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Surgical Treatment of Portal Hypertension: Review of Henry Ford Hospital Experience

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Of 146 operations performed for the complications of portal hypertension in the Henry Ford Hospital between 1927 and August 31, 1969, 114 were portasystemic shunts. Operative mortality, sequelae and long term survival were closely related to the state of the patients' liver function and the urgency of operation.

Although the surgical treatment of portal hypertension includes the management of all its major complications, namely, bleeding esophageal varices, hypersplenism and ascites, exsanguination from variceal bleeding represents the greatest therapeutic challenge. In an attempt to evaluate how effective has been our treatment of bleeding esophageal varices and to place our current practice in perspective, we reviewed the operations performed for portal hypertension in the Henry Ford Hospital from 1927 to August 31, 1969.

Clinical Material and Method

The medical record of every patient who had had an operation for the treatment of a complication of portal hypertension during this period (1927-1969) was studied and the information tabulated. The compiled data was then subjected to analysis with the assistance of computer sorting.

In this series, 146 patients were found to have had some form of surgical therapy for portal hypertension.

There were 83 males and 63 females. Although ages ranged from 4.5 years to 73 years, 72.2% were in the fifth, sixth or seventh decades of life. It was found that among the 146 cases, there were 114 who had been treated by some type of portasystemic shunt for a complication of portal hypertension. As the major concern of our study centered on patients for whom a portasystemic shunting operation was done to treat bleeding esophageal varices, we focused our primary attention on this group of 98 patients and their operative results, sequelae and survival experience.

In spite of the well-known obstacles that are frequently encountered in tracing cirrhotic patients, we were able to obtain a 100% complete followup on all cases within two months of the closing date of the study (August 31, 1969). When personal examination of patients was not possible, letters of inquiry or phone calls were made to the involved physicians, relatives or to Bureaus of Vital Statistics.

Results

The causes of the portal hypertension, in 91.6% of the 146 cases treated surgically, consisted of Laennec's, post-

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necrotic or biliary cirrhosis (Table 1). The miscellaneous category included such diverse causes as hepatic malignancy, portal vein malformation, hepatic mucovisidosis, and pancreatitis with portal vein thrombosis. One patient from Puerto Rico gave a history of schistosomiasis.

When all of the cases were distributed chronologically in three surgical therapeutic categories (Table II), we observed that: splenectomy alone was used as the primary form of treatment before 1950 and has been rarely used since that time; variceal and arterial ligations enjoyed some popularity between 1950 and 1960; however, portasystemic shunts have been used with increasing frequency in each period. Because portasystemic shunting opera-

tions have now become the accepted form of therapy in contrast to ligations or splenectomy, we will deal chiefly with the results of the 114 portasystemic shunts.

The most frequently used type of portal vein decompression (Table III) was a portacaval shunt (58.8%); two-thirds being of the end-to-side variety. The next most frequently used type of shunt was a splenorenal shunt (37.7%); recently, there have been four cases in which a caval-mesenteric shunt has been constructed.

Five of the 114 portasystemic shunting procedures were done before the advent of effective medical diuretic therapy in attempts to control intractable ascites. Two patients died postoperatively, and in the remaining three

TABLE I
ETIOLOGY OF PORTAL HYPERTENSION

ETIOLOGY	OPERATIONS	
	NO.	%
Laennec's cirrhosis	99	67.8
Post-necrotic cirrhosis	29	19.7 ⎬ 91.6%
Biliary cirrhosis	6	4.1
Miscellaneous*	9	6.3
No information	3	2.1
TOTAL	146	100.0

* Note: Hepatic malignancy, hepatic mucovisidosis, portal vein malformation and pancreatitis with portal vein thrombosis - 2 cases each. Schistosomiasis - 1 case.

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TABLE II
CHRONOLOGICAL DISTRIBUTION OF TYPE OF OPERATION

TIME PERIOD	PORTASYSTEMIC SHUNTS	SPLENECTOMY	VARICEAL AND/OR ARTERIAL LIGATION	TOTAL
1927 – 1950	3	10	0	13
1951 – 1960	37	4	14	55
1961 – August, 1969	74	3	1	78
TOTAL	114	17	15	146

TABLE III
TYPE OF PORTASYSTEMIC SHUNT

TYPE OF SHUNT	OPERATIONS NO.	OPERATIONS %
PORTACAVAL	67	58.8
End–to–side 48		
Side–to–side 19		
SPLENORENAL	43	37.7
CAVAL–MESENTERIC	4	3.5
TOTAL	114	100.0

Note: Emergency Operations: Portacaval 16, Splenorenal 2, and Caval-Mesenteric 0

patients the ascites was not improved. Fortunately, it has not been necessary to consider a shunting procedure for a case of ascites in the past eight years.

