Original Article

Outcome of Esophageal Variceal Ligation in Cirrhotic Patients: Experience in a Tertiary Care Hospital in Dhaka

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Abstract:

Background: *Bleeding from esophageal varices in cirrhosis is an emergency condition. Esophageal varices band ligation has shown better results in terms of variceal obliteration as well as having fewer side effects like ulceration, perforation and stricture formation.*

Methods: *This observational study was conducted at the gastroenterology department of BIRDEM general hospital, from September 2014 to March 2015. Subjects were eligible if they had a diagnosis of cirrhosis based on history, physical examination, biochemical parameters and presence of esophageal varices in upper gastrointestinal endoscopy. All patients were tested to determine the cause of liver cirrhosis. All patients under-went upper gastrointestinal endoscopy after consent. Esophageal variceal ligation was done at appropriate situation and patients were followed up later on. SPSS 23 was used for statistical analysis.*

Results: *The sample size was 69. The cumulative mean age was 55.58±14.462 years (range: 20-90), with gender-based mean age of 54.76±15.704 years for males and 57.22±11.739 years for female. Mild portal hypertensive gastropathy (PHG) was found 31 (44.9%) patient and severe PHG 36 (52.2%). Patients were followed up for mean period of 8.52±3.6 months. Variceal obliteration was achieved in 25 (36.2%) patients, while 06 (8.7%) cases developed re-bleeding during the study period and this type of patients were managed by other modalities or combination therapies. Recurrence of varices occurred in 13 (18.8%). 25 (36.2%) patients reduction of varix size occured after esophageal variceal ligation (EVL), 32 (46.4%) required second session and 12 (17.4%) required more than second session (Table-2). Thirty nine (56.5%) patients experienced minor adverse events like GI discomfort (retrosternal pain or dysphagia), while severe adverse events were noticed in 13 (18.8%) patients. Fundal varix was found among 8 (11.6%) patient on follow up endoscopy and GAVE found in 6 (8.69%) patients. All patient developed PHG during follow up endoscopy.*

Conclusion: *Band ligation eradicates esophageal varices with less complications and a lower re-bleeding rate, but at the same time eradication is associated with more frequent development of PHG and fundal varices.*

Key words: *Esophageal varix, Cirrhosis, Outcome.*

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Introduction

Variceal hemorrhage, hepatic encephalopathy, and ascites - the major complications of cirrhosis of the liver, result from portal hypertension. Complications of portal hypertension rank among the top leading causes of death in cirrhosis of liver worldwide.[1] Bleeding from esophagogastric varices in cirrhosis is an emergency condition with high mortality.[2-4] Approximately half of patients with cirrhosis have esophageal varices, and one-third of all patients with varices will develop variceal hemorrhage, a major cause of morbidity and mortality in patients with cirrhosis. [5, 6]The risk of hemorrhage

has been related to the size and appearance of the varices, as well as the degree of hepatic dysfunction. Despite substantial improvements in the early diagnosis and treatment of variceal hemorrhage, the mortality from variceal hemorrhage remains high (20%-35%).[7-9] The 6-week mortality with each episode of variceal hemorrhage is approximately 15 to 20%, ranging from 0% among patients with Child class A disease to approximately 30% among patients with Child class C disease. [10-13] In recent years, application of endoscopic hemostasis has reduced the mortality rate from variceal hemorrhage.[14] Endoscopic sclerotherapy has largely been replaced by endoscopic band ligation, except when poor visualization precludes effective band ligation of bleeding varices. Available evidence does not support emergency sclerotherapy as first line treatment of variceal bleeding.[15] Esophageal varices band ligation has shown better results in terms of variceal obliteration as well as having fewer side effects like ulceration, perforation and stricture formation than sclerotherapy.[16] However, with increasing use of esophageal variceal ligation (EVL) and sclerotherapy for oesophageal varices, the incidence of fundal varices has increased. In addition, studies have shown that the degree of portal hypertensive gastropathy (PHG) has also shown a worsening trend after the introduction of therapeutic endoscopic interventions for esophageal varices.[17]

In view of excellent results of band ligation as far as obliteration of esophageal varices is concerned, its effect on development of fundal varices and PHG has raised concern among endoscopists. The aim of the current study was to assess the over-all outcome of band ligation in esophageal varices in terms of their eradication, recurrence and re-bleeding in addition to its effect on PHG and fundal varices.

