Is Splenectomy Necessary in Devascularization Procedures for Treatment of Bleeding Portal Hypertension?

Hector Orozco, MD; Miguel Angel Mercado, MD; Raul Martinez, MD; Manuel Tielve, MD; Carlos Chan, MD; Moises Vasquez, MD; Gustavo Zenteno-Guichard, MD; Juan Pablo Pantoja, MD

**Objective:** To investigate whether splenectomy as a part of devascularization procedures is necessary.

**Design:** Prospective, controlled, randomized trial.

**Setting:** University hospital, referral center.

**Patients:** A total of 55 patients (Child-Pugh class A and B) with a history of bleeding portal hypertension were treated by means of a modified Sugiura-Futagawa procedure. Twenty-three patients underwent splenectomy and 22 did not.

**Methods:** Postoperative outcome was recorded and comparison of the 2 groups was done with the Fisher exact test. Kaplan-Meier survival curves were constructed. Main outcome and postoperative differences between the patients who underwent splenectomy and those who did not were investigated.

**Results:** Both groups were comparable in the postoperative period. Significant differences were observed in transfusion requirements and postoperative portal vein thrombosis, both favoring the group without splenectomy. No differences in rebleeding, encephalopathy rate, operative time, or postoperative complications were observed.

**Conclusion:** Splenectomy is not routinely necessary in devascularization procedures for bleeding portal hypertension.

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SURGERY is the best therapeutic choice for patients with a history of variceal bleeding and good liver function (Child-Pugh class A). Low rebleeding and postoperative encephalopathy rates, as well as adequate survival and life quality, is obtained in these selected patients undergoing an elective procedure with portal blood flow preservation. For patients in whom a shunt is not feasible (because of thrombosis or inadequate anatomy), devascularization procedures are the best surgical choice. Several procedures of this kind have been described, many of which have a high rebleeding rate. The Sugiura-Futagawa procedure described in 1973, and our modification of the procedure, have shown similar good postoperative results, as compared with those obtained with selective shunts. Other groups have also reported good postoperative results with this type of devascularization.

Splenectomy is one of the steps in the abdominal stage of the procedure. It is the most difficult and troublesome part of the abdominal stage, requiring transfusions in almost all cases. There is also some morbidity associated with splenectomy. We conducted a prospective, randomized, controlled trial to study if splenectomy is necessary.

**RESULTS**

**Splenectomy Group**

There were 23 patients in the group undergoing splenectomy. The mean age was 40.4 years (range, 12-70 years). There were 13 men and 10 women. Eighteen patients were classified as Child-Pugh class A and 5 were classified as class B. The operative mortality rate was 9% for the group as a whole; 1 patient died of postoperative myocardial infarction and 1 of postoperative liver failure. No cases of severe hypersplenism were seen. Mean operative time for the abdominal stage was 255 minutes (range, 180-540 minutes). Intraoperative blood requirements were 600 mL (range, 0-2000 mL). Rebleeding was observed in 2 patients (9%) and postoperative encephalopathy in 1 (4%). Postoperative pancreatic complications were observed in 2 patients: 1 with pancreatitis that eventually resolved and 1 with a pancreatic pseudocyst that required surgical drainage.
PATIENTS AND METHODS

Patients admitted to our hospital with acute bleeding portal hypertension are treated by means of pharmacotherapy, sclerotherapy, or both. After the acute bleeding episode is controlled, patients are classified according to the Child-Pugh classification. Only low-risk patients (Child-Pugh class A) with good cardiopulmonary and renal function are selected for elective surgical treatment. Patients classified as Child-Pugh class C are considered for long-term sclerotherapy or pharmacotherapy, transjugular intrahepatic portosystemic shunt, and the liver transplantation program. Low-risk patients are routinely evaluated with preoperative angiography. Patients with adequate vessels are considered for selective shunts and some for low-diameter shunts. The patients with unshuntable vessels (because of thrombosis, recanalized thrombosis, tortuosity, or small diameter [<1 cm]) are considered for our modification of the Sugiura-Futagawa procedure.

The technique of our modification of the Sugiura-Futagawa procedure is described in detail elsewhere. Briefly, it consists of a 2-stage surgical procedure (abdominal and thoracic) usually performed with a 6- to 8-week interval between each stage. We usually start with the abdominal stage, in which the upper two thirds of the stomach is devascularized (ablation of afferent and efferent vessels: left gastric artery and vein, left gastroepiploic artery and vein, and short gastric vessels) through a midline incision, leaving only the right gastroepiploic artery intact. The lower third of the esophagus is also devascularized and, as a consequence of this maneuver, a truncal vagotomy and a pyloroplasty, usually of the Heinecke-Mickulicz type, are performed. When we first modified the technique, splenectomy was also done. In this stage, a liver biopsy specimen is obtained. In the thoracic stage, the esophagus is devascularized through a left thoracotomy from the left pulmonary vein to the level reached in the abdominal stage. At approximately 2.5 cm from the esophagogastric junction, a transection (classic or modified) is also done. In the postoperative period, angiography is carried out to evaluate portal blood flow.

Between 1989 and 1995, a total of 198 operations to treat portal hypertension were done at our hospital. Patients selected for our modification of the Sugiura-Futagawa procedure were randomized to splenectomy or no splenectomy. Surgery was performed by 2 surgeons only (H.O. and M.A.M.). Fifty-five patients were included in this study; 23 in the splenectomy group and 22 in the no splenectomy group. Survival curves were constructed according to the Kaplan-Meier method and the Fisher exact test was used for comparison between the 2 groups. Written informed consent was obtained from all patients. Angiography of the portal vein was obtained in the first postoperative month and at 1 year.

