-rays showed "a ptotic dilated stomach with a filling defect typical of ulcer."

At seven that evening he was suddenly seized with a severe epigastric pain which was sharp and tearing in character and did not radiate. The pain was associated with vomiting and prostration. He was brought to the hospital at 9:35 A.M., fourteen and one-half hours after the onset of symptoms.

Physical Examination.—Temperature, 38.2°; pulse, 96; respirations, 34; blood-pressure, 138/100.

The patient was in evident distress. He held himself immobile, had a drawn, anxious expression, was sweating and breathed with shallow rapid respirations. The general physical examination was negative. The abdomen showed retraction below the costal margin with generalized board-like rigidity. There was exquisite tenderness with rebound tenderness over the entire abdomen slightly more marked in the right upper quadrant. Shifting intra-abdominal fluid could not be demonstrated. The liver dullness was not obliterated. Rectal examination showed generalized pelvic tenderness.

Laboratory Findings.—Hæmoglobin, 98 per cent.; red blood-cells, 4,330,000; white blood-cells, 25,400. *Urine.*—Dark yellow. Specific gravity, 1026; sugar, 0; albumin, heavy trace. *Mic.*—Many granular casts with occasional white blood-cells.

Impression.—Perforated peptic ulcer.

Operation.—At 10:35 A.M., fifteen and one-half hours after perforation, under ether anæsthesia, the abdomen was opened through an upper right rectus incision. As soon as the peritoneum was incised, turbid fluid welled out of the wound. A culture was

* This patient was referred to the clinic through the courtesy of Dr. Harold Trott, of Hemlock, New York.

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taken. The peritoneum was everywhere reddened and covered with fibrin. There was a perforation one-half inch in diameter on the anterior surface of the duodenum just beyond the pylorus. The opening was closed with through-and-through silk sutures; a second row of inverting mattress sutures was placed above this. Exudate and food particles were carefully aspirated from the abdomen. Because of the long interval between perforation and operation, a drain was placed in the pelvis and brought out through a stab wound in the right lower quadrant. The upper abdominal incision was closed in layers with a small rubber tissue drain to the subcutaneous tissues. The patient stood the operation well and left the table in fair condition.

Post-operative Course.—The patient was given 500 cubic centimetres, 10 per cent. glucose by vein and 2,000 cubic centimetres normal saline by hyperdermoclysis on his return to his room. For the first two post-operative days fluids were supplied by subcutaneous administration. Fluids by mouth were taken on the third day and soft solids on the sixth post-operative day. The rectus incision healed by first intention. The stab wound drained profusely for seven days, then closed and healed. The culture taken at operation showed no growth. The patient's general condition being satisfactory and his wounds well-healed, he was allowed up on his fourteenth post-operative day and was discharged on a modified diet three days later.

Final Diagnosis.—Perforated duodenal ulcer.

Second Admission.—The patient was readmitted October 1, 1931. He stated that he had been perfectly well for more than year after his previous operation. Consequently he had not adhered to the diet prescribed. In July, over two months before admission, he had had a return of epigastric distress with eructations and burning coming on about two hours after meals. He consulted his physician, who prescribed a modified diet and powders. This gave some relief.

On the day of admission at 12:30 P.M. he had a sudden severe epigastric pain just to the right of the mid-line. The pain continued and he entered the hospital four and three-quarter hours after its onset.

Physical Examination.—Temperature, 36.4; pulse, 88; respiration, 26. Blood-pressure, 128/78. The findings were similar to those at his previous admission. A diagnosis of recurrent perforated duodenal ulcer was made and operation advised.

Operation.—Under ether anæsthesia, the abdomen was opened through a paramedian incision. The peritoneal cavity contained many adhesions which when freed allowed escape of a large quantity of food, turbid fluid and gas. The stomach was greatly distended, the pylorus was fibrosed and constricted. Just beyond the pylorus, on the anterior surface of the duodenum, was a perforation one-quarter inch in diameter. This perforation was in exactly the same location as the previous one. The perforation was closed with a double layer of mattress sutures of silk. Since a definite organic pyloric stenosis existed and since the patient's condition was favorable, a posterior gastro-enterostomy was done.

The patient had a satisfactory convalescence until his fourteenth post-operative day. At this time he had a right-sided pulmonary infarct. He was just recovering from the effects of this when, six days later, he had a second infarct. Subsequently a bronchopneumonia developed in the right lung. Blood cultures showed no growth. Repeated examinations revealed no evidence of subdiaphragmatic or subhepatic abscess. The temperature remained elevated for sixteen days. At the end of this time it returned to normal. The lung signs cleared. He was allowed out of bed on his forty-third post-operative day and discharged in good condition forty-nine days after operation.

