

Band Ligation Vs Endoscopic Sclerotherapy in Esophageal Varices: A Prospective Randomized Comparison

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Abstract

Objective: A prospective randomized trial was conducted to compare efficacy, safety and complications of band ligation (BL) with sclerotherapy (Scl).

Methods: Patients with esophageal variceal bleeding were randomized into two study groups. BL (group A) was done in 28 patients whereas 30 patients (group B) had Scl. After initial treatment, follow-up sessions were repeated by the same method every two weeks till obliteration or reduction to grade 1. Subsequent sessions of endoscopy were done every three months, same procedure was repeated for recurrence of varices and for any episode of rebleeding.

Results: Initial control of bleeding by Scl was achieved in 22 of 28 patients (78%) and in 23 of 24 patients (96%) with BL. Eradication of varices was significantly better achieved in BL group, with less treatment sessions required in Group A as compared with group B 2 ± 1.2 vs 5 ± 2.5 , $P < 0.001$). Major complications (3% vs 16%, $P < 0.05$) as well as mortality (11% vs 21%, $P > 0.05$) was higher in group B.

Conclusion: Band ligation was more effective mode of treatment and was associated with lesser early mortality and complications as compared with sclerotherapy (JPMA 48:192,1998).

Introduction

Variceal bleeding is a life threatening complication of portal hypertension, cirrhosis being the most important cause in Pakistan¹. About 30% patients with liver cirrhosis get variceal bleeding with a 40% mortality following the first episode. Seventy percent of survivors get second episode of bleeding within one year². Therapeutic endoscopy is effective in the management of upper GI bleeding³, whose primary goal is to control active bleeding and prevent recurrent bleeding thus reducing the morbidity and mortality. Sclerotherapy, over the last five decades, has been found effective in controlling active bleeding and reducing recurrent bleeding⁴⁻⁶. It, however, requires multiple sessions to achieve eradication with frequent sclerotherapy failures and several local and systemic complications⁷⁻⁹. Some fatal complications, i.e., esophageal perforation and mediastinitis have been reported^{10,11}. During sclerotherapy, the sclerosant injected into the varices is responsible for most of the major systemic complications.

Band ligation, a new modality of treatment was devised to reduce the possibility of these complications¹². In band ligation, the obliteration of varices is due to mechanical strangulation of varices. As no chemical is introduced into the circulation, therefore, it is considered to be superior in efficacy and associated with fewer complications¹³. We conducted a prospective randomized trial to compare band ligation with sclerotherapy regarding their efficacy, safety and complications.

Patients and Methods

Patients with esophageal variceal bleeding were included consecutively in this prospective, randomized

study.

Inclusion criteria were: patients more than 18 years of age, with endoscopic evidence of variceal bleeding. Patients with liver cirrhosis and non-cirrhotic portal hypertension were included in the study. It also included those who had received octreotide (sandostatin), balloon tamponade therapy and beta blockers. Beta-blockers were however, not continued during the study. Exclusion criteria were: patients unfit for endoscopy, esophageal stricture, associated disease with death expected within six months, previous history of endoscopic or surgical treatment of varices. Informed consent was obtained from all patients or their guardians. Randomization was done by sealed envelopes into Group A (BL) and group B (Sc!).

Actively bleeding patients were admitted and those with history of recent bleeding were treated as outpatients. Initial management was carried out within twelve hours of onset of bleeding after resuscitation or apparent stoppage of bleeding. Treatment sessions were repeated every 2 weeks till the eradication of varices. Subsequent follow-up endoscopy was done every 3 months or for any episode of rebleeding. Recurrent varices or bleeding was treated with originally assigned form of endoscopic therapy. Patients were also randomized further in each group to either receive sucralfate or omeprazole. In case of treatment failure alternative procedure was done, oilier life saving measures, e.g., sengstaken blakemore tube (SB tube) placement, use of ocireotide, or shunt surgery was considered in case the bleeding was not control led.

Grading of the varices was done from 1-4 as described earlier¹⁴. In sclerotherapy group, 75% alcohol was, injected either paravariccal ly or nt ravariceally. Injections were started at or near gastroesophageal (GE) junction and confined to distal 8 cm of the esophagus and proximal 1-2 cm of stomach. Aliquot of 2 ml of sclerosant was injected at each site but not more than 20ml during each session. Injection sclerotherapy was rendered at a site distal to actively bleeding varix initially prior to finishing the session.

