Sinistral Portal Hypertension

Splenectomy or Expectant Management

John P. Loftus, M.D.,* David M. Nagorney, M.D.,* Duane Ilstrup, M.S.,†
and Allen R. Kunselman, B.S.†

From the Department of Surgery and the Section of Biostatistics,‡*
Mayo Clinic and Mayo Foundation, Rochester, Minnesota

Splenectomy has been considered the treatment of choice for patients with bleeding from sinistral portal hypertension (SPH) and varices, but is controversial for asymptomatic patients. To further define the role of splenectomy for SPH, the authors compared the clinical presentations and outcomes of 25 patients treated with splenectomy with those of 12 observed patients. Clinical features were similar except for transfusions administered (60% *vs.* 25%, $p < 0.05$), hemoglobin (9.8 ± 2.2 g/dL *vs.* 12.5 ± 2.1 g/dL, $p < 0.05$), and history of prior bleeding episodes (56% *vs.* 8%, $p < 0.05$), splenectomy *versus* no splenectomy, respectively. At 3 years, neither survival (78% *vs.* 64%, $p = 1.0$) nor new or recurrent bleeding (16% *vs.* 24%, $p = 0.2$) differed, splenectomy *versus* no splenectomy, respectively. The authors conclude that in the absence of prior bleeding episodes, anemia, or severe hemorrhage, observation of patients with SPH is justified.

Sinistral portal hypertension (SPH), a manifestation of splenic vein thrombosis, is a localized form of extrahepatic portal hypertension, and although infrequently encountered, is curable by splenectomy.[1] The diagnosis of SPH should be suspected in patients with bleeding gastroesophageal varices, splenomegaly, and normal liver function.[2] Although splenectomy is potentially curative for SPH, not all patients require operative intervention. Indeed, splenic vein thrombosis has been noted incidentally at autopsy and in 20% to 40% of patients with chronic pancreatitis.[3-5] The appropriate management of asymptomatic patients remains controversial. Both prophylactic splenectomy and expectant management have been recommended.[2,6] We hypothesized that the clinical course of patients with SPH who had splenectomy deferred might differ from that of patients who had splenectomy. Thus, we reviewed our recent experience with SPH to determine whether clinical factors could be identified to select patients for initial nonoperative management.

Address reprint requests to David M. Nagorney, M.D., Department of Surgery, Mayo Clinic, 200 First Street, SW, Rochester, MN 55905.
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METHODS

The records of all patients with SPH diagnosed at our institution between 1970 and 1990 were reviewed retrospectively. The diagnosis of SPH was based on evidence of isolated splenic vein thrombosis, splenomegaly, and gastroesophageal varices determined by angiography, ultrasonography, computed tomography, or laparotomy. Patients with concomitant portal vein thrombosis were excluded. Patient demographics, symptoms and signs, associated conditions, laboratory data, diagnostic evaluation, transfusion requirements, survival, and new or recurrent gastrointestinal bleeding were recorded for all patients. Forty-three patients were identified, six of whom were diagnosed at autopsy; the remaining 37 patients form our study population.

Follow-up was based on the last clinical evaluation in the patient history or when necessary by telephone contact. Comparisons of proportions were made using chi

Table 1. PATIENT PRESENTATION

	Splenectomy (%)	Nonsplenectomy (%)
Splenomegaly	84	67
Abdominal pain	52	83
Abdominal mass	84	75
Varices	88	82
Gastric	88	82
Esophageal	28	36

square or Fisher's exact tests. Differences in the distributions of continuous variables were assessed by the Wilcoxon rank-sum test. Survival was estimated using the Kaplan-Meier product limit method, and differences in survival curves were assessed with the log-rank test.

RESULTS

Patient Population

Thirty-seven patients had SPH, 25 underwent splenectomy, and 12 initially had splenectomy deferred. Men outnumbered the women by 1.3:1 (14 to 11) and 1.4:1 (7 to 5), splenectomy and nonsplenectomy, respectively. Mean age was 49 years for splenectomy patients and 53 years for nonsplenectomy patients.

Presentation

For splenectomy patients, splenomegaly was detected in 84%, abdominal pain in 52%, and palpable abdominal mass in 84%. Eighty-eight per cent of this group had gastric varices, but esophageal varices were also detected in 28%. Importantly, esophageal varices were never present in the absence of gastric varices (Table 1).

