Gastrocolic Fistulas Due to Cancer: Report of a 16-year Survival and a Review of the Literature

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Report of a 16-year Survival and a Review of the Literature

Susan Adelman, M.D.,* and Joseph L. Ponka, M.D.**

A case of 16-year survival following resection of a malignant gastrocolic fistula is reviewed. The patient's post-gastrectomy anemia is discussed. The world literature of 92 cases of malignant gastrocolic fistulas reported since 1925 is reviewed.

Although a carcinoma initially presenting as a gastrocolic fistula may look unpromising to surgeons, such a case should not be considered hopeless. This report is of a patient who is a 16-year survivor of a resected gastrocolic fistula due to carcinoma of the stomach.

We have found in the literature only 18 survivals of one or more years, and three of five or more years. Of these, two died at nine years. Our patient is 16 years post-surgery without evidence of metastases. His only problem has been a post-gastrectomy megaloblastic anemia, which we will discuss.

We will also review 92 cases of gastrocolic fistula secondary to malignancy reported since 1925, when Verbrugge published his series of 121.

Gastrocolic fistulas are usually of malignant origin, as contrasted with gastrojejunal fistulas which usually are the results of perforating anastomotic ulcers following surgery for peptic ulcer. Other reported etiologies of gastrocolic fistula have included tuberculosis of the stomach or colon; ulcerative colitis, gastric reticulosarcoma; perigastric abscess opening into the stomach and colon simultaneously; pancreatic tumors; perforated diverticulum of the colon; syphilis, and, most frequently, postoperative peptic ulcers. Rarely, they may result from benign gastric ulcer in a patient who has not undergone an operation.

The symptoms of gastrocolic fistula are those of the underlying disease, plus some combination of diarrhea, weight loss, malnutrition, fecal vomiting and foul or fecal eructation. The diagnosis is confirmed by barium enema with from 85 to 100% success, and by barium swallow with 26 to 33% success. Moisse notes that the fistula secondary to peptic ulcer appears as a clear channel, and a fistula through tumor is irregular, often admitting the passage of material in one direction only. Where fistulas of benign origin admit unidirectional flow only, he postulates anatomic irregularities comparable to those found in tumor.

Operative procedures employed for these fistulas have been highly individual, varying from one stage to three stages, and the goal has varied from

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palliation to cure. A staged operative procedure was used in the patient reported in this paper.

**Progress Report**

The patient was first seen at Henry Ford Hospital in February, 1954, at age 57. He gave a history of a 60-pound weight loss in the past year, fecal vomiting, and gaseous eructations. He appeared chronically ill, with a blood pressure of 94/60. There was a nontender left upper quadrant mass measuring 8 by 10 cm. The hemoglobin was 10.6 gm/100 cc. A gastrocolic fistula was demonstrated by barium enema.

Initially, a right transverse colostomy was performed and liquified whole food feedings were begun through a long tube passed into the jejunum beyond the fistula. On March 13, he underwent a total gastrectomy, omentectomy, splenectomy, transverse colectomy, partial pancreatectomy, and esophagoduodenostomy. The colostomy was closed on June 15.

The pathologic diagnosis was adenocarcinoma of the greater curvature of the stomach with a fistula to the transverse colon. No metastases were seen in the accompanying lymph nodes, spleen or pancreas.

Follow up at six-month intervals showed the patient maintaining his weight, appetite, and feeling of well-being. At no time was there adenopathy or evidence of recurrent cancer.

The patient discontinued his follow-up visits and also his intake of iron after February, 1960. He was next seen in the emergency room on February 6, 1965, with a three-to-four-week history of progressively increasing swelling of the legs. He was pale, ill, and in moderately severe respiratory distress. The blood pressure was 90/60, pulse 88, and there was a 4+ pitting edema of the legs and indication of decreased vibratory sensation of the toes. The hemoglobin was 6.9 gms/100 cc. The marrow biopsy was read as diagnostic of advanced antipernicious anemia factor deficiency secondary to post-gastrectomy malabsorption. Serum iron was 93 mg/100 cc (N+ 60-120), LDH 1960 units, carotene 60 units/cc, reticulocyte count 1.3%, and stools negative for occult blood. Radiologic examination of the chest, colon and upper gastrointestinal tract showed no recurrence of carcinoma. The patient improved and lost 9.5 lbs on salt restriction, diuretics, parenteral B₁₂ and digitoxin. He was discharged 12 days later with a hemoglobin of 7.8 gms/100 cc.