Final Diagnosis.—Recurrent perforation duodenal ulcer; pulmonary infarcts (multiple); bronchopneumonia, right.

Incidence of Recurrent Perforation of Peptic Ulcer.—The reports of 4,813 cases of perforated peptic ulcer were examined and thirty-three instances of recurrent perforation were found. This gives an incidence of

0.69 per cent. of recurrent perforation in perforated ulcer. This figure may be a little low since some authors did not mention recurrent perforation. Instances of it may have occurred which were not recorded.

Can any procedure be used at the time of the first operation which will prevent subsequent perforations?—In its essentials this question is reduced to that of the end-results of surgical management of acute perforated ulcer. For, if ulcers recur after surgical treatment for perforation, then that recurrence renders them liable to re-perforation.

It is desirable, then, to summarize the data related to the results of operative treatment of perforated peptic ulcer. The factors influencing the immediate mortality are:

(1) *Age*.—Very young and very old patients do not withstand the ordeal of perforation as well as do those in the middle groups of life. On the other hand, 71 per cent. of perforations occur between the ages of twenty and fifty years, so that in the majority of patients age is not a conditioning factor.

(2) *The general condition of the patient*.—The presence of cachexia, anæmia, cardiovascular or nephritic lesions or debilitating diseases such as tuberculosis may render the individual incapable of surviving the perforation.

(3) *Character of the lesion*.—The perforation of gastric ulcers results in a higher mortality than does that of duodenal ulcers. Large perforations are more serious than small openings.

(4) *Interval between perforation and operation*.—The elapsed time is the most important of any of the conditioning factors. The mortality has been repeatedly shown to be directly proportional to the interval before operation. The surgeon is powerless to overcome the handicap of a delayed operation. The greatest responsibility rests in the hands of the physicians who first see the patient. The statistics of Dineen well illustrate the importance of early operation.

Ninety-four cases operated upon under six hours, mortality 7 per cent.

Thirty-two cases operated upon between six to twenty-two hours, mortality, 31 per cent.

Sixteen cases operated upon after twenty-two hours, mortality 81 per cent.

The aforesaid factors influence the mortality prior to operation. There is nearly universal agreement as to their importance. No such united opinion exists among surgeons as to relative merits of different operative procedures. There is only one positive indication that is agreed upon by all. The opening in the bowel must be closed. When this is not done the mortality is very high. The incomplete procedures which have been attempted include (a) simple drainage; (b) packing or tamponade of perforation with drainage; (c) jejunostomy with drainage; (d) gastrostomy or enterostomy by a tube inserted in the perforation.

These halfway measures fail to meet the one clear-cut indication of operation. They do not close the hole in the bowel.

Aside from the agreement on this principle of closure there is a wide divergence of opinion as to what constitutes the operation of choice for per-

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forated peptic ulcer. Each procedure has its advocates. The operations used are: (a) Simple closure of the perforation; (b) excision of the ulcer with closure; (c) excision of the ulcer with pyloroplasty; (d) closure of the perforation with gastroenterostomy; (e) excision of the ulcer with subtotal gastrectomy. For the first two it would seem immaterial whether the ulcer was excised or closed so long as a tight approximation was obtained. The addition of pyloroplasty to the excision would appear on theoretical grounds to be an ideal procedure. It eliminates the perforated ulcer and at the same time creates a more physiological safeguard against recurrence. In our experience it has not fulfilled expectations and has given poor end-results. Hinton has recorded the same observation.

The use of subtotal gastrectomy for the treatment of acute perforated ulcers has been advocated by European surgeons. Granting that gastric resection is often valuable in the treatment of gastric ulcer, it would appear illogical to use it in the presence of a perforation. To do so subjects an already handicapped patient to an extensive major operation. It has not been accepted in this country.

The greatest field of debate has been between the advocates of simple suture and suture plus gastroenterostomy. Guthrie attempted by a questionnaire to find out the consensus of opinion on this topic. One hundred fifty-two answers were received from prominent surgeons throughout the country. Three used pyloroplasty. Of the remainder, twenty-two (14 per cent.) did a gastroenterostomy as a routine, sixty-four (42.1 per cent.) never did a routine gastroenterostomy at the time of perforation, and sixty-three (41.3 per cent.) occasionally added gastroenterostomy to closure of the perforation. It would seem that the correct solution rested with the latter group. In the great majority of instances simple closure of the perforation is sufficient. There are occasional cases where gastroenterostomy is indicated irrespective of the perforation. The statistics reviewed show clearly that the added manipulation of a gastroenterostomy is well tolerated by a robust patient operated upon within twelve hours of perforation. Hence, if there is reason to do the procedure, such as for organic pyloric stenosis, and if the condition of the patient is favorable, there appears to be no contraindication to it. The treatment indicated for the perforation is its closure, that for the pyloric stenosis is gastric drainage with a gastroenterostomy. If the two can, with impunity, be combined at one operation, then it would appear logical to do so. This is entirely different from the proposition that gastroenterostomy should be used routinely in the treatment of perforated ulcers. Such a thesis has little factual basis.

