Selection of operation in patients with bleeding esophageal varices

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The results of surgical treatment of bleeding esophageal varices over an 8-year period in 155 patients are reviewed. Primary treatment of bleeding was conservative, with intravenous administration of vasopressin and balloon tamponade. Emergency operations were carried out after 48 hours in persons with persistent bleeding who were surgical candidates. Operative mortality was higher in this group (40%) than in those undergoing elective or urgent operations (each 10%). Postoperative encephalopathy occurred in 35% of patients and was correlated closely to late death after establishment of a shunt. The mesocaval shunt is no better than the portacaval but appears to be a good alternative in an emergency. In a controlled trial the distal splenorenal shunt was found to be associated with a lower rate of postoperative encephalopathy than the portacaval shunt, but thus far the long-term survival rates have not differed.

On passe en revue les résultats du traitement chirurgical du saignement des varices oesophagiennes, pratiqué chez 155 patients au cours d'une période de 8 ans. Le traitement primaire du saignement a été conservateur, consistant en l'administration intraveineuse de vasopressine et en une tamponnade par ballonnet. Les interventions d'urgence ont été pratiquées après 48 heures chez les candidats à la chirurgie dont le saignement a persisté. La mortalité opératoire a été plus élevée dans ce groupe (40%) que chez les patients qui subissent une opération, urgente ou pas (10% dans les deux cas). Une encéphalopathie postopératoire est survenue chez 35% des patients et a été reliée à une mort tardive après anastomose. L'anastomose mésocave n'est pas meilleure que l'anastomose portocave, mais elle semble être une bonne alternative dans les cas d'urgence. Dans une étude contrôlée, l'anastomose distale splénorénale a été associée à un taux moindre d'encéphalopathie postopératoire que l'anastomose portocave, mais, jusqu'à maintenant, la survie à long terme n'est pas différente.

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Since the first report of portal–systemic decompression for portal hypertension in 1945,[1] the role of surgical treatment of this condition has gone through several phases. The 1940s can be considered the pioneer years. In the 1950s decompressive operations were promoted enthusiastically, but in the 1960s more caution was exercised and controlled trials, first of prophylactic portacaval shunting[2,3] and then of therapeutic shunting,[4,5] were begun. These trials failed to show any role for prophylactic shunting. They did, however, define a role for shunting in patients who have already bled, but they have not yet clarified the place of emergency shunt operations, the selection of patients to receive a shunt or which is the best shunt operation.

In 1968 a program for the study and treatment of patients with bleeding esophageal varices was instituted at the Toronto General Hospital. Between then and September 1976, 155 patients underwent operations for bleeding esophageal varices. The experience has not given answers to all the questions referred to above, but it has provided some useful guidelines for treatment and has built a baseline from which answers to some of the questions may evolve, particularly those regarding the timing of the operation and the role of distal splenorenal and mesocaval shunts.

Table I—Pathologic conditions responsible for portal hypertension and bleeding

Condition	No. of patients
Alcoholic cirrhosis	95
Macronodular cirrhosis	42
Primary biliary cirrhosis	5
Portal vein thrombosis	5
Budd–Chiari syndrome	4
Primary portal hypertension	4
Total	155

Table II—Operations performed on the 155 patients, 1968–76

Type of operation	No. of procedures
Establishment of shunt	
Portacaval	
End-to-side	82
Side-to-side	4
Distal splenorenal (Warren)	32
Splenorenal	15
Mesocaval (Drapanas)	13
Other	5
Splenectomy	4
Devascularization procedure	2
Ligation of varices	1
Total	158*

*Three patients had more than one operation.

Clinical and operative data

The pathologic conditions responsible for the portal hypertension and bleeding in our patients are listed in Table I. Alcoholic cirrhosis was by far the commonest, affecting two thirds of the patients. Most of the rest had macronodular posthepatitic cirrhosis.

Primary treatment of bleeding was conservative, with intravenous administration of vasopressin and balloon tamponade.

The operations done in the 8-year period are listed in Table II. Our greatest experience has been with the establishment of the standard end-to-side portacaval shunt.

The timing of the operation is outlined in Table III. Thirty-nine operations were elective — that is, they were carried out in patients admitted to hospital in stable condition for their operation. Fifty-three were urgent, which implies that the operation was carried out during the admission prompted by hemorrhage, but after control of the bleeding, stabilization of the patient's condition and complete preoperative study. Sixty-three patients underwent an emergency operation because of uncontrolled bleeding after 48 hours of conservative treatment. Operative mortality was closely linked to timing, being much greater (40%) for emergency procedures than for elective or urgent procedures (10% each); the overall mortality was 22%.