Eleven shunting operations were performed in conjunction with splenectomy for hypersplenism. As would be expected, nine of the shunts were splenorenal, but in two other patients it was necessary, because of an inadequate splenic vein, to resort to portacaval anastomosis in one case and, in the other, a caval-mesentric communication. There were two operative deaths in this group. Six of the 11 patients were still alive at the end of the review period, with a mean survival time of 39 months.

The most frequent and, for the surgeon dealing with massive gastrointestinal bleeding, the most pressing indication for a shunting procedure is bleeding from esophageal varices. Ninety-eight of the 114 portasystemic shunts in this series were done for this reason.

Operations for variceal bleeding were classified in two ways. First, if the shunt was done during a bleeding episode, the operation was classified as emergency; if the bleeding was first controlled and the shunt performed as a planned procedure, it was considered elective. Secondly, patients undergoing a shunting operation were classified into three grades of surgical risk based primarily on the degree of their liver dysfunction, using a modification of the criteria recommended by Child and Turcotte (Table IV).[1] In most cases, the category of risk was obvious; however, the poorer grade was chosen if two or more parameters applied.

Since most deaths in this series attributable directly to the surgical intervention occurred within a few days or weeks of the operation, we have considered those occurring during the first month as an operative mortality.

The operative mortality for shunting procedures undertaken for variceal bleeding was tabulated (Table V) according to the type of shunt, urgency

TABLE IV

DEFINITION OF GRADE OF SURGICAL RISK

	GRADE I	GRADE II	GRADE III
Bilirubin (mg %)	Less than 2.0	2.0 to 3	More than 3
Albumin (gm %)	More than 3.5	3.0 to 3.5	Less than 3.0
Ascites	None	Easily controlled	Uncontrolled
Encephalopathy	None	Minimal	Advanced (Coma)
Nutrition	Excellent	Good	Wasting
Associated disease	None	Single or minor	Serious or multiple

TABLE V

OPERATIVE MORTALITY IN 98 SHUNTS FOR VARICEAL BLEEDING
ACCORDING TO TYPE OF SHUNT, URGENCY AND SURGICAL RISK

SURGICAL RISK

TYPE OF SHUNT	GRADE I		GRADE II		GRADE III		TOTAL	
	OPS	%MORT	OPS	%MORT	OPS	%MORT	OPS	%MORT
Portacaval								
Elective	19	0.0%	19	15.8%	10	30.0%	48	12.5%
Emergency	2	100.0%	4	50.0%	10	60.0%	16	62.5%
Total	21	9.5%	23	21.7%	20	45.0%	64	25.0%
Splenorenal								
Elective	10	0.0%	15	20.0%	4	25.0%	29	13.8%
Emergency	0	——	1	0.0%	1	0.0%	2	0.0%
Total	10	0.0%	16	18.8%	5	20.0%	31	12.9%
Caval-Mesenteric								
Elective	1	0.0%	2	0.0%	0	——	3	0.0%
Emergency	0	——	0	——	0	——	0	——
Total	1	0.0%	2	0.0%	0	——	3	0.0%
TOTAL	32	6.3%	41	19.5%	25	40.0%	98	20.4%

of operation and the grade of surgical risk. Although the number of cases in some categories is too small to be significant, certain trends can be recognized. While the overall surgical mortality was 20.4%, the mortality for patients undergoing shunting procedures with Grade I risk was 6.3%, with Grade II 19.5%, and with Grade III 40%. When the operative mortality of the 80 elective shunts for the treatment of bleeding varices was considered (Table VI), the adverse effect of the increased severity of liver disease was again obvious; the mortality for Grade I was 0; for Grade II 16.6%, and for Grade III 28.6%. The overall mortality for elective cases was 12.5%. This also clearly demonstrates the decreased mortality rate for elective cases in contrast to the emergency shunt group (55.5%).

The influence of the underlying liver disease in determining the success of treatment of these patients is again seen when the causes of operative mortality are investigated (Table VII). The most frequent cause of operative mortality was hepatic failure (35%). Continued variceal bleeding and/or bleeding from a duodenal ulcer accounted for 30% of the operative mortality. Although in some cases determination was difficult, it was usually assumed that the cause of upper gastrointestinal bleeding was related to the patient's portal hypertension.