He was given an out-patient regimen comprising digoxin, oral iron, multivitamins and vitamin B₁₂ 100 mcg monthly, but the patient discontinued his visits after two months. When seen on March 8, 1965, his hemoglobin was 8.9 gms/100 cc. Two years later, he was readmitted (March 9, 1967) for symptoms similar to those of his last admission. At this time, the blood pressure was 110/60, and he had a beefy red tongue and distinctly decreased reflexes bilaterally. The vibration sense and equilibrium were intact. The hemoglobin was 8.7 gms/100 cc. Bone marrow was again diagnostic of megaloblastic anemia. Small bowel biopsy showed a nonspecific enteritis. Films of the chest, bone survey, upper bowel and colon were negative for recurrence of tumor. He was discharged March 26, and again placed on the vitamin replacement regimen.

The patient was readmitted two years later (June 4, 1969) for biopsy of an abdominal wall mass. Examination showed the tongue was smooth and red, and the reflexes were bilaterally equal. The hemoglobin was 16.2 gms/100 cc. The WBC was 16,900/cu mm with occasional target cells and rare basophilic stippling and the mass was found to be a benign desmoid tumor. Again all films failed to show recurrence of malignancy. He was discharged 15 days later on his previous medical regime, to continue follow-up in the clinic.

**Megaloblastic Anemia**

Many reports and discussions correlate a megaloblastic anemia with the post-gastrectomy state.⁰⁻¹² We had ample opportunity to watch the ebb and flow of this complication in the unusually long follow-up period of our erratic patient.

In our patient the first evidence of pernicious anemia was found in the peripheral smear six years after surgery, and the acute form of the condition was first seen 11 years after surgery. Bone marrow studies were accomplished in 1965 and 1967 and are classic for pernicious anemia. Taking into account the patient’s tendency not to appear at the clinic or hospital...
June 5, 1969: Findings from the upper gastrointestinal x-rays show that the barium reaches the small intestine with ease. There is no evidence of displacement or destruction. The small arrow indicates the distal esophagus.
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until his symptoms were far advanced, this still represents a significantly delayed onset of the condition.

This observation is in accord with the conclusion drawn by Harvey after study of 28 cases of B12 deficiency following total gastrectomy. He found that macrocytosis first appeared in six months to seven years (average 2.5 years) following surgery. Anemia then appeared, accompanied by glossitis and various other gastrointestinal signs in six months to nine years (average 4 years). The anemia was defined as a hematocrit of less than 37%. Megaloblasts finally appeared in the marrow at two to 10 years (average 4.5 years), and central nervous system symptoms began at six to eight years. He concluded that vitamin B12 deficiency would be inevitable after total gastrectomy if the patient lived long enough.

Between Harvey and MacLean at least 73 cases of megaloblastic anemia following total gastrectomy are reported. The chapter by Ley in Winterrode also reports 34 cases of the same anemia after partial gastrectomy and 15 cases following gastroenterostomy. MacLean emphasizes that in many instances the operation was performed for gastric carcinoma and that "Gastric cancer occurs in patients with pernicious anemia at least 18 times more frequently than expected in the general population of the same age group." He suggests that many of these patients would have developed pernicious anemia whether or not they had had gastrectomies, and that perhaps the resection of any gastric mucosa capable of producing even small amounts of free acid might be enough to change a partial deficiency to a complete one.

It is interesting to note that macrocytic anemia has been recorded secondary to gastric carcinoma itself, without gastrectomy. In addition, there have also been reports of myelophthisic anemias, hemolytic anemias, and toxic or myelopathic anemia with gastric cancer. These are all completely unresponsive to hematinic agents, however.