Band ligation was performed with an endoscopic ligation device and overiube (Bard International Products Tewsbury, Mass.) as previously described¹⁵. Individual varices were ligated at least once per treatment, whereas, larger varices twice at separate sites, but no more than 10 ligations were performed during one session. In patients with active bleeding, ligation was performed at or around the site of bleeding to control haemorrhage, followed by ligation of rest of the varices.

Severity of cirrhosis was assessed according to Child Pugh's classification¹⁶. Other variables noted were, stay in the hospital (in days), number of blood transfusions, use of SB. tube, use of sandostatin and of other medications, i.e., sucralfate or omeprazole. Outcome evaluation included initial control of bleeding, rebleeding, variceal eradication, number of sessions required for obliteration of varices, recurrence of varices, complications and mortality. Instructions were given to report immediately to the accident emergency or G.I. department, in case of bleeding or occurrence of other complications. i.e; dyspnoea. chest pain, high grade fever and drowsiness.

Statistical Analysis

Student's t-Lest was used to compare the means of continuous variables. Nominal values were compared with comparison of proportion. e.g., hemostasis. recurrence of varices, recurrent bleeding, obliteration of varices. complications and mortality. Kaplan—Mcier analysis was used to examine the time to death and the log rank test was used to compare difference between groups.

Results

Seventy patients were enrolled in the study from January, 1996 to February, 1997, 12 were excluded. Seven of these had hepatocellular carcinoma and 5 were lost to follow up. Fifty- eight patients

completed the study, 28 in group A and 30 in group B. Baseline clinical amid endoscopic characteristics were similar (Table I).

Table I. Clinical characteristics in patients treated with endoscopic variceal sclerotherapy or band ligation for bleeding esophageal varices*

Characteristics	Group A (BL) (n=28)	Group B (Scl) (n=30)
Mean Age (Yrs)	50±13	54±12
Sex M/F	20/8	17/13
Cirrhosis	27	30
HBV virus	5	7
HCV virus	18	21
Both	1	-
Idiopathic	2	2
Non cirrhotic	1	-
Child Pugh class		
A	5	6
B	18	21
C	3	4
Grades of varices		
Grade 4	14	15
Grade 3	10	11
Grade 2	4	4
Blood transfusion for Index episode	3.24	3.9
Stay in hospital (days)	4.96±2.58	6.10±1.70
Follow-up (days)	175±120	150±110

* Plus minus value indicates mean±SD.

All patients were cirrhotic except one in group A. Hepatitis C virus in 39(67%), hepatitis B in 12 (20%) and both B and C in one (2%), was associated with cirrhosis. Majority of patients in both groups belonged to child-pugh class B, (65%A, vs 70%B) and had high grade (grade 3 and 4) varices (86%A vs 87%B). Results were comparable regarding requirement of blood transfusion and hospitalization: mean duration of follow-up was 175±120 days in group A and 150±110 days in group B (Table I). Fifteen patients of group A and 7 of group B had history of previous bleeding, whereas 24 (86%) of group A and 28(93%) of group B (Scl) were actively bleeding at presentation. Two patients had spurting varix which when ligated, immediately stopped bleeding. Hemostasis in acute bleeding, although better achieved in group A, did not reach statistical significance (96% vs 78%. P>0.05) (Table II).

Recurrent bleeding was seen in similar percentage of patients (29% vs 28%, $P > 0.05$) in both groups. Esophageal varices and treatment induced ulcers were the source of rebleeding in both groups (Table II).

Table II. Control of bleeding, rate of recurrent bleeding, and eradication of esophageal varices in patients treated with endoscopic sclerotherapy or band ligation*

Characteristics	Group A (BL) (n=28)		Group B (Scl) (n=30)		P value
	n	(%)	n	(%)	
Active bleeding	24	86	28	93	NS
Hemostasis achieved	23	96	22	78	NS
Eradication	26	93	20	66	<0.005
Treatment sessions	2±1.2		5±2.5		<0.001
Recurrent varices	5	20	3	14	NS
Recurrent bleeding	8	29	7	28	NS
Esophageal varices	3		4		NS
Treatment induced ulcers	4		3		NS
Gastric varices	-		-		
Undetermined	1		-		

*Value less than 0.05 is significant. NS (not significant).

