MEDICAL PRACTICE

*Clinical Problems***Elective Splenorenal Anastomosis**

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Thirty-six patients underwent splenorenal anastomosis for haemorrhage from oesophageal varices. Twenty-nine patients were cirrhotics and seven had extrahepatic blocks or congenital hepatic fibrosis. The patients have been followed from 16 years to 6 months. The operative mortality was 11%. Recurrent haemorrhage occurred in two patients (6%) and neurological manifestations in 38% of the patients at risk. It is concluded that splenorenal anastomosis is associated with a high degree of shunt patency.

Introduction

Splenorenal anastomosis for the relief of portal hypertension is often criticized on the grounds that it is associated with a high incidence of shunt closure. We do not feel that this is a valid criticism and give below our own results.

Patients and Methods

This report concerns 36 elective splenorenal anastomoses performed by three of us (K.B., K.E.F.H., and A.G.R.) between May 1955 and July 1971. All case notes have been studied and where possible the patients have been examined within the past few months. The operations were performed in a standard manner through a left thoracoabdominal incision. The spleen

was removed and the splenic vein was anastomosed end-to-side to the left renal vein, as described by Linton *et al.*¹

The age and sex distribution of the 36 patients (15 males and 21 females) is given in Table I. The table shows a biphasic distribution, a younger age group from 6 to 30 years and an older group from 40 to 70 years.

Selection of Patients.—Our criteria for the selection of patients for this operation have changed over the years. Early in the 'sixties, before percutaneous transsplenic portography was used as a routine investigation, patients who presented with easily palpable spleens were subjected to a splenorenal anastomosis rather than portacaval anastomosis. After the introduction of splenic venography as a routine investigation portacaval anastomosis was performed on all patients with a patent portal vein and splenorenal anastomosis was reserved for patients in whom the portal vein was thrombosed. We then became aware of the high incidence of portasystemic encephalopathy occurring

TABLE I—Age and Sex distribution of the 36 Patients

Age	Males	Females	Total
0-9	0	2	2
10-19	4	5	9
20-29	3	0	3
30-39	0	0	0
40-49	2	3	5
50-59	3	7	10
60-69	2	3	5
70-79	1	1	2

TABLE II—Cause of Portal Hypertension in the 36 Patients

Diagnosis	No. of Patients		
	Male	Female	Total
Portal cirrhosis	8	10	18
Macronodular cirrhosis	2	3	5
Biliary cirrhosis	..	2	2
Subacute hepatitis	..	1	1
Mucoviscidosis	1	..	1
Portal vein thrombosis	3	2	5
Congenital hepatic fibrosis	1	1	2
Congenital mastocytosis	..	1	1
Hydatid disease	..	1	1

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after portacaval anastomosis in patients with cirrhosis. In patients with poor liver function in whom we thought the risk of postoperative portasystemic encephalopathy was high we chose to perform splenorenal anastomosis. The indication for operation in all cases was haemorrhage from oesophageal varices secondary to portal hypertension. The causes of the portal hypertension in this series of patients are shown in Table II. The results of preoperative liver function tests are given in Table III, which compares the values for cirrhotic and non-cirrhotic patients. The mean levels of serum albumin, bilirubin, and alkaline phosphatase were significantly different for the two groups.

TABLE III—Mean Values for Preoperative Liver Function Tests

	Albumin (g/100 ml)	Globulin (g/100 ml)	Bilirubin (Mg/100 ml)	Alkaline Phosphatase (K.A. units)
Cirrhotics ..	3.6	3.1	1.2	27.6
Non-cirrhotics ..	4.2	2.7	0.7	13.4
P value ..	0.05 > P > 0.02	< 0.10 > 0.05	< 0.05 > 0.01*	< 0.05 > 0.01*

* Calculated using Bailey's* modification of Student's *t* test.

Results

Four patients died in hospital after the operation and the remainder were discharged. This gives an operative mortality of 11%. The causes of death of these four patients are shown in Table IV.

