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Salvage surgery in variceal bleeding due to portal hypertension

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Background: A proportion (10%-15%) of patients with variceal bleeding do not respond to medical management and require surgical intervention. **Methods:** Retrospective analysis of 82 consecutive patients (median age 31 years, range 3-71; 60 male) who underwent salvage surgery for variceal bleeding between 1989 and 2005. **Results:** Immediate control of variceal bleeding was achieved in 78 (95%) patients. Four patients (cirrhosis 3, portal vein block 1) continued to bleed in the postoperative period following gastro-esophageal devascularization (3) or porta-caval shunt (1). Twelve (15%) patients died in hospital; the commonest cause of death (n=7) was liver failure and sepsis leading to multi-system organ failure. The mortality rate was higher among patients who had undergone emergency surgery for active bleeding than among those who had been adequately resuscitated and evaluated prior to surgery (12/45 vs. 0/37; $p < 0.001$). Mortality rate tended to be higher in patients with cirrhosis (overall 10/45 [22%]; Child A 1/9 [11%], Child B 4/20 [20%], Child C 5/16 [31%]) than in those with non-cirrhotic portal hypertension (3/37 [8%]; $p = ns$). **Conclusions:** Our data suggest that salvage surgery is justified in patients with variceal bleed in whom non-surgical measures fail. [*Indian J Gastroenterol* 2007;26:14-17]

Acute bleeding from esophageal varices can usually be controlled with non-surgical methods, such as endoscopic sclerotherapy (EST), endoscopic variceal ligation, balloon tamponade and pharmacotherapy, individually or in combination.¹ However, 10%-15% of patients with portal hypertension bleed from gastric varices after successful obliteration of esophageal varices; such patients respond poorly to non-surgical treatment modalities.³ Transjugular intrahepatic portal-systemic shunt (TIPS) may be used in select patients with a favorable venous anatomy and failed endoscopic and medical measures.⁴ However, emergency surgical consultation is often asked for when these conservative measures fail.

Despite a large number of clinical trials and laboratory studies, decision-making in patients with

variceal hemorrhage remains difficult.⁵ We therefore assessed the outcome of "salvage surgery" in terms of control of bleeding and survival.

Methods

We retrospectively analyzed 82 consecutive unselected patients (median age 31 [range 3-71] years; 60 male) who had undergone emergency or semi-emergency salvage surgery for variceal bleeding between January 1989 and December 2005. The cause of portal hypertension was: cirrhosis in 45 (55%) patients, extrahepatic portal vein obstruction (EHPVO) in 24 (29%) and non-cirrhotic portal fibrosis (NCPF) in 13 (16%) patients. Of those with cirrhosis, 9 were in Child class A, 20 in Child class B and 16 in Child class C at the time of referral for surgery.

Salvage surgery was done because of failure of medical management, which was defined as persistence of bleeding or recurrence of bleeding (within 72 hours) after 2 attempts at endoscopic therapy combined with pharmacological therapy and balloon tamponade, the bleeding being significant enough to affect vital parameters, necessitating more than 2 units of blood transfusion or to reduce hemoglobin level by at least 2 g/dL.

Seventeen patients were operated on during the first bleed and 65 for interval bleed that occurred while on endoscopic sclerotherapy or band ligation program; 24 of the latter patients had received more than 4 sessions of EST. In 17 patients, preoperative status of varices (Table 1) could not be assessed accurately at endoscopy due to brisk bleeding. Four patients had had previous

Table 1: Status of varices before salvage surgery in 65 patients in whom endoscopy was done

Grade of esophageal varices	Status of gastric fundal varices		
	F1	F2	F3
No varices (n=8)	0	5	3
Grade 1 (n=4)	0	3	1
Grade 2 (n=19)	8	2	9
Grade 3 (n=16)	14	2	0
Grade 4 (n=18)	12	4	2

Table 2: Salvage surgical procedures performed

	Emergency (n=47)	Semi-emergency (n=35)
Devascularization (with esophageal transection, n=9)	36	13
Shunt	11	22
Proximal splenorenal shunt	6	13
Porto-caval shunt (Interposition n=12, end-to-side porto-caval n=1)	5	8
Distal splenorenal shunt	0	1

intervention(s): distal spleno-renal shunt (n=2), gastric devascularization (1), lateral pancreaticojejunostomy (1) and TIPS (1).