In the group of 78 survivors of the 98 shunting operations for bleeding esophageal varices of all grades, observations were made concerning certain postoperative sequellae: namely, encephalopathy, ascites and recurrent upper gastrointestinal bleeding.

An attempt was made to grade the degree of encephalopathy in individual cases. This posed a difficult problem both from the standpoint of evaluating subjective symptoms, which varied greatly with time, and also from the standpoint of the amount of occupational disability. Employment demands on patients were so different that deficiencies could not be objectively classified. Many were retired in their protected home environment or continued to do non-demanding work, noting only a tendency to fall asleep early in the evening. In contrast, a trial lawyer found he was not alert enough to continue his occupation after a portacaval shunt, even though to a casual observer he appeared unchanged. It was found that about 60% of the patients noted some evidence of encephalopathy (Table VIII), following a portacaval shunt, varying from minimal to severe. There was no significant difference between the end-to-side and side-to-side anastomosis in this respect. After a splenorenal shunt, the incidence was significantly less. There was no encephalopathy among the three patients with caval-mesenteric anastomoses, done primarily for extra-hepatic portal obstruction in the presence of good liver function. As could be expected, the severity of post-operative encephalopathy (Table IX) varied directly with the grade of preoperative liver dysfunction. Seven of 30 Grade I cases surviving operation had some degree of encephalopathy. Only four of these (13.3%) were 3+ in severity. Over 50% of Grade II operative survivors had encephalopathy. In Grade III, 11 of 15 patients, or 73%, had varying degrees of encephalopathy and of these, eight or 53.3% were 3+.

TABLE VI

OPERATIVE MORTALITY IN 80 ELECTIVE SHUNTS
FOR VARICEAL BLEEDING

SURGICAL RISK

TYPE OF SHUNT	GRADE I		GRADE II		GRADE III		TOTAL	
	OPS	%MORT	OPS	%MORT	OPS	%MORT	OPS	%MORT
Portacaval	19	0.0%	19	15.8%	10	30.0%	48	12.5%
Splenorenal	10	0.0%	15	20.0%	4	25.0%	29	13.8%
Caval-Mesenteric	1	0.0%	2	0.0%	-	-	3	0.0%
TOTAL	30	0.0%	36	16.6%	14	28.6%	80	12.5%

TABLE VII

CAUSE OF OPERATIVE MORTALITY
IN 98 SHUNTS FOR VARICEAL BLEEDING

CAUSE OF OPERATIVE DEATH	PORTACAVAL NO.	%	SPLENORENAL NO.	%	TOTAL NO.	%
Liver failure	5	31.2	2	50.0	7	35.0
Cardiopulmonary	4	25.0	0	0.0	4	20.0
Variceal bleeding	3	18.8	0	0.0	3	15.0
Bleeding ulcer	2	12.5	1	25.0	3	15.0
Other	2	12.5	1	25.0	3	15.0
TOTAL	16	100.0	4	100.0	20	100.0

(Variceal bleeding 15.0 and Bleeding ulcer 15.0 bracketed } 30.0)

Note: Patients with caval-mesenteric shunts had no
operative mortality.

TABLE VIII

INCIDENCE OF POSTOPERATIVE ENCEPHALOPATHY IN 78 OPERATIVE
SURVIVORS OF 98 SHUNTS FOR VARICEAL BLEEDING

TYPE OF SHUNT	IMMEDIATE SURVIVALS NO. CASES	P. O. ENCEPHALOPATHY NO.	%
Portacaval			
End-to-Side	33	20	60.6
Side-to-Side	15	9	60.0
Splenorenal	27	6	22.0
Caval-Mesenteric	3	0	0.0
TOTAL	78	35*	44.9

* Note: Severity of postoperative encephalopathy:
+1 - 9 cases; +2 - 11 cases; +3 - 15 cases

TABLE IX

SEVERITY OF POSTOPERATIVE ENCEPHALOPATHY
ACCORDING TO HEPATIC DYSFUNCTION
IN 78 SURVIVORS OF 98 PORTASYSTEMIC SHUNTS
FOR VARICEAL BLEEDING

SEVERITY OF HEPATIC DYSFUNCTION	IMMEDIATE SURVIVORS NO. CASES	SEVERITY OF P. O. ENCEPHALOPATHY*				
		+1 NO.	+2 NO.	+3 NO.	TOTAL NO.	%
Grade I	30	2/30	1/30	4/30	7/30	23.3
Grade II	33	7/33	7/33	3/33	17/33	51.5
Grade III	15	0/15	3/15	8/15	11/15	73.3

* Definition of the severity of encephalopathy:

+1 = Mild transient confusion easily controlled with diet

+2 = Transient confusion controlled by diet and non-absorbable antimicrobial

+3 = Confusion controlled with difficulty by diet and non-absorbable antimicrobial

Ascites of varying degree occurred in 57.7% of the 78 post-operative survivors (Table X), which was twice the preoperative incidence in these patients. The ascites was effectively treated by salt-restriction and/or diuretics in 44.6%. It was controlled with some difficulty in another 10.3%, but persisted in 2.6% in spite of treatment. While there was no clear difference between the end-to-side and side-to-side portacaval shunts, patients with a splenorenal anastomosis were slightly less subject to postoperative ascites.