Plus minus value indicates mean±SD.

There was no definite correlation between the incidence of recurrence of bleeding and the severity of liver disease. Eradication of varices was achieved in greater number of patients belonging to group A (93% vs 67%, $P < 0.005$) and mean treatment sessions required for obliteration of varices were less in group A as compared with group B (2±1.2 vs 5±2.5, $P < 0.001$) (Table II).

Mirror complications of chest pain, fever and transient dysphagia were seen in both groups, chest pain and fever was significantly more in Group B. Transient odynophagia was experienced in 50% of group A and none in group B. Sixteen patients in group A and 19 in group B had esophageal ulcers that were the cause of rebleeding in 3 patients in group A and 4 patients in group B (Table III).

Table III. Complications associated with the use of endoscopic sclerotherapy and endoscopic ligation*.

Complications	Group A (BL)		Group B (Scl)		P Value
	n	%	n	%	
Chest pain	6	22	22	73	<0.05
Fever	2	7	9	30	<0.05
Ulcer	12	43	16	49	NS
Bleeding ulcer	4	14	3	10	NS
Dysphagia	3	11	4	13	NS
Odynophagia	14	50	-		<0.01
Encephalopathy	-		4	13	0.05
SBP	-		1	3	NS
Perforation	-		-		-
Stricture	-		-		-
Mortality	3	11	6	21	NS

* Value less than 0.05 is significant. NS = not significant.

In group A major complications were, aspiration pneumonia in 1 (3%), whereas in group B encephalopathy in 4 (13%) and bacterial peritonitis in 1 (3%) case was seen. Stricture, esophageal perforation or pleural effusion was not seen in either group (Table IV).

Table IV. Comparison of rate of rebleeding and occurrence of ulcers in patients treated with prophylactic omeprazole and sucralfate after band ligation or sclerotherapy*.

Characteristics	Group A (BL)		Group B (Scl)		P value
	Omeprazole#	Sucralfate*	Omeprazole	Sucralfate	
Recurrent bleeding	3	4	1	5	NS
Ulcers	4	4	2	4	NS

* Value less than 0.05 is significant. NS = not significant

#Omeprazole * Sucralfate

Three (11%) of group A and 6(21%) of group B patients died during follow-up. All patients in group A died of uncontrolled bleeding within 30 days of treatment and belonged to Child Pugh class C, 2 had bleeding ulcers and in 1 cause of bleeding could not be determined. Of six patients who died in group B, 4 belonged to Child Pugh class C and the rest to child Pugh class B. Causes of death were hepatic

encephalopathy in 2, SBP in 1 and uncontrolled bleeding in 3 patients.

Discussion

Variceal band ligation has been compared with sclerotherapy in large randomised trials^{17,18}. Post necrotic cirrhosis due to chronic viral hepatitis was the commonest cause of variceal bleeding in our patients as had been shown by studies from China^{19,20} whereas commonest cause was alcoholic cirrhosis in the USA and the Europe^{17,18}. Control of active bleeding was effectively achieved in both groups, the results were comparable to other studies^{15,21,22}.

Recurrent bleeding rate was comparable in both groups; esophageal varices and bleeding ulcers were responsible in equal proportions. Rebleeding rate in group A (BL) as seen in our study was similar to that reported by others^{15,18,20} but higher rebleeding rates were seen with sclerotherapy^{15,18,19}. Jensen et al, reported rebleeding rates of 30% Vs 35% in their patients receiving band ligation and sclerotherapy respectively, these results are similar to our study²¹.

Rapid obliteration of varices with lesser number of sessions seen in band ligation in our study corroborates well with previous reports^{1,20}. Recurrence of varices in band ligation and sclerotherapy did not have statistical difference, although increased recurrence in band ligation was seen by Hou et al²⁰. Others have reported a variable recurrence rate of 20% - 68% after initial eradication with sclerotherapy²³⁻²⁵. Stiegmann et al, over a follow-up of 10 months, reported recurrence rate of 50% in Scl group and 33% in BL group¹⁵.

