Should Ablative Operations Be Used for Bleeding Esophageal Varices?

BLAIR A. KEAGY, M.D.  JOHN A. SCHWARTZ, M.D.  GEORGE JOHNSON, JR., M.D.

To evaluate the long-term success of an ablative procedure for esophageal varices, the clinical results of 60 standardized, non-shunt (Womack) operations performed from 1953-1974 were reviewed. The overall operative mortality in this series was 35%. The 39 patients surviving operation have been followed from 5 to 21 years (mean: 13.3 years). Excluding operative mortality, the absolute 5-year survival rates for Child's classes A, B, and C patients were 100%, 63%, and 33%, respectively. The actuarial survival for all patients was 40% at 5 years, 24% at 10 years, and 15% at 15 years. Although the incidence of recurrent bleeding was 54%, clinical factors predictive for rebleeding could not be identified. A review of a collected series of other ablative operations, with and without esophageal transection, generally reveals unacceptable mortality and rebleeding rates. It is concluded that an ablative operation without esophageal transection should be used only in highly selected patients who do not have appropriate veins suitable for venous shunt.

GUIDO BANTI, a young, Italian physician at the Institute of Pathologic Anatomy in Florence, first proposed splenectomy for "splenic anemia" in a paper published in 1883.1,2 His original concept was perpetuated and formed the basis for many subsequent variations on an ablative operation for bleeding esophageal varices secondary to portal hypertension. In this country, splenectomy for "splenic anemia" became popular in the early part of the century owing primarily to its support by prominent physicians including Sir William Osler3 and William Mayo.45 Splenectomy remained popular until 1945, when Pemberton6 of the Mayo Clinic reviewed their results. He reported recurrent bleeding after splenectomy in 30% of patients who were operated on for a history of hemorrhagic complications (gastrointestinal bleeding or unspecified sites).

From the Department of Surgery, University of North Carolina School of Medicine, Chapel Hill, North Carolina

Phemister and Humphries6 of Chicago presented a paper before the American Surgical Association in 1947 on esophagogastrectomy for bleeding esophageal varices due to portal hypertension. Nathan Womack, then of Barnes Hospital in St. Louis, was in the audience and was intrigued by an operation that was apparently able to control variceal hemorrhage without causing encephalopathy and without diverting flow from the liver. He was impressed that this was a more physiologic procedure than the shunt operation being proposed at the time.7 While at the University of Iowa, Womack devised an ablative operation to treat bleeding esophageal varices, which he later implemented at the University of North Carolina at Chapel Hill. His procedure was designed to control the hyperdynamic portal and systemic circulatory state that occurred in these patients.89

During the last several decades, there has been renewed interest in variations on ablative operations to control bleeding esophageal varices. Numerous procedures have been described, and their various results published in the literature. The present report reviews the clinical results and long-term follow-up of one standardized form of nonshunt operation, that proposed by Dr. Womack,10 in 60 patients operated on at the University of North Carolina from March 1953 through May 1974.

Patients and Methods

Sixty adult patients with a history of upper gastrointestinal bleeding comprise this series. All patients were thought to have had bleeding from esophageal varices and portal hypertension due to hepatic cirrhosis. Endoscopic documentation of variceal hemorrhage was not routinely employed. Patients less than 21 years of age and others with noncirrhotic portal hypertension were excluded from

Reprint requests: George Johnson, Jr., M.D., Department of Surgery, University of North Carolina School of Medicine, Burnett-Womack Clinical Sciences Building 229H, Chapel Hill, NC 27514.
Submitted for publication: December 23, 1985.
the analysis. Demographic information and pertinent clinical data, such as assessment of hepatic function and hemodynamic parameters, were collected and stored on an IBM 1130 computer (Armonk, NY) for retrieval and subsequent analysis. Cardiac output using cardiogreen dye dilution and blood volume by radioactive iodinated albumin were determined before operation in patients who underwent elective operation to evaluate the hyperdynamic circulatory state associated with cirrhosis. These methods and their results have been described previously.

The operation performed on all 60 patients consisted of splenectomy, resection of the superior half of the greater curvature of the stomach, ligation and division of all vessels along the lesser curvature from the inferior one-third to the diaphragm, and transgastric oversewing of the varices. In 54 patients, a liver biopsy was obtained at the time of operation. Occasionally, a gastrostomy was also performed. The spleen was weighed after removal in 49 of the patients.

The basic procedure described above represented the only form of operative therapy offered to patients with bleeding esophageal varices due to portal hypertension at the North Carolina Memorial Hospital until 1971. Consequently, there were no additional selection criteria applied to the first 55 consecutive patients in this series, other than the fact that they were considered surgical candidates. The last five ablative operations were performed during a period when shunt operations were also utilized.