Eleven of the 78 postoperative survivors, or 14%, had an episode of recurrent bleeding (Table XI). The porta-caval anastomosis resulted in a low incidence of recurrent bleeding (4.2%), but the anatomically smaller splenorenal shunt resulted in a significantly increased occurrence (33.3%).

Patency rates of the 98 shunts done for bleeding varices, whether or not the patients survived the operation, were studied in two ways. Where autopsies were performed, after either an operative or late death, patency was determined from the anatomical description. In those dead without autopsy or still living, patency was assumed if there was no evidence of recurrent bleeding. When upper gastrontestinal bleeding occurred postoperatively, re-

TABLE X

INCIDENCE OF POSTOPERATIVE ASCITES
IN 78 OPERATIVE SURVIVORS OF 98 SHUNTS
FOR VARICEAL BLEEDING

TYPE OF SHUNT	IMMEDIATE SURVIVALS NO. CASES	SEVERITY OF POSTOPERATIVE ASCITES*									
		+1		+2		+3		+4		TOTAL	
		NO.	%	NO.	%	NO.	%	NO.	%	NO.	%
Portacaval											
End-to-side	33	7	21.2	11	33.3	3	9.1	1	3.0	22	66.7
Side-to-side	15	3	20.0	3	20.0	2	13.3	1	6.6	9	60.0
Splenorenal	27	4	14.8	7	25.9	3	11.1	0	0.0	14	51.9
Caval-Mesenteric	3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
TOTAL	78	14	17.9	21	26.7	8	10.3	2	2.6	45**	57.7

* Definition of severity of ascites:
    +1 = Ascites controlled by salt restriction.
    +2 = Ascites controlled by salt restriction and diuretics.
    +3 = Ascites controlled with difficulty by salt restriction and diuretics.
    +4 = Ascites uncontrolled.
** 22 cases had no clinical evidence of preoperative ascites.

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TABLE XI

INCIDENCE OF RECURRENT GASTROINTESTINAL BLEEDING
IN 78 OPERATIVE SURVIVORS OF 98 SHUNTS FOR VARICEAL BLEEDING

| | IMMEDIATE SURVIVORS | P.O. G.I. BLEEDING | |
TYPE OF SHUNT	NO. CASES	NO.	%
Portacaval			
End-to-Side	33	*1	3.0
Side-to-Side	15	**1	6.7
TOTAL	48	2	4.2
Splenorenal	27	***9	33.3
Caval-Mesenteric	3	0	0.0
TOTAL	78	11	14.0

        *Liver Status: Grade I - 1 case
      **Liver Status: Grade III - 1 case
   ***Liver Status: Grade I - 3 cases, Grade II - 4 cases,
                         Grade III - 2 cases

current esophageal bleeding was incriminated unless proven otherwise. It was occasionally a conjecture as to whether the actual cause was hemorrhage from esophageal varices, peptic ulcer, or a variety of hemorrhagic disorders. Using these two criteria, patency for the portacaval shunts was 90.2% and for the splenorenal shunts 72.2% (Table XII). All of the caval-mesenteric shunts were patent clinically (two cases), or at autopsy (one case). The overall patency rate was 95.9%.

When the causes of late death are analyzed, the marked influence of the primary liver disease is again observed (Table XIII), with liver failure causing over half the late deaths.

In order to show the effect of portasystemic shunts on survival, a cumulative survival curve for the 98 cases of portasystemic shunts done for bleeding esophageal varices was constructed according to the method outlined in Szilagyi et al[2] (Table 14 and Fig 1). In Figure 1 the survival curve is compared first to the expected survival of a hypothetical population group with a similar mean age using life tables[3] and, second, to a group of 33 nonoperative patients who had had one episode of bleeding from esophageal varices, taken from Baker et al.[4] The "normal" loss of survival in 10 years was roughly 10%, while the overall survival for our cases treated with portasystemic shunting shows a steady decline to 30% at seven and 27% at ten years. In the group of 33 patients followed without surgery (Baker et al[4]), there was no survival after four years.