For nonsplenectomy patients, splenomegaly was noted in 67%, abdominal pain in 83%, and an abdominal mass in 75%. Gastric varices were present in 82% and esophageal varices in 36%. Again, esophageal varices occurred only in the presence of gastric varices. No significant differences in these variables were noted between groups (Table 1).

Seventy-two per cent of splenectomy patients presented with gastrointestinal bleeding as manifested by hematemesis (40%), melena (56%), or both. Nonsplenectomy patients presented with gastrointestinal bleeding in 50%, with hematemesis in 17% and melena in 42%. Although the presence of bleeding at presentation was not different between groups ($p = 0.3$), a history of prior hemorrhage and the number of patients in whom transfusions were administered differed between the two groups. Fifty-six per cent of splenectomy patients had experienced prior hemorrhage *versus* 8% of nonsplenectomy patients ($p < 0.05$), and 60% of splenectomy patients received blood transfusions, compared with only 25% of nonsplenectomy patients ($p < 0.05$) (Table 2). In addition, 93% of patients with prior hemorrhage had splenectomy, whereas only 50% of patients without prior hemorrhage underwent splenectomy ($p < 0.05$).

Splenectomy was performed to control gastrointestinal bleeding in 17 of 25 patients (68%). Three of these patients were transfused more than 10 units of red blood cells during the 48 hours before surgery (11, 12, and 14 units). In these three patients, massive life-threatening hemorrhage represented the first episode of gastrointestinal bleeding. Twelve of the remaining 14 patients had an average blood loss of 4.4 ± 1.2 units before operation.

Splenectomy was deferred in six patients because they presented without evidence of hemorrhage. Only three of the remaining six patients required blood transfusions at the time of diagnosis (4, 5, and 5 units). Two of these patients, however, also had an unresectable primary or metastatic carcinoma (pancreatic and colonic, respectively), which was considered a relative contraindication to an operative approach. The third patient had undergone orthotopic liver transplant. Emergency esophagogastroduodenoscopy in the third patient failed to demonstrate a variceal bleeding source. After transfusion, hemorrhage had ceased in all three patients and hence surgery was deferred.

Patients presented with a history of pancreatic pathology in 60% and 58%, splenectomy and nonsplenectomy groups, respectively. Chronic pancreatitis was the most common pancreatic problem in both groups (Table 3). Concomitant nonpancreatic pathology of potential etiologic significance was present in most of the remaining patients in each group. Two patients had an associated retroperitoneal mass or abscess. There were isolated cases of gastric ulcer, inflammatory bowel disease, agno-

Table 2. CHARACTERISTICS OF GASTROINTESTINAL BLEEDING

	Splenectomy (%)	Nonsplenectomy (%)
Gastrointestinal bleeding*	72	50
Hematemesis	40	17
Melena	56	42
Patients transfused	60	25†
Prior hemorrhage	56	8†

* Noted at patient presentation.
† $p < 0.05$.

genic myeloid metaplasia, and cardiomyopathy. Sinistral portal hypertension was idiopathic in four splenectomy patients. In the nonsplenectomy group, two patients had polycythemia vera, one had the Budd-Chiari syndrome, one had α_1-antitrypsin deficiency, and one had had a previous orthotopic liver transplant.

Postmortem diagnoses were obtained in six patients who had clinically occult splenic vein thrombosis. Associated pathology included adenocarcinoma of the pancreas, adenocarcinoma of the stomach, acute pancreatitis, alcoholic cirrhosis, rheumatoid vasculitis, and the Budd-Chiari syndrome.

Laboratory Data

Laboratory findings are shown in Table 4. Mean hemoglobin value was significantly less in splenectomy patients (9.8 + 2.2 g/dL *vs.* 12.5 + 2.1 g/dL, $p < 0.05$). Platelet count was less in splenectomy patients, although not significantly ($174 + 95 \times 10^9$/L *vs.* $266 + 158 \times 10^9$/L, $p = 0.1$). Total bilirubin was significantly greater in the nonsplenectomy group (1.1 + 0.7 mg/dL *vs.* 0.8 + 0.7 mg/dL, $p < 0.05$), although both groups were in the normal range for our laboratory (0.1 – 1.1 mg/dL). The remainder of the laboratory values were similar between groups.