The follow-up data to be reported include survival, incidence of rebleeding, and encephalopathy. These data were analyzed by absolute and actuarial survival (Kaplan-Meier). In the actuarial analysis, patients were withdrawn alive at the time of another procedure to control recurrent variceal bleeding. Operative mortality was defined as death during the same hospitalization as surgery or within 30 days of operation. Chi square analysis was used to evaluate the difference in results based on clinically obtained data. All patients surviving the operation were followed for a minimum of 5 years and as long as 21 years; mean length of follow-up was 13.3 years.

### Results

There were 37 males and 23 females whose ages ranged from 21 to 73 years (mean: 51.5 years). The distribution of these patients by Child's classification of liver disease was A in eight, B in 25, and C in 27 patients. Thirty-eight patients (63%) were thought to have liver disease as a result of alcohol abuse, and 22 patients (37%) had disease secondary to other causes. Twenty-nine procedures (48%) were performed electively; the remaining 31 operations (52%) were performed as an emergency for uncontrollable gastrointestinal hemorrhage. Liver biopsies that were obtained in 90% of the patients were all consistent with cirrhosis.

The overall operative mortality rate was 35% (21/60 patients). The operative mortality and absolute 5-year survival, with respect to the preoperative severity of liver disease, etiology of portal hypertension, and indication for operation, are summarized in Table 1. None of the class A patients with evidence of adequate hepatic reserves died as a result of operation. The operative mortality rate in class A patients (0%) was not statistically different from that of class B patients (24%). The operative mortality rate in class C patients (56%) was significantly higher than that of both class A (p = 0.005) and class B (p = 0.02) patients. There was no difference in early postoperative mortality in the alcoholic patients (32%) compared to nonalcoholics (41%). The operative mortality for elective procedures (28%) was no different from that of emergency operations (42%), p = 0.47. No relationship between operative mortality and age, sex, platelet count, spleen weight, preoperative cardiac output, or preoperative blood volume could be identified.

The overall absolute survival at 5 years was 40% (24/60). Of the 39 patients surviving operation, the absolute survival was 62% (24/39) at 5 years (Table 1). Absolute 5-year survival rates according to Child's classification were class A—100%, class B—63%, and class C—33%. Survival at 5 years was significantly improved for class A patients compared to class B (p = 0.04) and class C (p = 0.003) patients. Identical late survival rates were noted for alcoholic and nonalcoholic patients, 62% at 5 years.

The actuarial survival of all 60 patients was 40% at 5 years, 24% at 10 years, and 15% at 15 years (Fig. 1). Four patients had subsequent operations and were withdrawn alive, two at 9 months and one each at 15 and 49 months.

The incidence of rebleeding in the 39 patients surviving operation was 54% (Table 2). The incidence of rebleeding in patients with portal hypertension secondary to alcohol abuse was the same as that noted in patients with nonalcoholic cirrhosis. Of the patients whose spleen weights were recorded at the time of operation, 33 survived. The incidence of recurrent bleeding was 67% in 26 patients with spleen weights greater than 800 g, compared to a
33% incidence in 9 patients whose spleen weighed 800 g or less; this difference did not achieve statistical significance (p = 0.08). No preoperative clinical factor (i.e., age, sex, platelet count, cardiac output, or blood volume) was predictive of recurrent bleeding from varices in the late postoperative period. There were no cases of hepatic encephalopathy in the postoperative period that could be related to the operation performed.

Discussion

Management of bleeding from esophageal varices continues to be a major challenge. Many operations intended to "ablate," "disconnect," or "decongest" the dilated venous collaterals of the esophagus and stomach have been devised. The results achieved with a variety of these procedures continue to be compiled and reported in the literature.13 The selection of therapy for bleeding esophageal varices remains controversial. For several reasons, the present report represents a unique experience with an ablative operation for portal hypertension. (1) It was the only type of operation performed for bleeding esophageal varices in our institution during the initial 18 years of this study. Therefore, selection bias, in terms of a shunt versus a nonshunt procedure, was completely absent in 55 patients, 92% of the total series. (2) The basic operative technique was uniform for all patients. (3) Long-term results are available, with all patients being followed at least 5 years and others for as long as 21 years. However, this report suffers from the lack of a comparable group prospectively treated by medical therapy or an alternative surgical procedure.

Two basic problems persist with respect to ablative operations for bleeding esophageal varices. The first relates to the operative mortality rate of nonshunt procedures in patients from the United States who often have alcoholic cirrhosis. The operative mortality in our series was quite high, 35%. Although the majority of our patients (62%) were at increased risk for death, having either advanced liver disease (Child's class C) or emergency operation for uncontrolled bleeding, the 24% mortality rate in the remaining class A and B patients operated upon electively was still appreciable.