Frequency of treatment induced complications in band ligation were significantly lower as compared with sclerotherapy, mild chest pain and transient fever were significantly more in sclerotherapy. These findings were similar as previously reported²⁶⁻²⁷. An equal percentage of patients developed ulcers in both groups of our study. Others have found higher incidence when endoscopy was repeated earlier, e.g., 70% at 1 week and 30% at two week intervals⁹. Type of ulcers was different in two groups, superficial, shallow ulcers in band ligation whereas deep linear ulcers in sclerotherapy group, others have reported similar findings³⁰. Results of prophylactic use of medications, omeprazole and sucralfate, were similar regarding occurrence of ulcers and rebleeding (Table IV). Major complications were seen mostly with sclerotherapy, i.e., encephalopathy, bacterial peritonitis, as compared to aspiration pneumonia in band ligation. Similar results were reported previously by other workers^{16,17}. No patient had stricture or perforation in either group. Similar observations were made by Gimson et al, who attributed it to regular use of prophylactic sucralfate. We found no statistical difference in prophylactic use of sucralfate or omeprazole in our study. Sucralfate³¹ and ranitidine³² have been found to decrease the incidence of bleeding ulcers and stricture formation.

Survival, although not statistically significant, was better in band ligation (Figure).

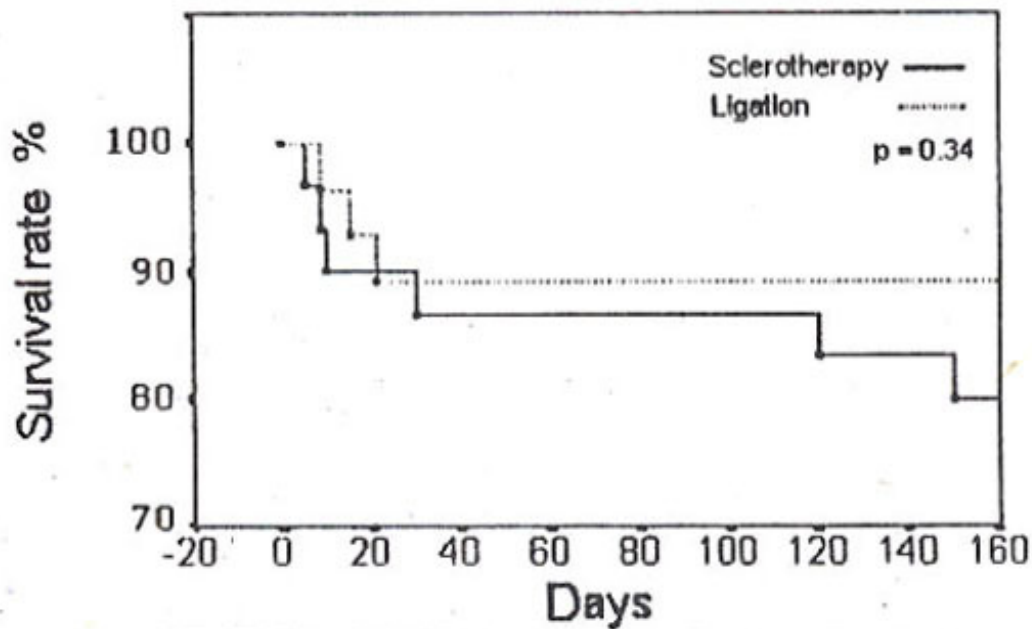


Figure. Survival in patients with cirrhosis and esophageal variceal bleeding treated with esophageal variceal sclerotherapy and band ligation. The difference between groups was not statistically significant ($P = 0.34$).

All deaths in this group occurred in child C patients due to uncontrolled bleeding and these were within 1 month of initiating treatment. None died due to procedure related complications, although this has been reported in some studies^{16,17}.

This study showed that band ligation was significantly superior to sclerotherapy in esophageal variceal bleeding in terms of lower number of sessions required for obliteration and lesser complications induced by it. These observations in this short term study are indicative of a definitive promising role of band ligation in the armamentarium for treatment of esophageal variceal bleeding.

Acknowledgments

We thank Dr. Abdul Harneed and Dr. Ashraf Chaudhary for statistical assistance and Mr. Rashid for typing the manuscript.

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