Selection of the surgical procedure (Table 2) was based on liver function, hemodynamic stability, splenoportal venous anatomy as determined on Doppler scan, and the preference and expertise of the surgeon. Shunt surgery was done in the presence of suitable splenoportal venous anatomy, ectopic varices, hemodynamic stability and relatively good performance status of the patient. It was performed in 10 patients with EHPVO, 10 with NCPF, and 13 with cirrhosis. The type of shunts included proximal spleno-renal shunt (n=19; all with EHPVO or NCPF), and small-diameter (8-mm) interposition portocaval shunt (n=13 [cirrhosis n=12, NCPF n=1]) or distal splenorenal shunt (n=1; with cirrhosis). Esophago-gastric devascularization was performed in 49 patients; this was combined with esophageal transection in 9 patients.

'Emergency surgery' was defined as an operation performed for ongoing active bleeding. 'Semi-emergency surgery' was defined as procedure done after initial resuscitation and temporizing treatment, during the next available routine operating list, but always within the next 24 hours. Forty-seven patients underwent emergency surgery (cirrhosis 30, NCPF 4, EHPVO 13) and 35 underwent semi-emergency surgery (cirrhosis 15, NCPF 9, EHPVO 11).

Statistical analysis was done using SPSS 10 software (SPSS Chicago, IL, USA), and Fisher's exact test; p values of <0.05 were taken as significant.

Results

Control of bleeding

Immediate control of variceal bleeding was achieved in 78 (95%) of the 82 patients. Four patients (cirrhosis 3, EHPVO 1) continued to bleed following

gastro-esophageal devascularization (3) or porta-caval shunt (1); two of these patients died.

Postoperative complications

Deterioration of liver function was seen in 19 of 45 (42%) patients with cirrhosis and 1 of 13 (8%) patients with NCPF.

Ten (12%) patients had recurrent gastrointestinal bleeding in the same hospital admission; it was in the form of altered nasogastric tube aspirate, and did not lead to hemodynamic instability, blood transfusion or surgery in any patient. Three patients had postoperative intra-abdominal bleed; one of these required re-exploration and packing. Four patients had bleeding from multiple sites, due to severely deranged coagulation.

Nine patients had aggravation of liver dysfunction with sepsis leading to multi-system organ failure. One patient had an esophageal suture line leak following gastroesophageal devascularization and esophageal transection (n=9); this was managed conservatively.

Postoperative fever occurred in 32 (39%) patients; in 13 (40%) cases it was related to chest infection. Other complications were: colonic fistula (1), pancreatic fistula (1) and intra-abdominal abscess (4).

Postoperative mortality

Of the 82 patients, 12 (15%) died in hospital. The causes of death were: liver failure combined with sepsis resulting in multi-system organ failure (7), uncontrolled variceal bleed (2), intra-abdominal bleed (2) and pulmonary aspiration (1).

The mortality rates were higher in patients with cirrhosis (10/45 [22%]; including Child A 1/9 [11%], Child B 4/20 [20%], and Child C 5/16 [31%]); it was 1/13 (8%) in NCPF and 1/24 (4%) in EHPVO. The patient in the EHPVO group who died had received massive blood transfusion and had undergone unsuccessful devascularization procedure elsewhere before referral to us; she died soon after surgery due to continued bleeding. The patient in the NCPF group died of liver failure. Mortality was higher in the cirrhosis group as compared to non-cirrhotic portal hypertension (p=0.193), and in Child's B and C as compared with Child's A (p=0.28), though these differences were not significant.