Diagnostic Evaluation

Esophagogastroduodenoscopy was performed in 21 (84%) splenectomy and in nine (75%) nonsplenectomy patients. Varices were confirmed in 76% and 89%, absent in 14% and 11%, and equivocal in 10% and 0% of splenectomy and nonsplenectomy patients, respectively. Upper gastrointestinal barium studies were performed in 11 (44%) splenectomy and in 5 (42%) nonsplenectomy patients. Upper gastrointestinal barium studies were positive for varices in 55% and 60%, negative in 36% and 20%, and equivocal in 9% and 20% of splenectomy and nonsplenectomy patients, respectively.

Computed tomography was done in 13 (52%) splenectomy and in five (42%) nonsplenectomy patients. Splenic vein thrombosis and splenomegaly was detected in 62% and 80%, not detected in 15% and 20%, and uncertain in 23% and 0% of splenectomy and nonsplenectomy patients, respectively. Ultrasonography was used in five (20%) splenectomy patients and in five (42%) nonsplenectomy patients. Ultrasonography confirmed splenic vein occlusion in 40% and 20%, was negative in 20% and 20%, and was equivocal in 40% and 60% splenectomy and nonsplenectomy, respectively. The relatively high rate of equivocal results is related to difficulties in visualizing the splenic vein in its entirety. Visceral angiography and its predecessor, splenoportography, detected splenic vein occlusion in all patients in whom they were employed: 16 (64%) splenectomy patients and seven (58%) nonsplenectomy patients underwent visceral angiography, and four (16%) splenectomy patients underwent splenoportography.

Follow-up

Mean follow-up was 4.5 years (range, 10 days to 18 years). No patient was lost to follow-up. The six autopsy patients were excluded. Among the splenectomy patients, 15 are alive, nine have died unrelated to SPH, and one has died of unknown cause. No patient has died of SPH. Of the nonsplenectomy patients, seven are alive and four have died of conditions unrelated to SPH. One patient has died of SPH associated with end-stage alcoholic cirrhosis. One patient in the nonsplenectomy group required splenectomy for recurrent bleeding associated with α_1-antitrypsin deficiency 4 years after the original diagnosis of SPH.

Table 4. LABORATORY VALUES*

	Splenectomy	Nonsplenectomy
Hemoglobin level (g/dL)	9.8 ± 2.2 (10.4)	12.5 ± 2.1 (12.4)†
Platelet count ($\times 10^9$)	174 ± 95 (165)	266 ± 158 (228)
Bilirubin level (mg/dL)	0.8 ± 0.7 (0.6)	1.1 ± 0.7 (0.9)†
Prothrombin time (sec)	13.5 ± 5.1 (12.2)	14.4 ± 4.1 (13.1)
Alkaline phosphatase level (U/L)	252 ± 337 (162)	310 ± 300 (240)
AST level (U/L)	26 ± 15 (22)	31 ± 24 (24)
Amylase level (U/L)	111 ± 83 (82)	104 ± 141 (46)

* Mean ± SD (median), rank-sum test.
† $p < 0.05$.
AST, asparate aminotransferase.

Table 3. ETIOLOGIC ASSOCIATIONS

	Splenectomy (%)	Nonsplenectomy (%)
Pancreatic pathology	60	58
Chronic pancreatitis	32	33
Islet cell carcinoma	20	8
Adenocarcinoma	8	17
Acute pancreatitis*	8	0

* One patient diagnosed with both acute and chronic pancreatitis.

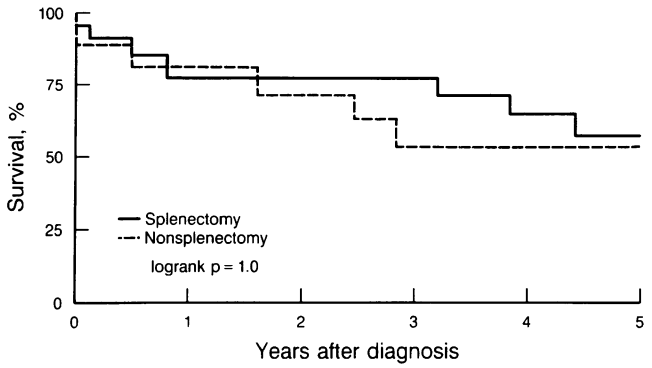

Figure 1. Overall survival of splenectomy and nonsplenectomy patients.