The effect of the degree of liver dysfunction on survival is shown by comparing three separate cumulative sur-

vival curves (Fig 2 and Tables XV, XVI, XVII). After the fourth year, the curves for Grades I (32 cases) and II (41 cases) are surprisingly close and parallel to each other. The curves for Grades I, II and III in Figure 2 and the nonoperative curve in Figure 1 have surprisingly parallel slopes at different levels of survival after the first year. All of the curves for operative and nonoperative treatment, although parallel to each other, are considerably steeper than the population sample curve.

Discussion

The chronological distribution of operations reflects that the surgeons involved in this series have come to rely primarily on the proven efficacy of decompression of the portal system by a shunting procedure to treat the hemorrhagic complications of portal hypertension. This conclusion has been reached by others.[5]

The last time that ascites was the sole indication for a shunt in our series was in 1962. In a comparable series,[5] most of the cases of intractable ascites were operated upon before 1960. The current lack of interest in portacaval shunting to treat ascites has been attributed to the great improvement in medical therapy.

The 11 patients who had an operation for hypersplenism with an associated portasystemic shunt have had satisfactory results. This indicates to us that when splenectomy must be done for portal hypertension with secondary hypersplenism, a concomitant shunting procedure, preferably a splenorenal shunt, should be done at the same time, even if there are no actively bleeding esophageal varices. In this respect, we

TABLE XII

DETERMINATION OF SHUNT PATENCY
BY AUTOPSY OR CLINICAL EVALUATION

TYPE OF SHUNT	AUTOPSIED		CLINICAL EVALUATION*		TOTAL	
	NO. AUTOPSIED	% PATENT	NO. WITHOUT AUTOPSY	% PATENT	NO. OF OPS.	% PATENT
Portacaval						
End-to-Side	14	78.6	32	90.6	46	87.0
Side-to-Side	4	100.0	14	100.0	18	100.0
Total	18	83.3	46	93.5	64	90.2
Splenorenal	15	80.0	16	68.8	31	72.2
Caval-Mesenteric	1	100.0	2	100.0	3	100.0
TOTAL	34	82.4	64	96.9	98	95.9

* Note: Patency assumed if no recurrent bleeding.

TABLE XIII

CAUSE OF LATE MORTALITY
IN 98 SHUNTS FOR VARICEAL BLEEDING

CAUSE OF LATE DEATH	PORTACAVAL		SPLENORENAL		CAVAL-MESENT.		TOTAL	
	NO. DEATHS	% DEATHS	NO. DEATHS	% DEATHS	NO. DEATHS	% DEATHS	NO. DEATHS	% DEATHS
Liver failure	16	69.7	7	38.9	0	0.0	23	54.8
Variceal bleeding	1	4.3	4	22.2	0	0.0	5	11.9
Bleeding ulcer	1	4.3	1	5.6	0	0.0	2	4.8
Cardiopulmonary	3	13.0	2	11.1	0	0.0	5	11.9
Other	2	8.7	4	22.2	1	100.0	7	16.6
TOTAL DEATHS	23	100.0	18	100.0	1	100.0	42	100.0

TABLE XIV

CUMULATIVE 20 YEAR SURVIVAL OF 98 CASES OF PORTAL HYPERTENSION
WITH VARICEAL BLEEDING TREATED BY PORTASYSTEMIC SHUNTS
(Includes Grade I - 32 Cases, Grade II - 41 Cases, Grade III - 25 Cases)