Table III—Relation of timing of operation to operative mortality

Timing of operation	No. of patients	No. (and %) of operative deaths
Elective	39	4 (10)
Urgent	53	5 (10)
Emergency	63	25 (40)
Total	155	34 (22)

There was also a correlation between preoperative liver function as graded by Child's classification[6] and operative mortality (Table IV): patients with grade A liver function had an operative mortality of 4%, those with grade B function 22% and those with grade C function 50%. The group described as having C→B liver function were patients whose liver function was classified as grade C during the bleeding episode, but after the bleeding was controlled with conservative measures and they were ready for operation the grading had improved to B. Their operative mortality was comparable to that of the group with grade B liver function, and this provides a strong argument for the avoidance, if possible, of emergency surgery, especially in those with grade C liver function.

In most cases we attempted to have histologic material for assessment prior to operation. The data obtained (Table V) showed that patients with evidence of active alcoholic liver disease, as determined by the amount of hyaline in liver cells, had a much higher operative mortality than those without such evidence. In the former group we therefore prefer to delay operation for several months, if possible, to allow the liver disease to stabilize.

Follow-up data

All patients surviving their operation were carefully followed up at regular intervals. The overall incidence of encephalopathy after establishment of a shunt was 35%; half the cases were mild and half severe. The incidence after establishment of a portacaval shunt was 50%. Attempts to correlate occurrence of encephalopathy with preoperative liver function, liver size, hepatic histologic features and hepatic blood flow have so far been unrewarding.

There was, however, a definite relation between postoperative encephalopathy and late death (Table VI). The accumulated late mortality in patients without encephalopathy was 15%, in those with mild encephalopathy it was 33% and in those with severe encephalopathy it was 59%.

Table IV—Relation of preoperative grading of liver function (by Child's classification[6]) to operative mortality

Liver function	No. of patients	No. (and %) of operative deaths
A	48	2 (4)
B	54	12 (22)
C	35	17 (50)
C → B	18	3 (17)

Table V—Relation of amount of alcoholic hyaline in the liver to operative mortality

Amount of hyaline*	No. of patients	No. of operative deaths	
0	22	2	
1+	11	0	— 2/36 (6%)
2+	5	0	
3+	4	3	
4+	3	3	— 6/7 (86%)

*Hyaline was present in no cells (0), fewer than 5% (1+), 5% to 10% (2+), 10% to 25% (3+) or more than 25% (4+).

Table VI—Relation between postoperative encephalopathy and late mortality

Encephalopathy	No. of patients	No. (and %) of late deaths (0-8 yr)
None	67	10 (15)
Mild	24	8 (33)
Severe	22	13 (59)

Assessment of shunt operations

Diversion of portal blood flow from the liver is thought to be an important factor contributing to postoperative hepatic injury, encephalopathy and death.[7-9]

In the absence of good preoperative predictors of postoperative encephalopathy our attention, along with that of others, has focused on the possibility of using shunts other than the standard end-to-end portacaval shunt, which inevitably diverts all portal blood from the liver. Two shunts we have evaluated are the Warren distal splenorenal shunt and the Drapanas version of the mesocaval shunt.

Warren distal splenorenal shunt

The distal splenorenal shunt (Fig. 1), as described by Warren, Zeppa and Fomon,[9] preserves some portal flow into the liver while simultaneously decompressing the gastroesophageal area, the area that bleeds. The angiograms in Fig. 2 show the separation of portal venous flow that occurs after establishment of a distal splenorenal shunt: gastroesophageal splenic flow proceeds through the shunt and up through the inferior vena cava, and mesenteric flow continues through the portal vein to perfuse the liver.

We have established 32 Warren shunts, most electively, with an operative mortality of 16%, a postoperative encephalopathy rate of 7%, and a late mortality of 11%. A look at these data alongside those for our unselected portacaval shunts (Table VII) suggests that the Warren shunt operation is superior in every way. These uncontrolled data do not, however, take into account the facts that most Warren shunts were established electively and that the Child grade of liver function was more favourable in the patients with these shunts; therefore this conclusion is invalid.