Survival and New or Recurrent Bleeding

Three-year survival was similar between splenectomy and nonsplenectomy patients: 78% *versus* 64%, respectively (Fig. 1). There were seven splenectomy patients presenting without a preoperative bleeding history. None of these patients bled during follow-up. Of the 18 splenectomy patients with a preoperative history of gastrointestinal bleeding, four (22%) rebled during follow-up. The diagnoses (and bleeding source) associated with recurrent hemorrhage were: cardiomyopathy (peptic ulcer), cryptogenic cirrhosis (esophageal varices), metastatic islet cell carcinoma (radiation gastritis and peptic ulcer), and chronic active hepatitis (source unknown).

In the nonsplenectomy group, six (50%) patients presented without a history of bleeding. Two of these patients bled during follow-up. One patient with chronic alcoholic pancreatitis and end-stage alcoholic cirrhosis exsanguinated from bleeding esophagogastric varices. This patient had the only life-threatening hemorrhage of the nonsplenectomy patients. The portal hypertension and varices in this patient, however, were clearly confounded by cirrhosis. Because of her advanced terminal liver disease and encephalopathy, surgery was not undertaken. Another patient with α_1-antitrypsin deficiency bled from gastric varices 4 years after the original diagnosis and subsequently underwent successful splenectomy.

Of the six nonsplenectomy patients presenting with bleeding, three bled during follow-up: one patient with chronic pancreatitis bled from an anastomotic ulcer (gastrojejunostomy), a second patient with unresectable pancreatic ductal carcinoma bled from an indeterminate source, and a third patient with metastatic islet cell carcinoma developed a bleeding peptic ulcer. Specifically, hemorrhage could not be attributed to SPH alone, although SPH may have been a contributing factor in each patient. There was no significant difference in the incidence of recurrent bleeding between the splenectomy and the nonsplenectomy patients (Fig. 2). Statistical comparison beyond 3 years was precluded because of the small sample size.

DISCUSSION

Sinistral portal hypertension occurs as a manifestation of splenic vein thrombosis or obstruction. Decompression of the splenic venous system is through the gastric vasa brevia to the coronary vein, and finally to the portal vein. In the past, upper gastrointestinal hemorrhage heralded the first sign of portal hypertension in these patients. Since the pathophysiology was first characterized by Greenwald and Wasch,[7] the incidence of SPH has been increasing steadily. Not only heightened physician awareness but also improved imaging modalities have allowed detection of SPH in asymptomatic patients.[8,9] With the expanded clinical recognition of SPH, management decisions have become more complex. Unfortunately, neither the frequency nor the severity of bleeding can be predicted on the basis of diagnostic or laboratory parameters, and consequently the applicability of splenectomy for all patients with SPH must be re-evaluated.

Our data show that patients selected for splenectomy have different clinical presentations than patients in whom splenectomy is deferred. Differences in the history of previous hemorrhage, transfusions administered for bleeding, and laboratory evidence of recent bleeding only partially identify factors that affected our management. Our study failed to demonstrate a significant difference in overall survival and in the number of subsequent bleeding episodes between splenectomy and nonsplenectomy patients. This finding in part probably was related to the presence of associated disease processes, which has not generally been emphasized in the long-term follow-up of these patients. Although others[6,10,11] have recognized the risk of late bleeding in both groups, the cause of late bleeding has not been consistently identified. Unequivocal predictors of late bleeding and death

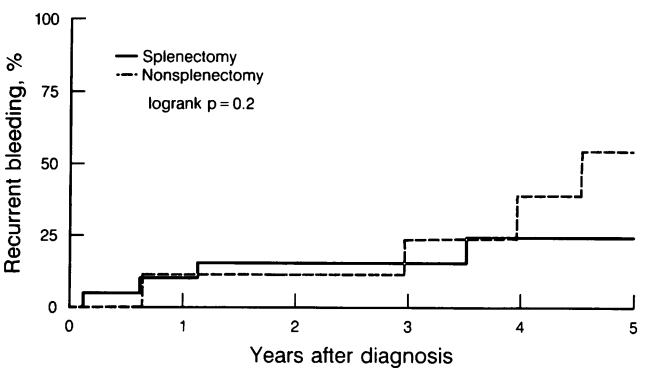

Figure 2. Incidence of new and recurrent bleeding in splenectomy and nonsplenectomy patients.

remain undefined. Importantly, SPH has not been the cause of late bleeding. Many patients remain free of bleeding, and resolution of splenic vein thrombosis has been observed.[12] We believe that these findings warrant the position of deferring splenectomy selectively.