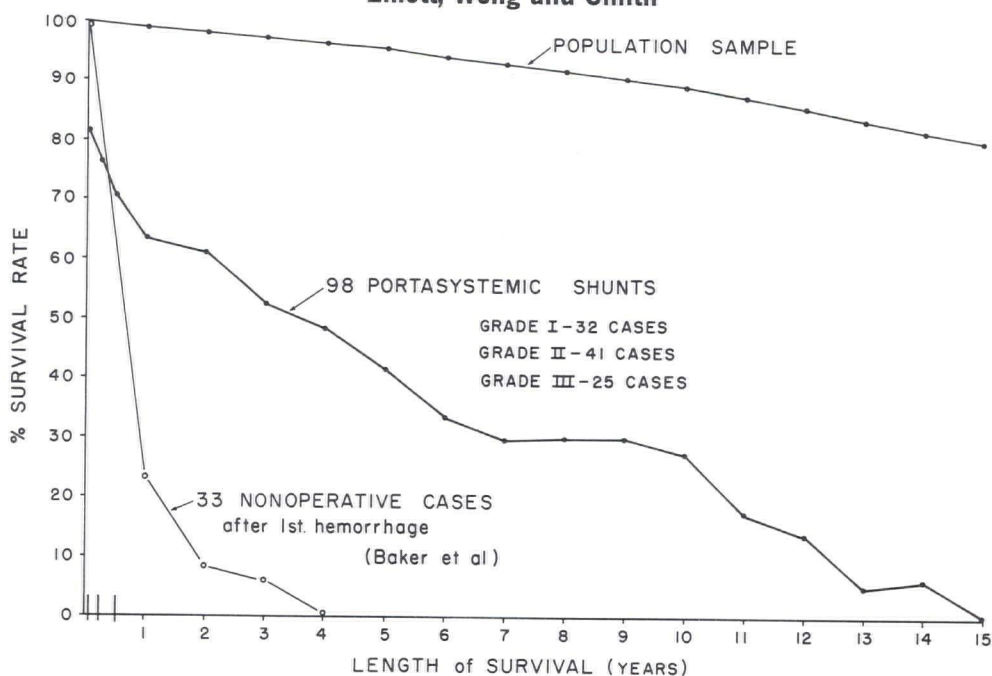| PERIOD OF FOLLOW UP	PATIENTS FOLLOWED FOR INDICATED PERIOD	SURVIVORS FOR INDICATED PERIOD	SURVIVAL RATE %
1 month	98	80	81.6
3 months	97	74	76.3
6 months	95	67	70.5
1 year	93	59	63.4
2 years	93	57	61.3
3 years	84	44	52.3
4 years	78	38	48.7
5 years	68	28	41.2
6 years	60	20	33.3
7 years	54	16	29.6
8 years	50	15	30.0
9 years	40	12	30.0
10 years	33	9	27.3
11 years	29	5	17.2
12 years	22	3	13.6
13 years	20	1	5.0
14 years	16	1	6.3
15 years	11	0	0.0
16 years	10	0	0.0
17 years	6	0	0.0
18 years	5	0	0.0
19 years	2	0	0.0
20 years	1	0	0.0

Figure 1

Graphic representation of the cumulative survival experience of our 98 cases of portal hypertension with esophageal bleeding treated by portasystemic shunts (Table XIV) compared to the calculated survival of a hypothetical general population sample with the same mean age[3] and to the previously published survival experience of 33 nonoperatvie cases after a first hemorrhage from esophageal varices (Baker et al[4]).

do "prophylactic shunts" in good risk patients with portal hypertension and hypersplenism, as has also been recommended by Drapanus.[6] We have not, however, undertaken prophylactic operations to prevent variceal bleeding in the presence of esophageal varices that have been entirely asymptomatic. Nor are we encouraged to do so from the controlled survival figures compiled by Jackson et al[7] or Garceau et al.[8]

Because of the favorable mortality experience with elective shunting procedures, compared to emergency operations (Table V), our current plan of treatment is to use double balloon tamponade for the initial control of esophageal bleeding. This maneuver also aids

in diagnosis as to the source of the hemorrhage; whether variceal or peptic ulcer. Following evaluation, a program is instituted to improve the patient's liver function and category of surgical risk for an elective operation that is ideally scheduled within a few days or weeks. Those patients who continue to bleed in spite of esophageal tamponade or who rebleed after its use for 24 to 48 hours may require an emergency operation in spite of the high risk involved.

Operative mortality (Table V) was adversely affected by poor liver status. Similarly, Hermann et al[5] found a mortality of 17% for good hepatic surgical risks and 48% for those patients with

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poor hepatic function. In the same series, emergency operative mortality was 71%, while the elective mortality was 16%. Although the patients in Hermann's series and our series are not truly comparable, the figures in Tables V and VI also indicate the importance of trying to perform shunts only electively. Grace[9] has further emphasized this. In an extensive review of the literature, he found that the overall emergency operative mortality was 31.8%, while elective mortality was 15.5%.

In view of the almost prohibitive mortality (55.6%) for patients undergoing an emergency operation and classified as Grade III surgical risk, we feel that alternative types of treatment are justified in patients with poor liver function and should be thoroughly in-

vestigated. Selective superior mesenteric arterial infusion with pitressin[10] or portal vein decompression via the umbilical and saphenous vein[11] deserve consideration in selected cases.