We have undertaken a prospective randomized trial of the elective Warren

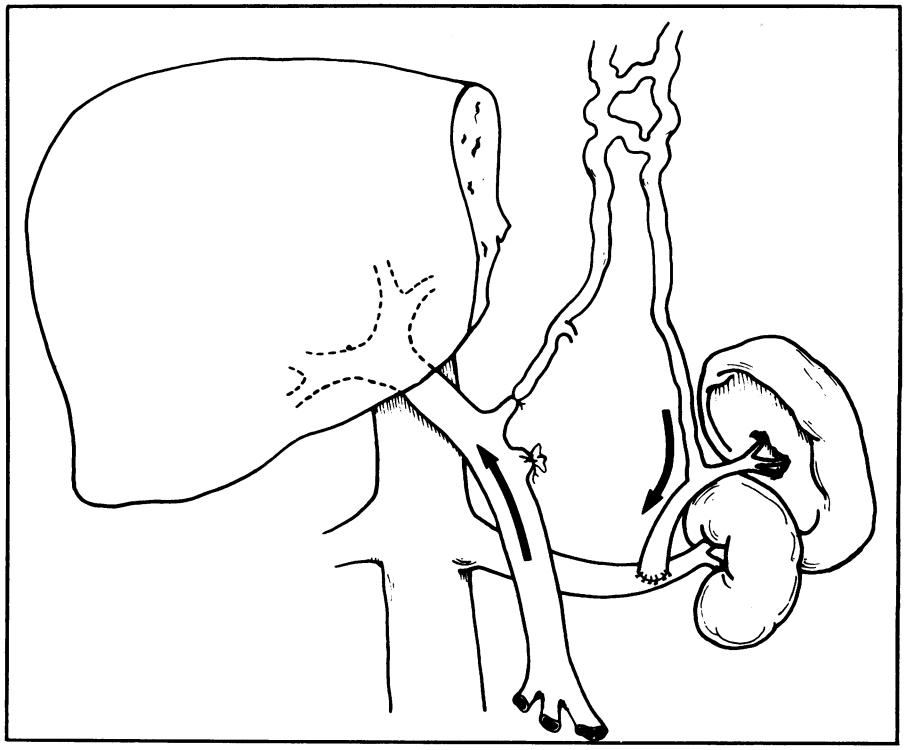

FIG. 1—Warren distal splenorenal shunt: distal end of splenic vein is anastomosed to left renal vein; coronary vein and gastroepiploic arcade (not shown) are ligated.

Table VII—Results of shunt operations (uncontrolled data)

Shunt	No. (and %) Total	Operative death	Postoperative encephalopathy	Late death
Portacaval	86	20 (23)	33 (50)	22 (33)
Distal splenorenal (Warren)	32	5 (16)	2 (7)	3 (11)
Mesocaval (Drapanas)	13	4 (31)	2 (44)	1 (11)

Table VIII—Results of controlled trial with the distal splenorenal (Warren) and portacaval shunts

Shunt	No. (and %) Total	Operative death	Postoperative encephalopathy	Late death
Distal splenorenal	22	4 (18)	1 (6)	2 (11)
Portacaval	21	0	6 (29)	3 (14)

shunt operation, with the portacaval shunt operation as the control procedure. The data tabulated as of Sept. 15, 1976 for the 43 patients entered up to July 1976 are shown in Table VIII. In contrast to the uncontrolled data, these data indicate no advantage of the Warren shunt thus far in terms of either operative mortality or late mortality, but they support the advantage claimed by Galambos and Warren and their colleagues[10] of a reduced rate of postoperative encephalopathy. This trial is continuing.

Drapanas version of the mesocaval shunt

The mesocaval shunt was first proposed as an alternative to the portacaval shunt in the patient with portal vein thrombosis. Drapanas[11] popularized the side-to-side version of the shunt, in which a prosthetic graft is used as an alternative shunt in the patient with a patent portal vein; he and his colleagues suggested that this allowed some forward flow to continue in the liver and claimed a reduced rate of postoperative encephalopathy in an uncontrolled group of patients. This claim has not been substantiated by others.

The Drapanas mesocaval shunt (Fig. 3) is merely a large side-to-side total portal–systemic shunt that theoretically should behave like a side-to-side portacaval shunt. Postoperative angiograms (Fig. 4) support this view and show that mesenteric flow is totally diverted through the shunt and up the inferior vena cava, and that gastroesophageal splenic flow does not go up into the liver but back down the mesenteric vein and then through the shunt and up the inferior vena cava; thus the liver is deprived of all portal blood flow.

We have established only 13 mesocaval shunts, most as emergencies, and the patients were comparable to those receiving portacaval shunts. The data (Table VII) are uncontrolled, but there is no apparent advantage of the mesocaval shunt operation over that of the portacaval shunt in immediate mortality, postoperative encephalopathy or late mortality. We have now begun a prospective randomized study of these two operations in emergency situations.