Comparison of the advantages and disadvantages of splenectomy to initial observation and deferred splenectomy can provide an additional basis for patient selection. In acutely bleeding patients requiring transfusions of blood components for resuscitation and with prior episodes of hemorrhage, the advantages of splenectomy are clear. Splenectomy permits rapid correction of potentially life-threatening bleeding, reduction of risks associated with multiple transfusion of blood components, prevention of hypersplenism, and possible reduction or elimination of future bleeding episodes. Disadvantages of splenectomy include associated operative mortality and morbidity rates, recurrent bleeding, and the potential for overwhelming postsplenectomy sepsis. Operative deaths after splenectomy in patients with SPH and bleeding has ranged from 0% to 12.5%.[6,11,13,14] Similarly, although reports in the literature of major postoperative morbidity after splenectomy for SPH are lacking, incidental splenectomy increases significantly the morbidity associated with upper abdominal surgery.[15] The incidence of recurrent bleeding at 3 years was 16% in our splenectomy patients and has approached 9% in other reports.[5,10] Additionally, Singer[16] has reported an 8% incidence of overwhelming postsplenectomy sepsis associated with a 6% mortality rate after splenectomy in patients with portal hypertension. These findings clearly show that the risk of splenectomy is acceptable for life-threatening hemorrhage. Risks of splenectomy, however, are not insignificant and must be considered carefully relative to expected benefits before splenectomy can be advocated in all patients with SPH.

In patients with SPH who are asymptomatic or have not experienced life-threatening or hemodynamically significant hemorrhage, the benefits of splenectomy become less distinct. Clearly, advantages must outweigh disadvantages to advocate prophylactic splenectomy. Regardless of the incidence of complications, bleeding from SPH in patients observed initially must be frequent rather than rare to advocate prophylactic splenectomy. Moreover, prophylactic splenectomy would be advocated further only if future hemorrhage was expected to be life-threatening. Our data and others,[6,14] however, suggest that few patients actually encounter life-threatening hemorrhage. In fact, only one patient herein required splenectomy for hemorrhage, and no patient died of SPH alone. Moreover, only two patients bled from varices after the diagnosis of SPH. Similar findings have been reported by others.[17] Importantly, attributing hemorrhage solely to SPH must be examined carefully. As mentioned previously, SPH is rarely the only contributing condition. In fact, our data show that other disease processes more directly contribute to hemorrhage. This relationship is not surprising because SPH is usually associated with or caused by other diseases. Although classically patients with SPH have normal liver function,[1] several of our patients had abnormal liver function tests, suggesting SPH can mimic or coexist with other diseases. Specifically, cirrhosis with Pugh-Child's class A liver disease, idiopathic splenomegaly, or splenomegaly from hematologic causes must be considered. Whether SPH significantly increases the risk of upper gastrointestinal bleeding or significantly contributes to active bleeding from other causes cannot be determined by our study. The data show, however, that splenectomy for SPH does not eliminate bleeding from other causes. Although recurrent hemorrhage from other sources is not unexpected, the fact that hemorrhage occurs after splenectomy suggests that SPH does not contribute significantly to upper gastrointestinal hemorrhage from these other sources.

Although prophylactic splenectomy has been advocated,[6,11,15] our data do not fully support this position. We believe current data support splenectomy for recurrent or life-threatening hemorrhage that requires transfusions, but initial observation is warranted for other patients with SPH. If hemorrhage occurs, endoscopic confirmation of varices and confirmation of normal wedge hepatic venous pressures to confirm presinusoidal portal hypertension is necessary to advocate splenectomy for SPH. Imaging confirmation of SPH alone is inadequate information to advocate splenectomy. Intra-abdominal imaging is important, however, to determine whether other gastrointestinal diseases are contributing to bleeding that may also require surgical therapy. Expectant management is indicated in patients with asymptomatic or minimally symptomatic disease. Such management demands careful follow-up and an informed and compliant patient who understands the risks of observation. Polyvalent pneumococcal vaccine should be given to all patients with SPH regardless of treatment because of the unpredictable potential for splenectomy and the risk of overwhelming postsplenectomy sepsis. In conclusion, our data suggest that patients with minimal or no transfusion requirements, no prior episodes of gastrointestinal bleeding, and normal laboratory values can be followed expectantly.

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