Grace[9] found an incidence of postoperative encephalopathy of 22.2% for portacaval shunts and 13.4% for splenorenal shunts. In our series, we found a higher incidence: 60% in the portacaval and 22% in the splenorenal group. The symptoms in our cases varied from mild, transient episodes of dullness, sleepiness or confusion to those severe enough to require diet and medication for control. The disparity in the reported figures for the postoperative incidence of encephalopathy may be partly due to the variable definition of significant encephalopathy.
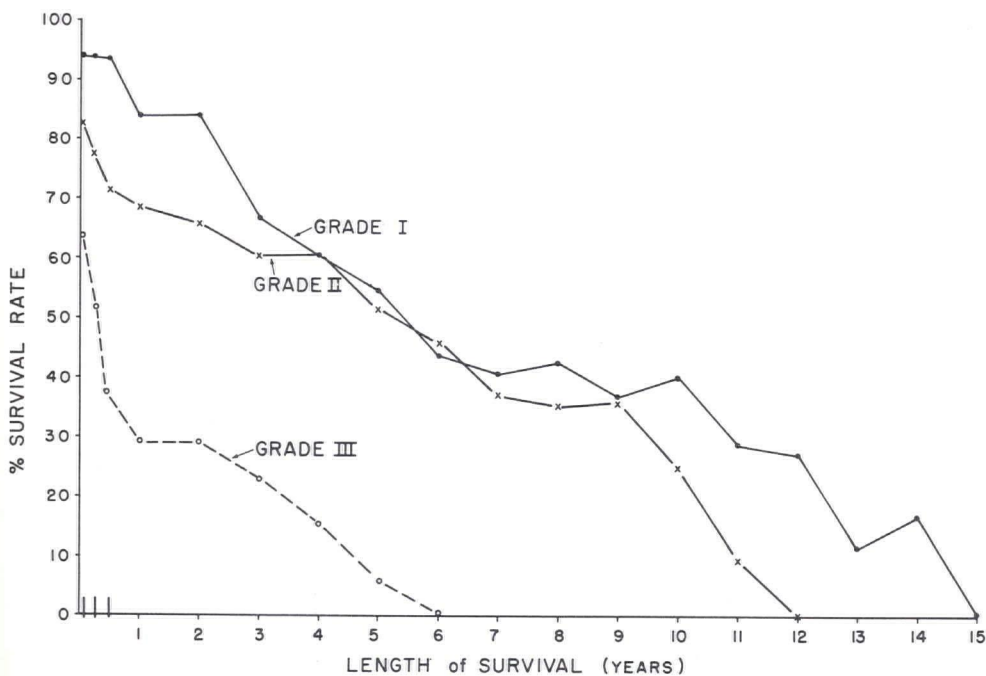

Figure 2

Cumulative survival curves for 32 Grade I cases, 41 Grade II cases and 25 Grade III cases, treated by portasystemic shunting for variceal bleeding (Tables XV, XVI and XVII).

TABLE XV

CUMULATIVE 20 YEAR SURVIVAL OF 32 GRADE I CASES OF PORTAL HYPERTENSION WITH VARICEAL BLEEDING TREATED BY PORTASYSTEMIC SHUNT

PERIOD OF FOLLOW UP	PATIENTS FOLLOWED FOR INDICATED PERIOD	SURVIVORS FOR INDICATED PERIOD	SURVIVAL RATE FOR INDICATED PERIOD (%)
1 month	32	30	93.8
3 months	32	30	93.8
6 months	31	29	93.5
1 year	31	26	83.9
2 years	31	26	83.9
3 years	27	18	66.7
4 years	25	15	60.0
5 years	24	13	54.2
6 years	23	10	43.5
7 years	22	9	40.9
8 years	21	9	42.9
9 years	19	7	36.8
10 years	15	6	40.0
11 years	14	4	28.6
12 years	11	3	27.3
13 years	9	1	11.0
14 years	6	1	16.7
15 years	4	0	0.0
16 years	4	0	0.0
17 years	3	0	0.0
18 years	3	0	0.0
19 years	2	0	0.0
20 years	1	0	0.0

TABLE XVI

CUMULATIVE 20 YEAR SURVIVAL OF 41 GRADE II CASES
OF PORTAL HYPERTENSION WITH VARICEAL BLEEDING
TREATED BY PORTASYSTEMIC SHUNT