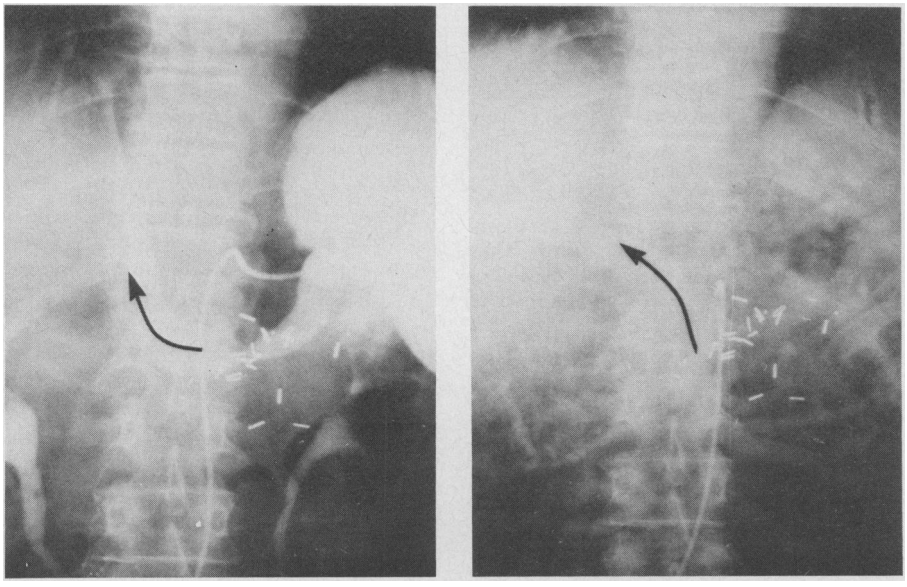

FIG. 2—Selective angiograms following establishment of Warren distal shunt. Left: splenic artery injection (venous phase) shows flow through shunt and up inferior vena cava. Right: superior mesenteric artery injection (venous phase) shows forward flow up portal vein and into liver.

Conclusions

When should a shunt be established?

Emergency operation for bleeding esophageal varices is associated with an operative mortality in the range of 50%.[12,13] Orloff,[13] the most enthusiastic proponent of emergency shunting operations, has shown to our satisfaction that establishment of a shunt as an emergency procedure in all bleeders is better than not doing this in any; however, he has not proven that selection of some patients for immediate operation and others for a delayed procedure is not better still. The operative mortality in the selected group of patients in our series with intractable bleeding was no worse than the rate for all persons with bleeding in Orloff's series.

In addition, we have shown that the hepatic status of a group of persons with alcoholic cirrhosis may improve; hence, if an emergency shunt operation can be avoided, their chances of surviving a later operation will be greater. This is particularly true in those with pronounced hyaline deposition in the hepatic cells.

Our present approach, therefore, is to treat the bleeding episode conservatively for approximately 48 hours. During this time the bleeding will stop in more than half the patients and can be dealt with later. Of the other half, those with operable conditions should have a shunt established.

Who should be given a shunt?

The operative mortality of shunt procedures is higher in patients with grade C (Child's classification) liver function than in those with grade A or B function, but when bleeding persists the nonoperative mortality is even higher. We therefore consider as unsuited for operation only patients in profound coma, those with severe, biopsy-confirmed alcoholic hepatitis, and those with a combination of ascites, precoma and progressive deterioration of liver function.