Recurrent Perforation.—These data on acute perforated peptic ulcers give a basis for consideration of their recurrent perforation.

Mortality.—In the group of thirty-three cases of reperforation there were three deaths. The cause of death in one of these cases (Gibson²²) is given as the “result of psychosis.” This gives a mortality rate of 9 per cent. However, these thirty-three cases represent a total of seventy-five acute perfora-

tions. Thus the mortality per perforation is 4 per cent. while for perforated ulcers in general it is 27 per cent. Apparently once a patient survives acute perforation of an ulcer he is less apt to die from subsequent perforations. Some factors contributing to this result are:

(1) The presence of adhesions which may limit the extravasated material to localized pockets rather than permitting dissemination through the peritoneal cavity.

(2) The possible increase in the local tissue immunity of the peritoneum from the previous inflammation.

(3) Perhaps most important is the fact that the patient has had this experience before, he makes his own diagnosis, and presents himself for treatment early.

The Influence of Previous Surgical Treatment on the Incidence of Reperforation.—Recurrent perforation of an ulcer is merely one manifestation of recurrent ulceration. As such its incidence should correlate with that of recurrent ulcer after surgical treatment of a perforation. However, in the cases studied there were no instances of reperforation following the use of pyloroplasty or subtotal gastrectomy. These procedures were used in only about 6 per cent. of cases, so this fact is interpreted to lack of data rather than to the prophylactic properties of these operations. Both, when used for non-perforating ulcer, lead to instances of recurrent ulceration. If they should be used extensively for treating the acute perforation of ulcers, then occasional cases of recurrent ulceration would be expected and these in turn would be liable to reperforation.

Johnson found that in 1,056 cases of perforated ulcer, 710 (67.2 per cent.) were treated by suture, 281 (26.6 per cent.) by suture and gastroenterostomy and sixty-five (6.2 per cent.) by all other methods. In the thirty-three cases of reperforation, twenty-four (72.7 per cent.) were treated by suture, eight (24.3 per cent) had an added gastroenterostomy, and in one (3 per cent.) the method was not stated. It is seen that the percentage of reperforation after these surgical procedures approximates the respective incidence of their use.

There is one additional fact worthy of note. In only one of the twenty-four cases of reperforation after suture was there a total of more than two perforations. This one case had three acute perforations. In the eight cases following an original suture and gastroenterostomy there were five cases who reperforated three or more times. In three of these a jejunal ulcer was responsible. It is ironical to note that one of the cases was originally operated upon by Deaver,¹² formerly the foremost advocate of routine gastroenterostomy in the treatment of acute perforated ulcers. Following his original operation, this patient survived two subsequent perforations that were treated by suture. It would seem, therefore, that the recurrent perforations after gastroenterostomy are more apt to be multiple and hence of more serious consequence. Two of the three deaths in the series occurred among the eight patients who had had a primary gastroenterostomy.

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SUMMARY

(1) A case of recurrent perforation of a duodenal ulcer is recorded.

(2) The reports of 4,183 cases of perforated peptic ulcer were examined and thirty-three instances of re-perforation were found. This gives an incidence of 0.69 per cent., or an average of one case in 145 cases of acute perforated ulcer.

(3) In the group of thirty-three recurrent perforations, there were three deaths, a mortality of 9 per cent. The group represents a total of seventy-five acute perforations, so that the mortality per perforation is 4 per cent. This is much lower than that for acute perforated ulcers in general, which have an average mortality rate of 27 per cent.

(4) In the thirty-three cases of re-perforation, twenty-four (72.7 per cent.) were originally treated by simple closure, eight (24.3 per cent.) had an added gastroenterostomy, and in one (3 per cent.) the method was not stated. This correlates with the statistics for the management of acute perforated peptic ulcers which shows 67.2 per cent. treated by simple closure, 26.6 per cent. by closure and gastroenterostomy and 6.2 per cent. by all other methods.

(5) Only one of the twenty-four cases of re-perforation treated by suture had more than two acute perforations. Of the eight patients who had a primary gastroenterostomy, five perforated three or more times. A jejunal ulcer was responsible in three of these cases. Two of the three deaths in the series of re-perforation occurred in this group which had had a primary gastroenterostomy.

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* These authors report cases of recurrent perforation.