TABLE IV—Cause of Postoperative Death

Diagnosis	Sex	Age	Cause of Death
Congenital mastocytosis ..	F.	65	Subphrenic abscess
Subacute hepatitis ..	F.	47	Intraperitoneal haemorrhage
Portal cirrhosis ..	F.	62	Liver failure
Mucoviscidosis ..	M.	14	Respiratory failure

Of the 32 patients who left hospital five had extrahepatic obstruction and two had congenital hepatic fibrosis. All of these seven patients with normal liver function were alive and symptom-free at the time of writing. The remaining 25 patients had cirrhosis. Of these, 12 died—6 from liver failure, 2 from hepatoma, 1 from renal failure, 1 from cerebrovascular accident, 1 from multiple sclerosis, and 1 from colonic carcinoma. Six patients lived longer than six years, and two of these were alive and well 12½ and 16 years after operation.

Upper Gastrointestinal Haemorrhage.—Two patients have had a further haemorrhage postoperatively. The first, a 17-year-old girl, bled shortly after operation when she became pregnant. After the delivery a mesentericocaval anastomosis was performed and she had no further symptoms of bleeding. The second patient bled six months postoperatively and died in hepatic coma; at necropsy the shunt was found to be thrombosed. The incidence of recurrent bleeding among the 32 patients was therefore 6%.

Post Shunt Encephalopathy.—In calculating the incidence of encephalopathy we excluded seven patients from the series who had extrahepatic blocks or congenital hepatic fibrosis. We did this because these patients had normal liver function and were unlikely to develop this complication. The neurological manifestations of hepatic disease include death in coma postoperatively or transient episodes of encephalopathy or hepatic coma occurring as a terminal event. Since we could not clearly separate these groups we included all patients with neurological manifestations in our calculations. There were 11 patients in this group. One died immediately postoperatively after 12 days in hepatic coma and a further six died later in hepatic coma. The remaining four patients developed non-fatal encephalopathy, and one of these died from a cerebral haemorrhage. The incidence of encephalopathy in this series was 38%.

Discussion

In a collective review² which compared the results of splenorenal anastomoses with portacaval anastomoses the long-term results of splenorenal anastomosis for the relief of portal hypertension were poor, as the recurrence rate from variceal bleeding was 2.8% after portacaval anastomosis but 19% after splenorenal anastomosis. There was a striking difference in the incidence of post-shunt encephalopathy—13.4% for splenorenal anastomosis compared with 22.2% after portacaval anastomosis. The conclusion to be drawn from these figures is that many splenorenal anastomoses thrombose.

Many papers have described variations in the technique of splenorenal anastomosis which suggest that surgeons are dissatisfied with the results of the operation. This is in striking contrast to portacaval anastomosis, where the techniques are standardized. Linton *et al.*³ have been strong protagonists for splenorenal anastomosis in patients with bleeding oesophageal varices secondary to cirrhosis of the liver. In their series the protection against further haemorrhage was equal after splenorenal or portacaval anastomosis. The long-term survival rate was improved and the incidence of neurological complications reduced after splenorenal anastomosis. The morbidity and survival data for 173 patients who underwent elective splenorenal or portacaval shunts were reviewed by Barnes *et al.*⁴ Splenorenal anastomosis was performed on 70 patients and all but eight had liver disease. The average values for serum albumin and globulin were comparable with those of our series (Table III). Recurrent bleeding from oesophageal varices occurred in 19% and post-shunt encephalopathy occurred in about 25% of patients. The survival data indicate that "the results of portasystemic shunting are superior in patients selected for splenorenal shunts."

In our own series the operative mortality was 11%. This is low when compared with the 18-19% given in the collective review² but high when compared with our own operative mortality for portacaval anastomosis, which is 1-2%. The reason for the increased operative mortality for splenorenal anastomosis as opposed to portacaval anastomosis is uncertain but partly related to case selection, in that we have chosen to perform splenorenal anastomosis in poor-risk cases.

The incidence of recurrent haemorrhage in this series was lower than that in other published reports and is comparable with our own results after portacaval anastomosis.⁵ There was little difference in the incidence of encephalopathy between those of our patients who underwent portacaval anastomosis and those who had splenorenal anastomosis. This is disappointing since we chose splenorenal decompression for patients in the older age group in the hope of reducing post-shunt encephalopathy. It may be that by selecting patients who had a greater likelihood of developing this complication we militated against better overall results for splenorenal anastomosis. This would explain the difference between our results and those of Barnes *et al.*, who showed that splenorenal anastomosis produced better long-term results than portacaval anastomosis.

We believe that these results indicate that a satisfactorily performed splenorenal shunt is no more likely to close than a portacaval anastomosis, since the incidence of recurrent haemorrhage and encephalopathy after both operations is the same.

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