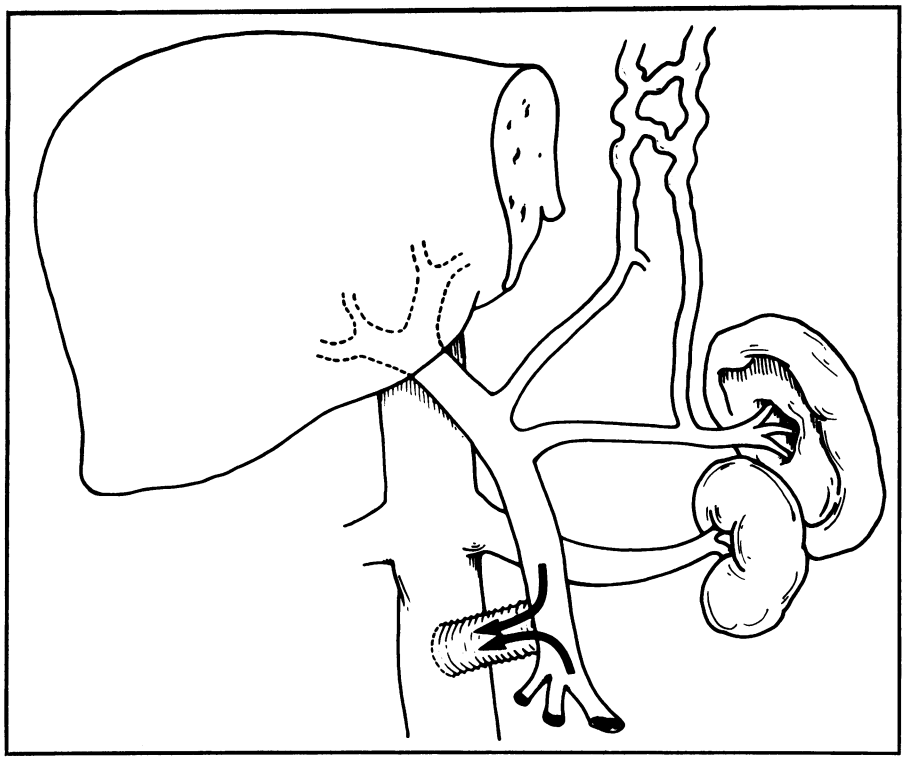

FIG. 3—Drapanas mesocaval shunt: knitted Dacron prosthesis 16 to 20 mm long used to make side-to-side anastomosis of mesenteric vein to inferior vena cava.

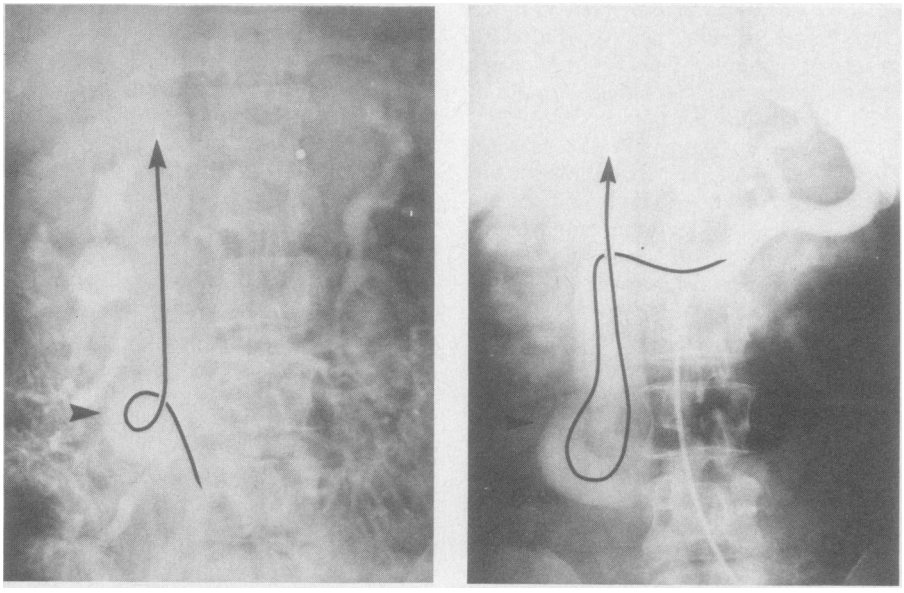

FIG. 4—Selective angiograms following establishment of Drapanas version of mesocaval shunt. Left: superior mesenteric artery injection (venous phase) shows flow through shunt and up inferior vena cava. Right: splenic artery injection (venous phase) shows flow back down superior mesenteric vein, then through shunt and up inferior vena cava.

All other patients are candidates for elective, urgent or emergency operation.

What operation should be used?

The end-to-side portacaval shunt operation is still the standard against which all other shunt procedures must be compared. It is easily done in most patients and is highly effective in stopping bleeding and preventing recurrent bleeding. The main problem with this operation is the high incidence of postoperative encephalopathy and associated late mortality. Whether any other operation is better in either respect remains to be proved.

The mesocaval shunt operation can, with experience, be done as quickly and, in some patients, more easily than the portacaval shunt. There is no good theoretical reason why it should be superior to the portacaval shunt as regards the incidence of postoperative encephalopathy, and our experience so far is in keeping with this concept. It is a good alternative in an emergency but needs more study, especially long-term follow-up with regard to encephalopathy and late potency.

The Warren distal splenorenal shunt operation is more difficult and time-consuming than the portacaval shunt operation. The early results in any surgeon's hands are likely to be unsatisfactory. It should therefore be used only as an elective procedure, by groups doing a sufficiently large number to justify the beginning morbidity and mortality costs, and for the present only as part of a controlled clinical trial. Although there is accumulating reliable evidence that the incidence of postoperative encephalopathy is lower with this operation than with the standard portacaval shunt operation, the real benefit, improved long-term survival, is not yet apparent.

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