The etiology of pernicious anemia after gastrectomy has long been argued in the literature. Pack and McNeer's summary of the recent work using radioactive vitamin B12 made it clear that the defect is entirely analogous to that in patients with classic pernicious anemia. The anemia then appears to be specifically due to the removal of the gastric secretions, and not due to mechanical motility disturbances. They feel that the difference between a subtotal and total gastrectomy is only quantitative. It also follows that anemia should be inevitable if enough gastric mucosa is removed and if the patient lives long enough. However, the quoted incidence varies from a 60% occurrence of macrocytic anemia to none.

Explanations for the cases which failed to develop megaloblastic anemia after gastrectomy have included: too short a survival period; incomplete resection of gastric mucosa; and the treatment of post-surgical patients with compound hematinics containing folic acid or B12. It should be remembered that the normal liver stores 75,000-225,000 mcg of vitamin B12, which is usually used at a rate of 1 mcg per day. At this rate, the liver stores should last 2.6 years.

The usual recommended treatment is 30-50 mcg of vitamin B12 daily.
Colon study June 6, 1969: Findings from barium enema examination show the present appearance of the colon; it is of excellent diameter, but the shortening is obvious.
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folic acid and ascorbic acid.\textsuperscript{12} Certainly, our patient responded dramatically to this treatment. Over the course of one two-week hospitalization, his reticulocyte count rose from 1.3% to 12.1%. Since he failed to continue his medications or his follow-up visits, we had another opportunity to see the full-blown megaloblastic anemia picture. Placed on the same medical regime, his hemoglobin rose in three weeks from 8.7 to 10.9 gms/100 cc. Apparently, he too was impressed with this treatment, because he then appeared regularly for out-patient visits and adjustments in treatment. His hemoglobin remained at a highly satisfactory 15 to 16 gms level.

Review of the Literature

Gastrocolic fistulas forming secondary to malignancy are considered rare, but an intensive search of the world literature shows that they are not. Since the 121 cases compiled by Verbrugge in 1925,\textsuperscript{2} some 40 reports have been published, coming from 12 different countries. A number of other papers have alluded to cases without supplying details.

In this review, the only papers tabulated were those in the Index Medicus and their bibliographies. These report 92 cases since 1925,\textsuperscript{3}, \textsuperscript{8}, \textsuperscript{13-57} all of which seemed to be of patients with gastrocolic fistulas secondary to malignancy. Of these, 66 were reported in enough detail to be suitable for study.

We grouped the information given in these 66 case reports into six categories, and attempted to draw some meaningful correlations. The data are grouped into date of diagnosis and treatment, sex, age, diagnosis and site of origin, surgical procedure or lack thereof, and survival. The date of diagnosis was in all cases in the same year as any operative procedures performed.

In classifying surgical procedures, no attempt was made to correlate the details of resection, staging, or reconstructive procedures because there were too many variables to be amenable to comparison. We classified the cases into those not operated upon, those given procedures designed for palliation, and those operated upon for cure.

Date: The cases were arbitrarily divided pre- and post-1945 because after World War II began the antibiotic era. The first group includes 25 cases, and the second has 41. Two cases do not specify the date.

Sex: There were 12 women and 52 men and two patients whose sex was not specified.

Age: Ages are summarized in Table I.

<table>
<thead>
<tr>
<th>AGES OF PATIENTS STUDIED</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGES</td>
</tr>
<tr>
<td>20-30</td>
</tr>
<tr>
<td>30-40</td>
</tr>
<tr>
<td>40-50</td>
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<tr>
<td>50-60</td>
</tr>
<tr>
<td>60-70</td>
</tr>
<tr>
<td>70-80</td>
</tr>
<tr>
<td>Unknown</td>
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</tbody>
</table>
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Diagnoses: There were 18 adenocarcinomas of the stomach and 38 adenocarcinomas of the colon. One case was an adenocarcinoma whose site was indeterminable as between stomach and colon. This was grouped, for purposes of correlation, with four other cases which were reported as showing separate primaries in stomach and colon. Five other cases were included, but excluded from any correlations with survival: one reticulosarcoma of the stomach, one carcinoid of the colon, one carcinoma of the pancreas, one Hodgkin's lymphoma of the colon, and one Hodgkin's lymphoma whose site of origin was not known. These cases are summarized in Table II.