The second problem associated with nonshunt operations concerns the control of bleeding. The 54% incidence of rebleeding noted in our series is unacceptable for an operation designed to control bleeding from esophageal varices. This incidence is higher than what we have previously reported11 with the "Womack" procedure. It is also greater than that seen with lesser procedures, such as splenectomy alone5 or transesophageal ligation of varices without devascularization.17 Although it was thought that hypersplenism might play some part in the etiology of the initial gastrointestinal bleeding and possibly relate to the incidence of rebleeding, this was not supported by our data. It is of concern whether any ablative operation could ever effectively control bleeding from a collateral circulation in which high pressures persist; recurrent or new varices would eventually form and lead to further bleeding.

The similarity in survival between the alcoholic and nonalcoholic patients in our series conflicts with the findings of Zeppa14 and Warren15,16 who have reported poorer survival in alcoholic patients after selective, distal splenorenal shunts. It was anticipated that the "Womack" procedure would produce results somewhat similar to those seen with selective shunt operations, since both procedures preserve portal flow to the liver. Our observation of equivalent clinical results in alcoholics and in patients with other causes of portal hypertension is more consistent with the pattern of survival reported in series of patients after nonselective shunting procedures. This finding may be related to the fact that if our patients survived the operation they apparently stopped drinking.

In order to compare our results to the variety of other "ablative" procedures currently performed, it is convenient to classify the procedures into three basic types: esophageal transection and reanastomosis, gastroesophageal devascularization without esophageal transection, and gastroesophageal devascularization with esophageal transection (Table 3).

| TABLE 2. Incidence of Rebleeding Following the "Womack" Procedure |
|-----------------------------|-------------------|
|                             | Number of Patients Surviving Operation | Incidence Rebleeding |
| Total                       | 39                | 54%               |
| Alcoholic                   | 26                | 54%               |
| Nonalcoholic                | 13                | 54%               |
| Spleen weight ≥ 800 grams   | 9                 | 33%               |
| Spleen weight < 800 grams   | 24                | 67%               |
| Platelets ≥ 100,000         | 14                | 57%               |
| Platelets < 100,000         | 16                | 56%               |
Esophageal transection and reanastomosis has been performed using the button of Boerema,16 the EEA stapler (U.S. Surgical Corp., Norwalk, CT),18,19 or sutures.20 Included in this category are the results reported by Gouge20 using a suture technique of transthoracic esophageal transection and reanastomosis. Table 1 summarizes his results with this procedure alone in 15 patients separately from a group of 21 patients undergoing transection combined with a more complete thoracic and abdominal devascularization, which will be discussed in a later section. In general, esophageal transection and reanastomosis procedures are associated with high mortality and rebleeding rates. The results achieved with these techniques are similar to those following transthoracic, intraesophageal ligation of varices proposed by Linton.17 Since these series usually contain high-risk patients, the high operative mortality rates might be anticipated. However, the reported rates of rebleeding are again excessive and are certainly unacceptable for a definitive procedure.

There are several available reports of ablative operations without esophageal transection. In Hassab's series21 from Egypt, a large number of procedures were performed for portal hypertension and bleeding esophageal varices with very acceptable results; however, the etiology of liver disease in the majority of his patients was schistosomiasis. It is difficult to compare the results of an ablative operation in his patients with parasitic infestation to those in patients seen in the United States, who usually develop liver disease secondary to alcoholism or hepatitis. Skinner22 proposed an extensive paraesophageal devascularization but added methodical oversewing of the varices. He has reported good initial results, but only in a very limited number of patients. The series reported by Estes,23 as well as the present report, suggests that an ablative operation without a procedure to completely disconnect the mucosal, submucosal, and extrinsic venous system of the esophagus does not control recurrent bleeding.

The final type of procedure consists of ablative operation along with esophageal transection and reanastomosis. Ginsberg24 has reported excellent results in a very highly selected group of patients with this type of operation using the EEA stapler. His procedure is designed to preserve "the acquired portosystemic shunts, including those in the peri-esophageal plexus," while interrupting the intraesophageal venous plexus by transection. Sugiura’s group in Japan continues to report outstanding clinical results.25 However, 185 of the 636 patients reported in his extensive series had no history of upper gastrointestinal bleeding and were operated on prophylactically. Although it is impossible to separate the prophylactic procedures from his reported data, even if all operative mortalities and episodes of rebleeding followed the 451 therapeutic operations, exceptional results would still be obtained. Sugiura is credited with emphasizing the importance of maintaining the connection of the coronary-azygos collateral venous circulation to effectively decrease the incidence of rebleeding. In contrast, Giordani26 has also reported good results with a complete portoazygos disconnection, in addition to esophageal transection, using either the button of Boerema or the EEA. However, very few patients (7.8%) in his series were class C, and only 80% of the patients were followed long-term, with a limited mean follow-up of 33 months. Johnston27 has documented moderate rates for both operative mortality and rebleeding utilizing the EEA instrument along with subdiaphragmatic devascularization in a series of patients unfit for shunt surgery. Weese28 has reported a high operative mortality rate for esophageal transection and