Methods

This observational study was conducted at the gastroenterology department of BIRDEM general hospital, from September 2014 to March 2015. Subjects were eligible if they had a diagnosis of cirrhosis based on history, clinical examination, and biochemical parameters and with esophageal varices presented either due to acute upper GI bleeding or for follow-up. Non-purposive convenient sampling technique was used to enroll the patients. Following detailed history and physical examination, patient's previous medical records were reviewed for etiology of cirrhosis, finding in the first endoscopy, if any, then number of endoscopies till date, and the number of band ligation sessions required for the complete disappearance or eradication of varices. All these patients underwent upper GI endoscopy after informed consent to look for the presence and degree of esophageal varices and PHG. All endoscopies were performed in a single endoscopy unit, using an Olympus video endoscope GIF 160. Esophageal varices might be small and straight (grade I), tortuous and occupying less than one third of the esophageal lumen (grade II), or large and occupying more than one third of the esophageal lumen (grade III). The size of the varices in the lower third of the esophagus was the most important and it was determined during withdrawal of the endoscope.[18, 19]

The diagnosis of PHG was based on the presence of a characteristic mosaic-like pattern of the gastric mucosa on endoscopic examination. This pattern was characterized by small polygonal areas with a depressed border. Superimposed on this mosaic-like pattern might be red point lesions that were usually greater than 2 mm in diameter. PHG was considered mild when only a mosaic-like pattern was present and severe when superimposed discrete red spots were also seen.[20]

Variceal ligations were performed at 1 month intervals until eradication. Successful variceal eradication was defined as the absence of ligable esophageal varices. During each session, up to 7 bands were placed beginning in the distal esophagus using a multiband ligation device (six shooter; Wilson-Cook Inc., Winston-Salem, NC or Speedband; Boston Scientific, Inc., Natick, MA). Minor adverse events included GI discomfort (retrosternal pain or dysphagia). Severe adverse events included bleeding and death.

The primary outcome was variceal obliteration which was defined as the complete disappearance of

esophageal varices or when the sizes of esophageal varices were too small to be ligated.[20] Secondary outcomes like rebleeding, recurrence of esophageal varices and minor or major adverse events of EVL procedure were assessed along with its effects on PHG.

Recurrence of esophageal varices was defined as re-appearance of esophageal varices or enlargement of previous small-size varices that became accessible by EVL.[21] Rebleeding from esophageal varices was defined as the presence of hematemesis and/or melaena and the bleeding site was identified to be from esophageal varices by emergency endoscopy.[22] Only those who had a drop in hemoglobin and needed a blood transfusion of 2 or more units were considered to be re-bleeding. When recurrent esophageal varices or re-bleeding from esophageal varices were encountered, repeated sessions of EVL were performed until the varices were obliterated once again. After treatment, response rate to treatment, re-bleeding rates, recurrences, effects on PHG, fundal varices and adverse events were evaluated and recorded on a predesigned proforma. Patients who developed re-bleeding were admitted and treated with adjuvant vasoactive treatment and/or blood transfusion was offered whenever needed.

Statistical analysis was performed using SPSS 23. Descriptive analysis was performed for demographic and clinical features, and results were presented as mean ± standard deviation for quantitative variables and frequencies (percentages) for qualitative variables.

Ethical clearance

It was taken from ethical committee of Bangladesh Diabetic Samity. Informed written consent had been taken from every patient prior to data collection.

Operational definitions

Cirrhosis of liver

Imaging and/or histopathological evidence of cirrhosis of liver with clinical features suggestive of cirrhosis of liver.

Results

Out of total 69 patients most (66.7%) were male. The mean age was 55.58±14.462 years (range: 20-90). Mild PHG was found 31 (44.9%) patient and severe PHG 36 (52.2%) (Table-1I). Patients were followed up for mean period of 8.52±3.6 months. Variceal obliteration was achieved in 25 (36.2%) patients, while 06 (8.7%) cases developed re-bleeding during the study period and this type of patients were managed by other modalities or combination therapies. Recurrence of varices occurred in 13 (18.8%). 25 (36.2%) patients reduction of varix size occured after EVL, 32 (46.4%) required second session and 12 (17.4%) required more than second session (Table-III). Thirty nine (56.5%) patients experienced minor adverse events like GI discomfort (retrosternal pain or dysphagia), while severe adverse events were noticed in 13 (18.8%) patients. Fundal varix was found among 8 (11.6%) patient on follow up endoscopy and GAVE found in 6 (8.69%) patients (Table-III). All patient developed PHG during follow up endoscopy.

Table I Grading of esophageal varices[18,19]

Progression of gastrointestinal varices can be determined on the basis of the size classification at the time of esophagogastroduodenoscopy (EGD).

Size of varix	Two-size classification	Three-size classification
Small	< 5 mm	Minimally elevated veins above the esophageal mucosal surface.
Medium	-	Tortuous veins occupying less than one-third of the esophageal lumen
Large	> 5 mm	Occupying more than one-third of the esophageal lumen.

Table II Baseline characteristics of study populations (N=69)

Variable	Value
Age (Years)	55.58±14.462
Gender, n (%)	
Male	46 (66.7)
Female	23 (33.3)
Etiology of cirrhosis, n(%)	
Hepatitis B	11 (15.9)
Hepatitis C	14 (20.3)
Hepatitis B+C	00 (0)
Other	44 (63.8)
Child-Pugh Class n(%)	
A	00 (0)
B	38 (55.1)
C	31 (44.9)
Bilirubin (mg/dl)	1.736±0.80
Albumin (g/L)	23.25±6.14
Platelet count (/cmm)	75043.48±49856.39
Prothrombin time (INR)	1.55±0.42
Esophageal Varices, n (%)	
Small	00(0)
Medium	19 (27.5)
Large	50 (72.5)
Portal Hypertensive Gastropathy, n(%)	
Mild	31 (44.9)
Severe	36 (52.2)
Not present	02 (2.90)