<table>
<thead>
<tr>
<th>DIAGNOSES OF PATIENTS STUDIED</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Adenocarcinoma of stomach</td>
<td>18</td>
</tr>
<tr>
<td>Adenocarcinoma of colon</td>
<td>38</td>
</tr>
<tr>
<td>Compatible with both adenocarcinoma of stomach &amp; colon</td>
<td>5</td>
</tr>
<tr>
<td>Reticulosarcoma of stomach</td>
<td>1</td>
</tr>
<tr>
<td>Carcinoid of colon</td>
<td>1</td>
</tr>
<tr>
<td>Carcinoma of pancreas</td>
<td>1</td>
</tr>
<tr>
<td>Hodgkin's lymphoma of colon</td>
<td>1</td>
</tr>
<tr>
<td>Hodgkin's lymphoma, site unknown</td>
<td>1</td>
</tr>
</tbody>
</table>

Surgical procedure: These are as summarized in Table III.

Survival: The lengths of survival or follow-up are summarized in Table IV.

Correlation with sex: There was no correlation between sex of patient and date of diagnosis, age, or length of survival, except that no women in the list had cancer of the stomach. All the women had carcinoma of the colon, except for one, whose carcinoma was undetermined positively as gastric or colonic. There were also no women among those undergoing no surgery and only two among those receiving palliative procedures. Owing to the small number of females in our series, we hesitate to attach any great significance to these findings.

Correlation with age: There was no significant correlation of age with site of origin, length of survival or whether or not the patient was operated for cure. The minimal increase in number of older patients in the recent series may be because there are now more older people in the population generally.

Correlation with operative procedure: Of the 24 patients undergoing either no surgery or only a palliative procedure, none survived one year. Of these, 22 survived less than six months, one had poor follow-up, and one died of his disease at one year. There is no significant correlation between either the failure to perform a curative procedure and the site of origin or the failure to perform a curative procedure and the year of diagnosis (Table III). There is a significantly decreased survival in those patients where there was no attempt to cure their disease. It is not at all clear, however, whether they were denied curative operations because they appeared to be so close to death.

Correlation of survival with date of diagnosis: For this comparison, we confined our study to gastric and colonic adenocarcinomas. We also rejected all cases who were followed for less than one year. We included those cases who were reported as living
<table>
<thead>
<tr>
<th>PROCEDURE</th>
<th>NUMBER</th>
<th>THROUGH 1945</th>
<th>AFTER 1945</th>
<th>ORIGIN</th>
<th>NUMBER</th>
<th>SURVIVAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>No surgery</td>
<td>14</td>
<td>8</td>
<td>6</td>
<td>Stomach</td>
<td>8</td>
<td>&lt; 1 yr.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Colon</td>
<td>5</td>
<td>&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pancreas</td>
<td>1</td>
<td>&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hodgkins</td>
<td>2</td>
<td>&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Stomach</td>
<td>3</td>
<td>&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Colon</td>
<td>5</td>
<td>&quot;</td>
</tr>
<tr>
<td>Palliative</td>
<td>10</td>
<td>2</td>
<td>8</td>
<td>Stomach</td>
<td>7</td>
<td>2 &gt; 1 yr.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Colon</td>
<td>27</td>
<td>14 &gt; 1 yr.</td>
</tr>
<tr>
<td>Attempted Cure</td>
<td>41</td>
<td>14</td>
<td>27</td>
<td>Stomach or Colon</td>
<td>5</td>
<td>2 &gt; 1 yr.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Gastric reticul-osarcoma</td>
<td>1</td>
<td>&lt; 1 yr.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Carcinoid of Colon</td>
<td>1</td>
<td>Poor follow-up</td>
</tr>
<tr>
<td>Unknown</td>
<td>1</td>
<td>1</td>
<td></td>
<td>Stomach</td>
<td>1</td>
<td>&lt; 1 yr.</td>
</tr>
</tbody>
</table>
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for one or more years after operation (or diagnosis, if there was no operation) since these results looked significant in the face of the overall paucity of long term survivors.