<table>
<thead>
<tr>
<th>Author, Year</th>
<th>No. of Patients</th>
<th>Operative Mortality</th>
<th>Length of Follow-up</th>
<th>Incidence Rebleeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Esophageal transection alone</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linschoten,18 1982</td>
<td>64</td>
<td>39%</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Wanamaker,19 1983</td>
<td>20</td>
<td>60%</td>
<td>avg 31 mo</td>
<td>50%</td>
</tr>
<tr>
<td>Gouge,20 1986</td>
<td>15</td>
<td>53%</td>
<td>to 35 mo</td>
<td>27%</td>
</tr>
<tr>
<td>Ablation without transection</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hassab,21 1970</td>
<td>605</td>
<td>10%</td>
<td>to 12.5 yr</td>
<td>7%</td>
</tr>
<tr>
<td>Skinner,22 1969</td>
<td>3</td>
<td>0%</td>
<td>to 2 yr</td>
<td>0%</td>
</tr>
<tr>
<td>Estes,23 1984</td>
<td>12</td>
<td>17%</td>
<td>to 7.5 yr</td>
<td>20%</td>
</tr>
<tr>
<td>Present report, 1985</td>
<td>60</td>
<td>35%</td>
<td>avg 13.5 yr</td>
<td>54%</td>
</tr>
<tr>
<td>Ablation with transection</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ginsberg,24 1982</td>
<td>20</td>
<td>20%</td>
<td>to 50 mo</td>
<td>0%</td>
</tr>
<tr>
<td>Sugiura,25 1984</td>
<td>636</td>
<td>5.2%</td>
<td>to 15 yr</td>
<td>6%</td>
</tr>
<tr>
<td>Giordani,26 1985</td>
<td>64</td>
<td>11%</td>
<td>to 9 yr</td>
<td>6.5%</td>
</tr>
<tr>
<td>Johnston,27 1982</td>
<td>80</td>
<td>14%</td>
<td>avg 3 yr</td>
<td>20%</td>
</tr>
<tr>
<td>Weese,28 1984</td>
<td>11</td>
<td>36%</td>
<td>to 28 mo</td>
<td>14%</td>
</tr>
<tr>
<td>Gouge,20 1986</td>
<td>21</td>
<td>9.5%</td>
<td>to 52 mo</td>
<td>37%</td>
</tr>
</tbody>
</table>
ABLATIVE OPERATION FOR ESOPHAGEAL VARICES

reanastomosis, using the EEA, in a small series of 11 patients, yet the incidence of rebleeding was reasonably low. Gouge has reported a high incidence of rebleeding in his group of patients undergoing both the thoracic and abdominal procedures; however, the coronary vein was ligated, disconnecting the portoazygos collateral system in these patients.

It is apparent that attempts by surgeons in this country to duplicate the clinical results achieved by others using various ablative operations, having different concepts of pathophysiology, in different patient populations, have been met with only limited success.

In contrast to the results of ablative operations reviewed above, the long-term results currently being reported from several centers in North America with selective transsplenic decompression of esophageal varices, or the splenorenal shunt, are encouraging. The immediate postoperative mortality rate in the well-prepared patient is low, and the incidence of shunt occlusion and encaphalopathy is acceptable, approximately 10%. Similar results, at least in terms of mortality and shunt patency, have also been reported for total shunts such as the portacaval shunt.

In summary, our results, as well as those reported from various other series in the United States, have shown ablative operations for bleeding esophageal varices in the adult age group to be associated with a prohibitive risk of operative mortality and recurrent gastrointestinal bleeding. It is concluded that in this situation ablative procedures should only be used in highly selected patients who cannot undergo a decompressive shunt. If an operation is indicated and appropriate veins are available, some type of portal venous decompression is preferred in patients with bleeding esophageal varices. Although surgeons seeing a limited number of these patients may find ablative operations technically easier to perform, this fact alone does not justify the use of a nonshunt procedure in an individual with suitable venous anatomy. To clearly define the effect of the addition of esophageal transection on the clinical results achieved with ablative procedures, larger numbers of patients and longer follow-up intervals will be required. For the present, these procedures should be evaluated only in interested centers that have adequate resources and the technical expertise necessary to manage these challenging patients.

References