One patient randomized to the no splenectomy group was included in the splenectomy group because the spleen had to be removed later because of technical reasons. Two groups were thus obtained: 23 patients who underwent splenectomy and 22 who did not.

Angiographic findings (Table) showed postoperative portal vein thrombosis in 3 (20%) of the 15 cases with previous patent veins. For the splenectomy group as a whole, the survival rate at 1 year was 75% and 62% at 4 years.

NO SPLENECTOMY GROUP

Twenty-two patients did not undergo splenectomy. The mean age was 41.2 years (range, 16-67 years). There were 12 men and 10 women. Seventeen patients were classified as Child-Pugh class A and 5 were classified as class B. No patient had severe hypersplenism. Operative mortality for this group was 5%. The mean operative time was 228 minutes (range, 120-480 minutes) and intraoperative blood requirements were 300 mL (range, 0-2000 mL). Rebleeding was observed in 3 patients (13%) and postoperative encephalopathy in 1 case (4%). No pancreatic complications were observed. One patient developed a partial splenic infarction (Figure), which manifested clinically as fever. The splenic infarction was observed at routine angiographic examination. The patient was managed in a conservative fashion and had an uneventful recovery. No patients with preoperatively patent vessels had postoperative thrombosis.

GROUP COMPARISON

Both groups were comparable in the postoperative period. Statistically significant differences were observed in transfusion requirements (P < .05) and in postoperative portal vein thrombosis (P < .05), both favoring the no splenectomy group. No differences were observed in operative time, rebleeding, encephalopathy, postoperative complications, and survival. Also, no differences were found in the postoperative outcome of the different types of cirrhosis (alcoholic, viral hepatitis C, or primary biliary).

COMMENT

Devascularization procedures for bleeding portal hypertension have shown variable results. Most reports in the United States show a high rebleeding rate for these operations. Nevertheless, we and others outside Japan have shown good results with the Sugiura-Futagawa procedure, making it a good alternative for patients with adequate liver function in whom a shunt is not feasible.

One of the technically difficult steps of the procedure is splenectomy. Spleenectomy has historically been justified for the following reasons: (1) possible spontaneous portal-
systemic shunts through splenic and renal veins, (2) for technical reasons, and (3) its beneficial effect on hypersplenism. However, we have found that (1) spontaneous portosystemic shunts are not totally avoided by splenectomy and can occur with or without the spleen; (2) it is technically easier to preserve the spleen and doing so may decrease the operative time, number of blood transfusions, and morbidity due to splenectomy; and (3) in most cases, hypersplenism is not clinically important. In our extensive experience with surgically treated patients, we have found that hypersplenism is rarely symptomatic (ie, white blood cell count <2×10^9/L, platelets <20×10^9/L), with clinical signs of bleeding nose, mouth, or skin in only 1% of cases.

To evaluate the potential benefit of removing or preserving the spleen, we conducted a study that shows that the spleen can be preserved in most cases. Our study shows that blood transfusion requirements are lower and that portal blood flow is better maintained in the group that had a spleen-preserving procedure. We currently recommend splenectomy for bleeding portal hypertension in only the following circumstances: (1) patients with large and symptomatic splenomegaly (as observed in some patients with prehepatic portal hypertension), (2) patients with severe hypersplenism, and (3) patients with segmental portal hypertension (thrombosis of the splenic vein caused by pancreatitis or trauma).

An important issue regarding splenectomy is the potential development of postoperative infections. We have previously shown that postoperative infections in splenectomized patients with portal hypertension are rare. Nevertheless, we use prophylactic antibiotics in all cases and, in the last few years, have begun using antipneumococcal vaccine. In this study, we did not observe differences between the 2 groups.

No other differences were observed, except in the radiological evaluation of the portal vein in the postoperative period. Maintenance of portal blood flow is essential in the postoperative period. We think that the outcome of postoperative liver function depends on the quality of portal blood flow. This is why we routinely favor portal blood flow–preserving procedures. Selective shunts maintain portal blood flow during the postoperative period in most cases. One of the features of the Sugiura-Futagawa procedure is the maintenance of portal blood flow. We chose our modification of the Sugiura-Futagawa procedures for cases in which a shunt was not feasible, such as patients with inadequate splenic veins or anatomy or with splenoporal thrombosis. In these cases, hepatopetal flow is obtained through collateral vessels in the hepatic hilus. This is a condition observed more frequently in patients with a noncirrhotic liver. According to our findings, we strongly recommend the preservation of the spleen in most patients undergoing the Sugiura-Futagawa procedure or our modification. There is frequent postoperative portal vein alteration in patients in whom splenectomy is performed. The portal vein and portal blood flow are very important to preserve good liver function, especially for those patients who will require liver transplantation in the future because of deteriorating liver function. We conclude that postoperative results with the Sugiura-Futagawa procedure are not altered with spleen preservation; preservation of the spleen also has no effect on postoperative portal vein characteristics. Spleen preservation makes the abdominal stage a less difficult operation and lowers the intraoperative blood transfusion requirements.

Late postoperative rebleeding is a major concern with devascularization procedures. Nevertheless, we are convinced that the Sugiura-Futagawa procedure has the lowest rebleeding rate of these kinds of surgical procedures. Our results as well as those of the Japanese groups show a low rebleeding rate (5%-10%) in the long-term follow-up. We think that this is the result of the extensive devascularization (not done in other procedures) that effectively achieves portoacysos disconnection. The rupture of the communication between the portal system and the azygous veins through collateral vessels is essential to prevent rebleeding.

Corresponding author: Hector Orozco, MD, Surgical Division, Instituto Nacional de la Nutricion, Salvador Zubiran, Vasco de Quiroga 15, 14000 Tlalpan, Mexico.