PERIOD OF FOLLOW UP	PATIENTS FOLLOWED FOR INDICATED PERIOD	SURVIVORS FOR INDICATED PERIOD	SURVIVAL RATE FOR INDICATED PERIOD (%)
1 month	41	34	82.9
3 months	40	31	77.5
6 months	38	27	71.1
1 year	38	26	68.4
2 years	38	25	65.8
3 years	35	21	60.0
4 years	33	20	60.6
5 years	27	14	51.9
6 years	22	10	45.5
7 years	19	7	36.8
8 years	17	6	35.3
9 years	14	5	35.7
10 years	12	3	25.0
11 years	11	1	9.1
12 years	9	0	0.0
13 years	9	0	0.0
14 years	8	0	0.0
15 years	5	0	0.0
16 years	4	0	0.0
17 years	2	0	0.0
18 years	1	0	0.0
19 years	0	0	0.0
20 years	0	0	0.0

TABLE XVII

CUMULATIVE 20 YEAR SURVIVAL OF 25 GRADE III CASES OF PORTAL HYPERTENSION WITH VARICEAL BLEEDING TREATED BY PORTASYSTEMIC SHUNT

PERIOD OF FOLLOW UP	PATIENTS FOLLOWED FOR INDICATED PERIOD	SURVIVORS FOR INDICATED PERIOD	SURVIVAL RATE FOR INDICATED PERIOD (%)
1 month	25	16	64.0
2 months	25	13	52.0
3 months	24	9	37.5
1 year	24	7	29.2
2 years	24	7	29.2
3 years	22	5	22.7
4 years	20	3	15.0
5 years	17	1	5.9
6 years	15	0	0.0
7 years	13	0	0.0
8 years	12	0	0.0
9 years	7	0	0.0
10 years	6	0	0.0
11 years	4	0	0.0
12 years	2	0	0.0
13 years	2	0	0.0
14 years	2	0	0.0
15 years	2	0	0.0
16 years	2	0	0.0
17 years	1	0	0.0
18 years	1	0	0.0
19 years	0	0	0.0
20 years	0	0	0.0

The incidence of postoperative bleeding (Table XI) compares well with another reported series. Sedgwick[12] found an 8% and a 17% incidence for end-to-side and side-to-side portacaval shunts, respectively, and a 26.5% incidence of recurrent bleeding for splenorenal shunts. It would appear that the splenorenal shunt offers less protection from recurrent bleeding than the portacaval shunt.

The loss of life from operative and late postoperative mortality (Tables VII and XIII) is closely related to hepatic dysfunction. The effect of the degree of liver impairment on cumulative survival experience following portasystemic shunting can also be seen in Figure 2. For obvious practical clinical reasons we have no "control patients" from our own experience. We have, therefore, compared our survival results with a group of 33 patients followed by Baker et al[4] who did not undergo surgical treatment after one episode of bleeding from proven esophageal varices. When the survival curve of these medically-treated patients is plotted (Fig 1), it falls well below the curves for our surgically-treated Grade I and Grade II patients, and somewhat below the curve for patients in the Grade III risk group (Fig 2). Thus, even if all of the cases in Baker's series were considered to be in the Grade III group, there seems to be some advantage to the surgical approach for even the poor risk patient.

Summary and Conclusions

In the Henry Ford Hospital between 1927 and August 31, 1969, 146 operations were performed for the treatment of the complications of portal hyper-tension. Of this group, 114 were portasystemic shunts; five for ascites, 11 for hypersplenism and 98 for bleeding esophageal varices.

A survey of these cases has led to the following conclusions:

1. Ascites associated with liver cirrhosis and portal hypertension is best treated medically.

2. Patients who are reasonable risks requiring splenectomy for secondary hypersplenism with associated portal hypertension and esophageal varices should have concomitant splenorenal shunt if technically possible. This is the only type of prophylactic portasystemic shunt that is recommended where there is no history of bleeding esophageal varices.

3. In patients who have portasystemic shunts performed for bleeding esophageal varices, the operative mortality and long-term survival depends primarily upon their state of liver function and the urgency of the operation.

  a. In Grade I cases, an elective shunt can be offered with good assurance of satisfactory result.

  b. In Grade III patients, an emergency shunt should be avoided if at all possible because of an accompanying mortality rate of over 50%.

  c. Those patients classified in Grade II require a high degree of medical and surgical judgment before an operation is recommended. A vigorous attempt should be made to convert these patients into candidates for elective rather than emergency operations and to bring their liver function to its optimal state prior to any operative intervention.

4. Portacaval shunts (compared to splenorenal shunts) offer greater like-

lihood of continued patency and protection from recurrent bleeding. However, caution must be exercised in the use of portacaval shunts, in patients whose occupations require a high degree of intellectual activity.

5. Caval-mesenteric shunt is excellent in children and selected adults.

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