Table III Outcome of esophageal varices after band ligation (N=69)

Outcome	Values
Obliteration, n (%)	25 (36.2)
Recurrence, n (%)	13 (18.8)
Re-bleeding, n(%)	06 (8.7)
Reduction of size, n (%)	25 (36.2)

Table IV Session of esophageal variceal ligation needed in study populations (N=69)

Session of EVL, n (%)	Values
First session	25 (36.2)
Second session	32 (46.4)
>2nd session	12 (17.4)

*EVL, Endoscopic variceal ligation

Table V Adverse events followed by esophageal variceal ligation (N=69)

Adverse events	Values
Mild events	39 (56.5)
Severe events	13 (18.8)
No events	17 (24.6)

Table VI Other complications and mean period of follow up (N=69)

Other complications and mean period of follow up	Values
GAVE n (%)	6 (8.69)
Fundal varix on follow upmendoscopy n (%)	8 (11.6)
PHG, n (%) on follow up endoscopy	69 (100)
Mean period of follow up (Months)	8.52±3.6

* GAVE, Gastric antral vascular ectasia; PHG, Portal hypertensive gastropathy

Discussion

The current study prospectively assessed the overall outcome of EVL in the eradication of esophageal varices secondary to liver cirrhosis. During the study it was found that variceal obliteration was achieved in 25 (36.2%) and 25 (36.2%) patients achieved reduction of varix size after EVL (Table III). Endoscopic variceal ligation (EVL) was developed in an effort to find an effective means of treating esophageal varices endoscopically with fewer complications than endoscopic sclerotherapy (ES).[23, 24, 25, 26] EVL works by capturing all or part of a varix resulting in occlusion from thrombosis. The tissue then necrosis and sloughs off in a few days to weeks, leaving a superficial mucosal ulceration, which rapidly heals. EVL avoids the use of sclerosant and thus eliminates the deep damage to the esophageal wall that occurs after endoscopic sclerotherapy (ES). Collateral vessels near the cardia decrease after EVL and it may promote the development of deep gastric collaterals. These factors may also contribute to the effectiveness of EVL for preventing further variceal bleeding.[27, 28]Another interesting finding is that during acute variceal bleeding, the hepatic venous pressure gradient (which correlates with the risk of variceal bleeding) increases after ES, but not after

EVL. [29]In this study only 06 (8.7%) patients developed rebleeding and recurrence of varices occurred in 13 (18.8%) (Table III). The incidence of rebleeding after EVL in different study showed about 20%. Early rebleeding after EVL is affected by many clinical, laboratory, ultrasonographic and endoscopic parameters. The most prominent of them are spontaneous bacterial peritonitis (SBP), splenomegaly, the presence of collaterals, anemia, more decompensated cirrhosis and the presence of large varices with red signs. [30] There are no absolute restrictions on coagulation parameters that preclude performing EVL, although in patients with active bleeding, attempts should be made to improve the coagulation status.[31]

In this study most of the patients achieved variceal obliteration after first or second session of EVL, only 17.4% patient required more than second session (Table IV). It suggested that, variceal eradication was achieved with a lower number of endoscopic sessions with EVL than with sclerotherapy, although variceal recurrence was more frequent.[32]These suggestions emphasize the fact that there is no role for sclerotherapy as the first-line therapy in the current era. Severe adverse event like bleeding occurred following EVL only 18.8% (Table V) patients which was less than ES (Rebleeding 46.6%).[33] Beside the beneficial effect in obliteration of varices by EVL, it has shown disappointing results on PHG and fundal varices (Table VI). It may be due to the altered hemodynamic status following band ligation.[34] Many studies found that EVL makes the gastric mucosa more congestive soon after the procedure.[35, 36] This finding was also supported by a study which reported that portal pressure gradient was increased after the obliteration of varices.[37] Furthermore, this raised pressure resulted in worsening of PHG and the development of fundal varices, although there were reports that despite the worsening of PHG and the development of fundal varices, there was no change in portal pressure with either sclerotherapy or EVl.[38]

Variceal obliteration in cirrhotic patients varies with certain factors. Patients surviving a first episode of variceal bleeding have over a 60% risk of recurrence. Because of this, all patients surviving a variceal bleeding should receive active treatments for the prevention of rebleeding.[39] EVL has significantly reduced the frequency of variceal re-bleeding, mortality and complications, and has replaced endoscopic injection sclerotherapy as the first line therapy in the prevention of esophageal variceal rebleeding.[40]

There were mainly two limitations of our study; first, it was a single-centre study with a limited sample size and follow-up (around one year). Data needed further evaluation on a larger scale and over a longer follow-up duration; second, it was a single-arm study (only the outcome of band ligation) and so not comparable to other available options for esophageal varices like oral drugs, endoscopic sclerotherapy or their combination.

Conclusion

Band ligation eradicated esophageal varices with less complications and a lower re-bleeding rate, but at the same time eradication was associated with more frequent development of PHG and fundal varices.

Conflict of interest: Nothing to declare.

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