**TABLE IV**

<table>
<thead>
<tr>
<th>Follow-up</th>
<th>Alive</th>
<th>References for Survivors</th>
<th>Dead</th>
<th>Unknown*</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 mos.</td>
<td>21**</td>
<td>1, 13, 16-23</td>
<td>35</td>
<td>10</td>
</tr>
<tr>
<td>1 yr.</td>
<td>18</td>
<td>1, 16, 17, 19, 21, 23, 24</td>
<td>37</td>
<td>15</td>
</tr>
<tr>
<td>2 yrs.</td>
<td>14</td>
<td>1, 16, 17, 19, 21, 24</td>
<td>39</td>
<td>17</td>
</tr>
<tr>
<td>3 yrs.</td>
<td>10</td>
<td>1, 16, 17, 19, 21, 24</td>
<td>42</td>
<td>19</td>
</tr>
<tr>
<td>4 yrs.</td>
<td>5</td>
<td>1, 16, 17, 24</td>
<td>43</td>
<td>20</td>
</tr>
<tr>
<td>9 yrs.</td>
<td>3***</td>
<td>1, 16, 24</td>
<td>45</td>
<td>20</td>
</tr>
<tr>
<td>16 yrs.</td>
<td>1</td>
<td>1</td>
<td>45</td>
<td>20</td>
</tr>
</tbody>
</table>

* Follow-up on the patients in this column was discontinued at an arbitrary time before death.
** One patient had known metastases by 7 months.
*** One patient died at 9 years with known metastases and one died at 9 years without metastases.

Plotting survival against date of initial diagnosis and treatment seems to indicate a trend toward longer survival in more recent years. The earliest long survival was for 3½ years following resection for carcinoma of the colon by Gabridzhanian21 in Russia in 1924. All other survivals for one or more years were after 1935, and 15 of the 18 were diagnosed after 1945. This seems to validate 1945 as the dividing line between the two main periods of our study.

**Correlation of survival with site of origin:** Comparing the length of survival with the site of origin again reveals a significant trend (Table V). Of those patients dying in less than six months from initiation of treatment, 14 were gastric carcinoma and 16 were colonic, two remaining indeterminate. Of this total, 17 cases occurred in or after 1946 and 15 in or before 1945, indicating little difference between the two eras. One of the patients with indeterminate carcinoma died in nine years with metastases.1 Two with gastric carcinoma survived for one year;16 one dying of other causes at five years and the other living for 16 years without metastases. It should be noted that the original report listed the patient who died at five years as having colonic carcinoma, but a closer review discloses the lesion to be gastric carcinoma. These patients with cancers whose origin is colonic, in contrast, show a steady attrition over the years. There are 14 one-year survivals, dropping to 11 two-year, 7 three-year, 2 four-year and 1 nine-year survival. The latter was free of metastases at death. These figures suggest that the survival to one year carries a more reliable long-term prognosis for gastrocolic fistulas secondary to gastric carcinoma than for those secondary to carcinomas of the colon.

**TABLE V**

<table>
<thead>
<tr>
<th>Survival vs. Site</th>
<th>Stomach</th>
<th>Colon</th>
<th>Both</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 6 mos.</td>
<td>14</td>
<td>16</td>
<td>2</td>
<td>35</td>
</tr>
<tr>
<td>1 yr.</td>
<td>2</td>
<td>14</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>2 yrs.</td>
<td>2</td>
<td>11</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>3 yrs.</td>
<td>2</td>
<td>7</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>4 yrs.</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>9 yrs.</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

**Summary**

A surprising total of 92 cases of gastrocolic fistulas have been reported in the world literature from 1925 to 1968.

Although it would be misleading to try to equate the specific operative procedures used by the many different surgeons handling the cases, it is apparent that virtually the only patients who had a chance for survival
over one year were those operated upon with an attempt at a curative procedure.

The one-year survival period seems to carry a more favorable long-term prognosis in gastric adenocarcinoma than in adenocarcinoma of the colon.

Of the 66 cases tabulated, 18 survived for one year or more, and three survived for over five years, two apparently cured. A case report of one of the latter is presented in this paper, with a survival for 16 years, so far, without evidence of metastases.

REFERENCES

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