The mortality rate was higher after 'emergency surgery' (12/47, 26%) than after 'semi-emergency surgery' (0/35; p<0.001). The mortal-

Table 3: Etiology of portal hypertension, surgical procedures and mortality (in parenthesis)

Etiology	Devascularization	Shunt	Total
Cirrhosis	32 (9)	13 (1)	45 (10)
Child A	5 (1)	4	9 (1)
Child B	13 (4)	7	20 (4)
Child C	14 (4)	2 (1)	16 (5)
NCPF	4 (0)	9 (1)	13 (1)
EHPVO	13 (1)	11(0)	24 (1)
Total	49 (10)	33 (2)	82 (12)

EHPVO: extrahepatic portal vein obstruction; NCPF: non-cirrhotic portal hypertension

ity rates were similar with shunt procedures (2/33 [6%]) and non-shunt procedures (10/49 [20%]; p=0.11) (Table 3).

Discussion

In the present study, immediate control of bleeding was achieved in 95% of cases. This is comparable to that reported in other series on emergency porto-caval shunts or esophago-gastric devascularization.^{2,6} Overall in-hospital mortality rate was 15%, and the mortality rate in Child's B or C cirrhosis was not different from that in Child's A cirrhosis and non-cirrhotic portal hypertension. Mortality is dependent on pre-existing liver function status.^{2,6,7} A higher mortality following devascularization than after a shunt procedure reflects a selection bias since only relatively good-risk patients are selected for shunt procedure. In our study, the mortality rate was higher in those patients who needed emergency surgery. In fact, an overall 85% survival and a 69% survival in patients with Child C cirrhosis is encouraging. Our observation is substantiated by the results of a prospective study of 400 unselected Child's C patients with acute variceal bleed who underwent emergency porto-caval shunts⁶ with 75% and 70% 30-day and 5-year survival rates, respectively, without liver transplant. However, in other series,² postoperative mortality rate has been as high as 80% in patients with Child class C.

Though most patients with NCPF have well-preserved liver function,⁸ nearly 10% have poor liver function with mild jaundice, ascites or low serum albumin.⁹ Surgical mortality after emergency shunt for acute variceal bleed in NCPF has been reported to be 10%,⁸ and this has been corroborated in our study.

The surgical options for the control of acute variceal bleeding are porto-systemic shunt or a non-shunt procedure. Whereas shunt surgery, particularly distal spleno-renal shunt, is preferred in

elective situation,^{10,11} non-shunt procedures are used primarily for emergency control of bleeding.^{2,7} Shunt procedures are not popular in the emergency setting because of need for time-consuming preoperative delineation of venous anatomy, longer operating time, greater technical expertise, and higher rates of shunt thrombosis and encephalopathy.^{7,11,12,13} In experienced hands, however, these procedures have high immediate and long-term bleed control rates, leading to benefits in terms of survival and quality of life.^{6,14} Orloff *et al*⁶ reported 0.5% incidence of shunt thrombosis and 99% immediate and permanent control of variceal bleed. The survival rate at 30 days was 81%, and 8% had recurrent encephalopathy.

Esophago-gastric devascularization procedures have been particularly advocated in the emergency setting. These procedures are essential when a shunable vein is not available, as happens in 10%-20% of patients with EHPVO. Whereas studies from the West have reported a relatively high rebleed rate after such procedures, Mathur *et al*² reported immediate bleed control in 100% of patients; 6% of their patients rebled at 33 months. In the present series, immediate control of bleeding was achieved in 95% of patients; four patients had uncontrolled bleed despite surgery, including one with shunt surgery and three with devascularization. The lower early postoperative mortality in Child's class C patients in our study than those in other series^{2,16} could perhaps be explained by very few esophageal transections in the esophago-gastric devascularization group. Our data may be somewhat biased because of exclusion of some patients who declined surgery for financial reasons. We do not have data on such patients, because of the retrospective nature of our analysis. Only nine patients underwent TIPS in our hospital during the study period.

To conclude, salvage surgery is indicated in patients with acute variceal bleeding who do not respond to pharmacological, endoscopic and interventional radiological procedures. The choice of procedure is dictated by the underlying hepatic reserve, the hemodynamic status of the patient, the venous anatomy and the technical expertise of the surgeon. The outcome is better if the patient can be operated upon after stabilization.

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